Peep Learning Together Programme

Evaluation Report

February 2020

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Sarah Miller, Laura Dunne, Aimee Smith and Abby Laishley.

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About the evaluator

The project was independently evaluated by a team from Queen's University Belfast: Dr Sarah Miller, Dr Laura Dunne, Dr Abby Laishley and Dr Aimee Smith.

The evaluation team was led by Dr Sarah Miller who was responsible for overseeing all aspects of the design, allocation, and the analysis and write-up of the data. Dr Laura Dunne led the coordination of researchers and collation of the data, also contributing to report writing. Dr Abby Laishley and Dr Aimee Smith managed the day-to-day running of evaluation events, communicating with practitioners and the Peeple project delivery team, arranging outcome data collection, and organising the process evaluation activities.

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Executive summary

The project

The Peep Learning Together Programme, developed by Peeple, aimed to improve parenting skills and the quality of the home learning environment in the early years (nursery pupils of three to four years old) to promote positive long-term academic and social change for children and their parents.

The version of the Programme evaluated by this study (Peep-LTS) consisted of an initial home visit, then 20 weekly one-hour sessions held in the nursery setting, delivered by nursery practitioners and attended by parents and their child. The sessions provided parents with background information about how children learn and practical ideas and activities to help parents build on what they were already doing at home to make the most of everyday learning opportunities including listening, talking, playing, singing, and sharing books and stories.

The Programme was evaluated via a cluster randomised controlled trial to assess effectiveness in improving language and literacy in the early years and explore the impact on the home learning environment and parental skills. The research team undertook semi-structured interviews with practitioners and parents in intervention settings; a usual-practice survey was administered to all settings at the beginning of the trial and to control settings at the end, and an implementation survey was administered to all intervention settings during the trial.

The evaluation project operated between January 2017 and December 2018, with the trial intervention period starting in January 2018 and ending in July 2018. In total, the evaluation involved 1,447 families across 139 nursery settings: approximately ten children and parents per setting.

The previous version of this report (published in February 2020) was published without the Early Year Pupil Premium (EYPP) subgroup analysis due to delays in accessing data from the National Pupil Database (NPD). This updated version incorporates this analysis.

Key conclusions
1. Pupils in the Peep-LTS Programme made, on average, no additional progress in core language skills (the primary outcome) in comparison to those in the control group, equivalent to zero months. This finding has a moderate to high security rating.
2. The analysis of the secondary outcomes showed a positive effect of the intervention on early literacy development. Pupils in the intervention group made, on average, two months' additional progress compared to those in the control group. This finding is less secure than the estimate for the primary outcome.
3. Parents reported small improvements in the home learning environment and their confidence in enjoying and playing with their child, following the Programme. There were moderate improvements reported in parental self-acceptance and parents' confidence in their own parenting knowledge and learning.
4. Nursery settings, supported by mentors, delivered the Programme with high fidelity. Engaging parents was a key challenge for settings: 23% of parents who signed up to the intervention did not attend a single session (parents who did attend the Programme joined, on average, 70% of sessions).
5. Although more than 90% of practitioners reported that the Peep-LTS Programme was easy to use and implement, practitioners also felt that the length of the Programme—20 weekly sessions—may have been a barrier to commitment for parents.
6. Exploratory subgroup analysis showed that children eligible for Early Years Pupil Premium (EYPP) in the Peep-LTS Programme made progress in core language skills (the primary outcome) and communication (secondary outcome) equivalent to 4 months' additional progress for each outcome, and for early literacy development (secondary outcome) equivalent to 3 months' additional progress, in comparison to children eligible for EYPP in the control group. The sample sizes were small in these subgroup analyses, and so these effects have lower security than overall findings.
7. Parents of children eligible for EYPP reported improvements in their self-acceptance following the programme. Parents of children for whom English is an additional language reported lower scores on the TOPSE play and enjoyment scale, regardless of whether they were in the intervention or control group. The sample sizes were small in these subgroup analyses, and so these effects have lower security than overall findings.[1]

[1] Additional key conclusions 6 and 7 added in March 2023 to reflect new subgroup analysis on EYPP pupils added to the report.

EEF security rating

These findings have a moderate to high security rating. This was an efficacy trial, which tested whether the intervention worked under developer-led conditions. It was a well-designed randomised controlled trial; however, 20% of the pupils who started the trial were not included in the final analysis, most commonly due to the child being absent on the day of testing and subsequent follow-up data collection days.

Additional findings

Key factors that supported successful implementation were the training delivered by the Peeple project delivery team, support from school leaders, the structure of the Programme, and time and resources being available for practitioners to deliver. Ongoing support was also available to practitioners through Peeple 'mentors' who supported schools through the set-up of the study, provided training, and became the first point of contact for settings delivering the Programme.

Barriers to delivery included lack of support from senior staff and resources; organising a time for the sessions and maintaining parental attendance. The actual delivery of the Programme was largely reported to be straightforward.

The findings of the current study indicate a mixed effect of the Peep-LTS Programme. Consistent with previous evaluations of Peep (and as hypothesised), positive changes were observed in the home learning environment and in a number of dimensions of Peep-LTS parents' confidence in their parenting knowledge and skills. Whilst an additional improvement in Peep-LTS children's early literacy was also observed, this study found that children's language skills (the primary outcome) did not improve (beyond that of the control group) as a consequence of taking part in Peep-LTS. As with any study, there is always statistical uncertainty around this 'best estimate' result: the possible impacts of this study, for children's core language skills, also include a small negative effect of one month's less progress and a positive effect of two months of additional progress (effect size 0.03, 95% CI [-0.09, 0.14]).

Statistical uncertainty around the secondary outcome of early literacy is consistent with an effect of zero months' additional progress to larger positive effects of up to three months of additional progress (effect size 0.10; 95% CI [-0.02, 0.21]). This estimate of impact is less secure than the estimate for the primary outcome. A threat to the validity of the findings included imbalance on the Concepts about Print measure of early literacy, in favour of the control group.

Analysis of the secondary, parent-related outcomes showed a positive effect of the intervention on parental self-acceptance (effect size 0.17, 95% CI [.03, .31]) and confidence in learning and knowledge (effect size 0.16, 95% CI: [.02, .31]) as measured by the Tool to Measure Parenting Self Efficacy (TOPSE). Small, positive effects of the intervention on the home learning environment (effect size 0.13, 95% CI [-.01, .27]) and parents' confidence in playing with and enjoying their child (effect size 0.11, 95% CI [-.03, .25]), were found.

The statistical uncertainty around the parent-related and home learning environment results is consistent with null impacts or larger positive impacts.

As per the exploratory subgroup analysis for children eligible for EYPP, this study shows positive changes for pupils receiving the programme. Most notably progress in core language skills (the primary outcome) and communication (secondary outcome) equivalent to 4 months' additional progress, and for early literacy development (secondary outcome) equivalent to 3 months' progress. Although these results have more uncertainty due to the smaller sample size of this subgroup, these are promising emerging findings which may warrant replication with a larger sample. Moreover, and in line with findings from the whole sample, a subset of parents of children eligible for Early Years Pupil Premium (EYPP) also reported improvements in their self-acceptance following the programme.

Cost

The cost to schools of delivering the Programme is very low: £31.60 per pupil per year, as averaged over three years. The cumulative cost to schools over a three-year period is £948. These estimates are based on two practitioners being trained per setting and delivering the Programme to ten pupils per year.

Impact

Table 1: Summary of impact on primary outcome

Outcome/ Group	Effect size (95% confidence Interval)	Estimated months' progress	EEF security rating	No. of pupils	P value	EEF cost rating
Language skills	0.03 (-0.09, 0.14)	0	🔒🔒🔒🔓🔓	1154	0.62	£ £ £ £ £
Early literacy development	0.10 (-0.02, 0.21)	2	N/A	1166	0.08	£ £ £ £ £

Introduction

Background evidence

During the first five years of a child's life, the home learning environment provided by parents and carers is one key factor that contributes to the development of children's competencies in the early years (Early Intervention Foundation, 2015; Asmussen et al., 2016). Existing evidence shows that the quality of learning opportunities within the home learning environment is a predictor of positive academic and social outcomes (for example, Foster et al., 2005; Melhuish et al., 2008; Kelly et al., 2011). Another key factor that contributes towards child development is parent involvement with their child's learning. As reported in several reviews and meta-analyses relating to children of all ages, both home-based and school-based parental involvement facilitates academic achievement (Cox, 2005; Nye et al., 2006; Jeynes, 2007; Pomerantz, Moorman and Litwack, 2007). The Peep Learning Together Programme is a parent education programme developed by the charity Peeple. By providing parents with the necessary information and practical ideas to improve the quality of the home learning environment the Programme aims to promote positive long-term academic and social change for children and their parents.

Over the past twenty years, an evidence base in support of the Peep Learning Together Programme has been building. Although each study has an individual focus, this evidence base broadly examines the extent to which Peep Learning Together Programmes can achieve three critical objectives: first, to effectively reach target parents; second, to raise parental awareness of how to foster child development; and third, to demonstrate a positive and lasting impact on children's achievements in both literacy and wellbeing domains, particularly self-esteem. A series of studies exploring Peep Learning Together Programmes has reviewed the extent to which these aims could be fulfilled.

The foundation on which Peep Learning Together is based is the idea that educating parents changes the practices that occur in the family's everyday environment. Accordingly, the largest study of the Peep Learning Together Programme to date examined the extent to which the home learning environment was influenced in demonstrable practice after attending the Programme sessions, and whether this influence occurred alongside progression in literacy and wellbeing outcomes. The 'Birth to School Study' (Evangelou et al., 2005)—a quasi-experimental study—used a longitudinal approach over six years, looking at a large cohort of 600 families. Half of these families lived in an area with access to structured Peep Learning Together groups in the community; the other half did not. After a year, there were statistically significant differences in parenting views and practices, with Peep parents reporting enhanced parent-child interaction in everyday activities compared to non-Peep parents. When their children were aged two, Peep parents also showed significant differences in the quality of the care-giving environment. This would suggest that the Peep Learning Together activities were impacting on practices within the home learning environment that the parents were providing. Over the extended six-year period, the study provided support for the hypothesis that the quality of the home learning environment and parental confidence was improved after attending Programme sessions. Furthermore, it seemed that educating parents about child development contributed towards an increased rate of progress in their children for academic and wellbeing outcomes. By the end of the study, children whose parents attended Peep Learning Together sessions, in comparison to those who did not, made additional progress over time in five measures of skills-based literacy development—vocabulary, phonological awareness of rhyme and alliteration, letter identification, understanding of books and print, and writing. By the age of five, children whose parents attended Peep Learning Together sessions also had significant advantages over those who did not attend sessions in five measures of self-esteem—peer acceptance, cognitive competence, physical competence, general competence, and total self-esteem.

The 'Enabling Parents' study (Sylva, Evangelou, Taylor, Rothwell, and Brooks, 2004) used a quasi-experimental design comparing interviews from 75 families that were taking part in the Birth to School Study and had access to structured Peep Learning Together Programme sessions (intervention group) with demographically matched families from a different town without access to the Programme (comparison group). Compared to parents in the comparison group, intervention parents self-reported a higher extent of awareness of their child's literacy development and how to foster it. It may follow that this awareness impacts on parents' lifestyle as parents who received the Programme said that it steered them towards decisions to access further training. These parents were more likely to engage in professional development, shown by a statistically significant improvement in their long-term socio-economic status.

In addition to impacting parental awareness, there is also support for an impact on child outcomes. A quasi-experiment reported in the 'Foundation Peep' study (Evangelou and Sylva, 2007) followed the cognitive and social and emotional

development of 150 children aged three to four years over two years. Again, groups were not randomly assigned as families with access to the Peep Learning Together Programme (intervention group) lived in Oxford, while families without access to the Programme (comparison group) were recruited from a demographically matched nearby town. Comparing the outcome measurements from children at pre-test before their parents attended the Programme to post-test measures after two years of attendance, the study suggested that supporting parents as educators positively affected child outcomes. Children from families attending the Peep Learning Together Programme made greater gains in emergent literacy/numeracy and socioemotional wellbeing over the two-year period compared to children from families in the comparison group. Effect sizes recorded were as follows: verbal comprehension, 0.26; vocabulary, 0.16; and understanding of books and print, 0.22. In self-esteem measures, effect sizes were recorded as 0.20 for cognitive competence and 0.18 in physical competence. This showed that the Programme impacted on children's achievements in both academic and wellbeing domains, and the suggested mechanism for this boost in progression was through educating parents on fostering child development.

The Peep Learning Together Programme can be delivered as a universal intervention. However, the aim of Peeple (and other organisations that deliver the Programme) is to narrow the gap in achievement between children from different socioeconomic groups. The above studies focused on the Peep Learning Together Programme as delivered by trained practitioners in weekly groups within community venues; however, Peeple has tested different ways of delivering the Programme in order to reach families that may not readily access services. For example, the 'Room to Play' study (Evangelou, Coxon and Sylva, 2008) targeted 'excluded' families in an open-access, informal way by setting up a home-like living room within a community shopping centre. It was very different to other modes of Programme delivery but through informal interviews, the drop-in nature of the sessions was found to be an effective platform to target 'hard to reach' families and could act as stepping stone to access other provisions.

Taken together, existing evidence suggests that the Peep Learning Together Programme successfully engages parents of young children and fulfils the aims in supporting parents to understand how they can foster child development, increasing parents' own skills and promoting positive outcomes for their children. Peep can also be delivered in a variety of ways through, for example, structured weekly community groups (as seen in the 'Enabling Parents', 'Birth to School', and 'Foundation Peep' studies) or through more unstructured informal channels as seen in the 'Room to Play' mode of delivery (although this study did not explore child outcomes). All of these are delivered by trained practitioners and the findings have been consistent across different modes of delivery.

The Peep Learning Together Programme was included as one of the evidence-based projects in the government-funded Early Learning Partnership Project (2006–2008; see Evangelou et al., 2008). Improving the home learning environment has since become a key issue for the government. In November 2018, the Department for Education (DfE) issued guidance to early years settings, community organisations, and businesses on improving the home learning environment in an effort to raise attainment in communication, language, and literacy in the early years. Whilst not referring to specific or named programmes, the 'Chat, Play, Read' model is suggested as a way parents can enhance the home learning environment they provide for their child and support language development (DfE, 2018). This was also supported by the allocation of a multi-million pound investment to support research examining the best way to help parents in disadvantaged communities to support children's learning at home.

Previous evidence on the effectiveness of the Peep Learning Together Programme has relied on quasi-experimental methods and these studies have largely been located within disadvantaged communities in Oxford, England. The evaluation of the Programme undertaken by Queen's University Belfast is the first (cluster) randomised controlled trial (RCT) evaluating its effectiveness in improving language and literacy in the early years as well as exploring its impact on the home learning environment and parental skills.

Intervention

The Peep Learning Together Programme aims to improve the quality of the relationships between parents and their young children and the quality of the home learning environment (both shown by research to have a positive impact on children's outcomes). It is a strengths-based programme that values and builds on what families already do to support parents to be the best that they can be through:

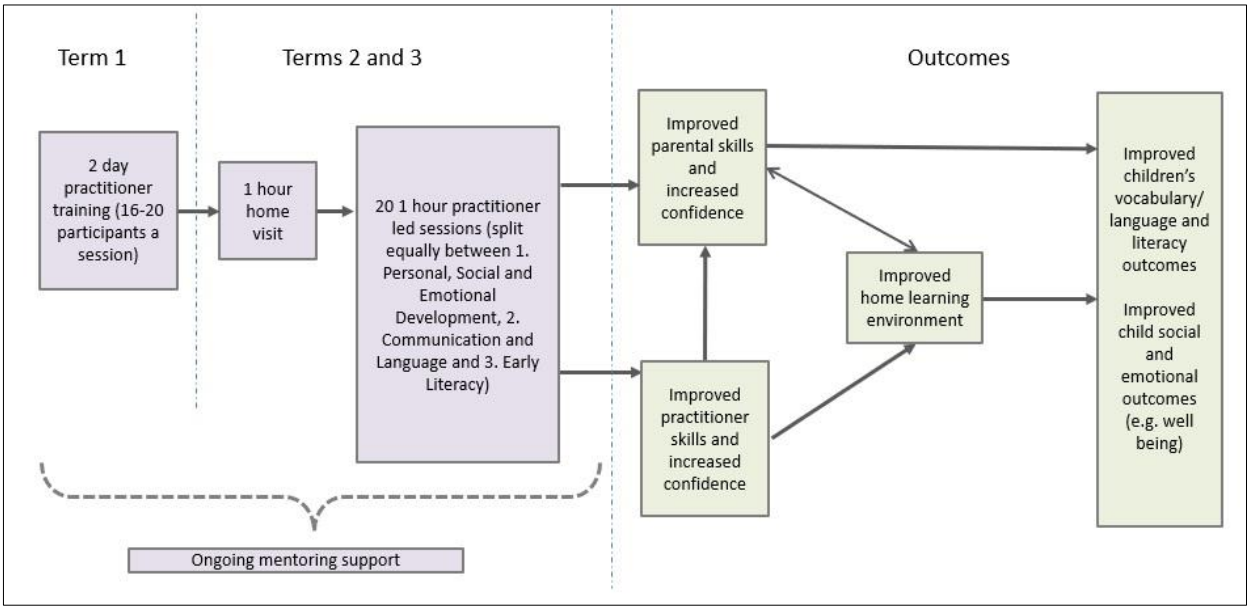
- nurturing sensitive, consistent, and loving relationships with their young children as the bedrock for all later cognitive and socio-emotional development;

- understanding the importance of play and simple everyday activities in supporting children's learning, development, confidence, self-esteem, resilience, and wellbeing; and
- providing a wealth of no-/low-cost play opportunities as part of everyday life.

The Programme uses the Opportunities, Recognition, Interaction, and Modelling (ORIM) framework (Hannon, 1995) that describes the social context within which child development takes place. The framework provides a theory to describe and acknowledge parental support in a child's development. It also provides a rationale and structure to extend that support through intervention and is a means to encourage parents' metacognition about their own role in their child's learning. The Programme teaches parents how to consciously extend everyday learning opportunities and encourages parents to implement and practice home learning activities.

The Logic Model (Figure 1) depicts the hypothesised theory of change. It is expected that in the first instance the Peep Learning Together Programme will result in an improvement in the skills and confidence of both the practitioners (who are delivering the Programme) and the parents (who are receiving the Programme sessions and implementing the activities at home). As a result of improved parenting skills and confidence, it is expected that improvements will subsequently be seen in the home learning environment, children's vocabulary/language and literacy outcomes, and social and emotional outcomes.

Figure 1: Logic model



Programme content

The Programme covers five strands of learning and development: Personal, Social and Emotional Development (PSED), Communication and Language (CL), Early Literacy (EL), Early Maths (EM), and Health and Physical Development (HPD). It comprises 74 topics which cover three stages of development: babies, toddlers, and pre-schoolers. Some topics are suitable for children at any developmental stage. Practitioners and/or parents select the number and combination of topics which suit their particular needs/requirements. This combination is delivered as a Peep Learning Together Group, one-to-one with families during home visits or in drop-in sessions. Peeple recommends that the Programme is delivered by at least two practitioners, with at least one receiving the training (described in more detail below).

The Peep Learning Together Programme aims to help parents increase their activities and interactions, thereby contributing to a rich home learning environment, improved quality and quantity of language experiences, and sensitive parenting by:

- sharing knowledge from research (*key ideas*) to support understanding about why particular activities, strategies, and so on are helpful;
- embedding knowledge through shared activities, discussion, and reflection;

- modelling and cued modelling—not just demonstrating how something can be done, but explicating sharing with parents how they can do it too;
- promoting and supporting daily book sharing/reading to increase vocabulary and lexical sophistication;
- providing activities to be done at home to consolidate learning;
- building up a repertoire of songs/rhymes that parents are confident to use regularly;
- promoting understanding of, and activities which encourage, sensitive, attuned interactions and lead to secure attachment relationships
- promoting understanding of activities that help parents to support their child's capacity for emotional self-regulation, self-esteem, and confidence; and
- encouraging parents to believe that their own efforts and actions can support their child's learning.

For the purpose of the Learning Together Study, a bespoke 20-week course focused on Communication and Language and Early Literacy was delivered by Peep-trained nursery practitioners to the parents of three-year-old children (together with their children). To differentiate this bespoke 20-week programme from other versions of the Peep Learning Together Programme, it will be referred to as 'Peep-LTS' (Learning Together Study) from now on. The 20 topics were:

- Session 1: Importance of names
- Session 2: Helping children feel good about themselves
- Session 3: Helping children to understand and manage their feelings
- Session 4: Understanding and managing behaviour
- Session 5: An introduction to ORIM
- Session 6: Becoming a good listener
- Session 7: Talking and listening with children
- Session 8: Play and language
- Session 9: Making the most of technology
- Session 10: Musical interactions
- Session 11: Thinking and talking
- Session 12: Talking maths
- Session 13: Sharing books with toddlers and young children
- Session 14: Our world in books
- Session 15: Homemade books
- Session 16: Environmental print
- Session 17: Becoming a writer
- Session 18: Lots to read and write about
- Session 19: Exploring writing through play
- Session 20: Looking back and recapping

Training

Following randomisation, nursery practitioners in the intervention group received two days training (between November and December 2017) from experienced and trained Peep Trainers (n = 5) who subsequently acted as mentors throughout the study. Training was delivered to groups of practitioners (at least two from each school who consisted of headteachers, nursery teachers, nursery nurses, family workers, and SEN staff) at a venue within their region. Staff

were required to attend both days of training, although alterative arrangements including evening training sessions were made for staff who had other commitments and were unable to attend the daytime training. The Peep Learning Together Programme training covers the three elements of the Programme: Why, What, and How.

Why

The 'why' element of the training examined the research evidence behind the Programme including the importance of the quality of parent/child interactions and the quality of the home learning environment to children's outcomes. It also explored the evidence base for the Peep Learning Together Programme itself.

What

The 'what' element of the training provided delegates with the opportunity to get to know the content of the LTS Programme, to become familiar with the strands of learning and to explore the 20 topics and the supporting materials including session plans and topic handouts for parents.

How

The 'how' element of the training covered the qualities and skills needed by the practitioner in order to deliver the Programme to families. It gave delegates the opportunity to observe the trainers who demonstrated how a session can be delivered, and to prepare and practise delivering a session themselves. It also included information and exercises to help delegates to understand how adults learn, including group theory. Finally, it explored the practicalities and planning for delivering Peep-LTS within their individual settings

For the purposes of this evaluation, practitioners were provided with hard-copy and electronic versions of the Programme content and the majority of resources needed to deliver the 20-week Peep Learning Together Programme. Delegates were also given the Peep Learning Together Programme Manual, which supports their experience on the training and provides information and ideas to help with delivery. Each intervention setting was assigned a named Peep Mentor who provided regular support and visited settings throughout the programme delivery phase of the evaluation. Mentors checked in with practitioners at least once a month to provide ongoing support during programme delivery.

Delivery

The intervention started with a home visit which involved the nursery practitioner visiting each participating family in their home. After that, each week, approximately two nursery practitioners delivered a Peep-LTS session to the group of parents and children attending the sessions together in the nursery setting. There were approximately ten families per group with groups ranging from two to 20 regularly-attending families within the current evaluation. Settings aimed to deliver 20 weekly one-hour sessions between January and July 2018, allowing for term breaks.

The intervention was not designed to be tailored to individual settings or families. The intervention was not modified during the intervention period, however due to unforeseen personal circumstances of some practitioners such as illness, maternity leave, and organisation clashes, some settings modified the weekly delivery schedule by occasionally delivering more than one session per week or by omitting one or more sessions from the intervention.

Evaluation objectives

The aim of the evaluation was twofold: the first aim was to determine the impact of the Peep Learning Together Programme (Peep) on the outcomes of participating parents and their three- to four-year-old children; the second aim was to explore fidelity and the mechanisms through which any impact on outcomes was achieved. These aims were respectively addressed by the randomised controlled trial and the implementation and process evaluation.[2] It was originally proposed that language and early literacy would be co-primary outcomes. However, in August 2017 it was decided that language should be the sole primary outcome and the protocol was updated.[3] Peep-LTS aims to impact on a wide range of outcomes, but for the purpose of this trial it was necessary to agree a single outcome and primary and language development was agreed to be the best candidate given the Programme content. Early literacy was

[2] The protocol and statistical analysis plan for this trial can be found at: https://educationendowmentfoundation.org.uk/projects-and-evaluation/projects/peep-learning-together-programme
[3] It was an oversight that the research questions were not updated in the statistical analysis plan as well.

subsequently designated as a secondary outcome, in line with the EEF's guidance to identify one primary outcome, and the other secondary outcomes remained unchanged.

Research questions addressed through the cluster randomised controlled trial were:

1. What is the impact of the Peep-LTS on the language skills of three- to four-year-old children (primary outcome)?
2. What is the impact of the Peep-LTS on other child-related outcomes including early literacy, communication, and social and emotional development (secondary outcomes)?
3. What is the impact of the Peep-LTS on parent-related outcomes including the home learning environment and parenting confidence (secondary outcomes)?
4. Is there a differential impact of the Programme for children from different socioeconomic backgrounds?

This report was originally published in February 2020 without the subgroup analysis (research question four) due to the pandemic, and delays in accessing the relevant data from the National Pupil Database. This analysis was completed and added in November 2022. It is reported below.

Research questions addressed through the implementation and process evaluation were:

5. Was the intervention implemented with fidelity?
6. Is any variability in implementation associated with variability in outcomes?
7. Do the proposed mechanisms depicted in the logic model explain any link between the Programme and child-related outcomes (that is, communication, language, and early literacy skills)?
8. What were the facilitators and/or barriers to parental engagement with the Programme?

Ethics and trial registration

The trial was approved by the Research Ethics Committee, School of Social Sciences, Education and Social Work, Queen's University Belfast in March 2017. School-level consent to participate in the trial was sought from headteachers through a signed memorandum of understanding (MOU, Appendix C). Informed consent for child and parent participation was sought from parents/guardians on an opt-in basis (Appendix D). Schools returned consent forms to the evaluation team prior to randomisation. For the implementation and process evaluation interviews, further consent was sought from practitioners and parents (Appendices E and F).

The International Standard Randomised Controlled Trial Number, ISRCTN64960433, was assigned on 19 May 2017.

Data protection

The legal basis for processing personal data under the General Data Protection Regulation was explicit opt-in consent (Article 6, 1.a) to gain participants' informed consent for the use of their data and public task (Article 6, 1.e) in order to carry out research of this kind For the processing of special category data, the legal basis was explicit opt-in consent (Article 9, 2.a).

So that parents were informed about the protection of their data, an information sheet detailed how any information collected would be kept confidential, only accessible by the research team and stored securely. Parents were informed their child's named data would be matched with the National Pupil Database and shared with Peeple, the Department for Education, the EEF, the EEF's data contractor FFT Education, and, in an anonymised form, with the UK Data Archive.[4] It was clearly stated that no individual setting, parent, or child will be identified in any report arising from the research. Information sheets were provided to parents along with consent forms and are available in Appendix D.

All data was processed in accordance with policy within the School of Social Sciences, Education and Social Work (SSESW) at Queen's University Belfast. In line with this policy, anonymised data will be kept for up to five years before it will be destroyed. Members of the research team acted as data controllers during the evaluation. This will remain until

[4] Anonymised data shared with the Office for National Statistics (and not the UK Data Archive) due to a change in DfE data access procedures.

data is destroyed in line with SSESW policies and to the point where the EEF becomes data controller for the datasets after archiving.

Project team

Personnel consisted of members of the Queen's University Belfast evaluation team and members of the Peeple project delivery team. The evaluation team was led by Dr Sarah Miller (PI) who was responsible for overseeing all aspects of the design, allocation, and the analysis and write-up of the data. Dr Laura Dunne led the coordination of researchers and collation of the data, also contributing to report writing. Dr Abby Laishley and Dr Aimee Smith managed the day-to-day running of evaluation events, communicating with practitioners and the Peeple project delivery team, arranging outcome data collection, and organising the process evaluation activities.

The Peeple project delivery team was led by Dr Sally Smith who had overall responsibility for delivery of the project as line manager. Susannah Chambers operated as the project manager, managing the mentors and the project administrator. Lisa Clissett, Clare Lawrence, Debbie Rudman, Gillian Smith, and Alison Tebbs are experienced Peep practitioners and trainers; they acted as mentors during the project. All mentors were responsible for training setting staff and providing ongoing mentoring support to participating practitioners throughout the project, including support for recruitment of families, retaining parents, and maintaining the quality of programme delivery. Helen Stroudley, a Delivery Manager from Peeple, also provided ongoing support and consultation to the project manager and mentors.

Methods

Trial design

Trial type and number of arms		Randomised controlled trial with two levels (children clustered within settings) and two arms (an intervention arm and a control arm)
Unit of randomisation		Nursery settings
Stratification variable(s) (if applicable)		Deprivation level of the nursery setting location—as measured by the income deprivation affecting children index (IDACI)—and defined as 'high', 'medium', or 'low'
Primary outcome	variable	Language skills
	measure (instrument, scale)	Clinical Evaluation of Language Fundamentals (CELF) Preschool 2UK—core language subscale
Secondary outcome(s)	variable(s)	Early literacy development Social and emotional learning and communication Quality of the home learning environment Parenting skills
	measure(s) (instrument, scale)	Concepts About Print The Ages and Stages Questionnaire and the Brief Early Years Skills and Support Index The Home Learning Environment Tool to Measure Parental Self Efficacy

The study was a cluster randomised controlled trial with one control and one intervention arm. Using a clustered trial design ensures that the risk of contamination between the intervention and control settings is minimised. The unit of allocation was the setting.

Of the 139 early years settings taking part, 65 were allocated to the intervention group and 74 were allocated to the control group. A one-to-one allocation ratio was used, however, due to the way in which the programme Minim allocates settings to groups—preferencing balance on the minimisation variable (in this case, deprivation)—this can result in unequal numbers allocated to the two groups. The control group settings did not have access to or deliver the intervention during the period of the evaluation. Control settings continued with 'business as usual', which was monitored and reported through the implementation and process evaluation. To incentivise settings to take part in the study, a payment of £500 was made to control settings at the end of the study. Settings were free to choose how to spend this money, including the option to purchase the Peep Learning Together Programme training and resources the following year at a discounted cost of £500.

Participant selection

Settings that met the following criteria were eligible for inclusion in the study:

- had not previously delivered the Peep Learning Together Programme;
- located within the 50% most disadvantaged Super Output Areas;
- ideally received a good or outstanding Ofsted rating;
- willing to be randomly assigned to condition at the level of the setting;
- willing to engage with the intervention and implement it with parents and children;
- able to recruit 10–12 families; and
- willing to administer pre-test measures and provide child background information to the evaluation team.

Recruitment of early years settings was primarily undertaken and managed by the Peeple project delivery team; the QUB evaluation team supported the recruitment process and provided advice as necessary. Settings were recruited across all regions of England, including the North East, East Midlands, East of England, London, North East, North West, Sheffield, Yorkshire and The Humber, South East, South West, and West Midlands. Settings (and parents) were oversampled in case of attrition and participating settings were asked to sign a memorandum of understanding (Appendix C) which provided details of the research and stipulated what participation would entail for the setting, parents, and children. In each participating setting, all parents with a child of the target age of three to four years of age was invited to take part in the study. Practitioners personally approached eligible parents in their setting to ask if they would like to take part. Parents were eligible to take part if they had a child aged three to four attending the setting. Settings provided parents with a written pack of information prepared by the Peeple project delivery team and the evaluation team. Parents were allowed a period of time to consider their participation and if they agreed to take part, they signed and returned the opt-in consent form enclosed in their information pack.

Outcome measures

Table 1 summarises the pre- and post-test outcomes, measures, and method of administration. The outcomes for this evaluation were decided together, by both the evaluation team and the developer team. These outcomes are aligned with those described in the logic model (Figure 1) which hypothesises that the Programme makes its initial impact on parents' confidence and parenting skills, which in turn equips parents with the knowledge and skills to provide a better home learning environment for their child. It is further hypothesised that these changes in parental outcomes and the home learning environment yield subsequent improvements in children's language skills, early literacy, and social-emotional wellbeing.

Table 1: Summary of outcome measures at pre- and post-test

Outcome	Primary or Secondary outcome	Measure	Method of administration	Reliability Cronbach's alpha
Pre-test				
Early literacy	Secondary	Concepts about Print	Teacher completion with child	0.95[2]
Communication skills	Secondary	Ages and Stages 3, communication subscale	Teacher completion with child	0.82[1]
Social emotional development	Secondary	Ages and Stages 3, personal social subscale	Teacher completion with child	0.68[1]
Post-test				
Language	Primary	Clinical Evaluation of Language Fundamentals (CELF) Preschool 2UK, core language subscale	Fieldworker completion with child	0.91–0.93[2]
Early literacy	Secondary	Concepts about Print	Fieldworker completion with child	
Communication skills	Secondary	Ages and Stages 3, communication subscale	Teacher completion with child	0.86[1]
Social emotional development	Secondary	Ages and Stages 3, personal social subscale	Teacher completion with child	0.62[1]
Social skills	Secondary	Brief Early Years Skills and Support Index	Teacher completion	0.89[1]
Home Learning Environment	Secondary	Home Learning Environment Index	Parent completion	0.76[1]
Parental confidence and self-efficacy	Secondary	Tool to Measure Parental Self-Efficacy	Parent completion	0.77–0.88[1]

[1] Reliability estimates from the evaluation data.
[2] Reliability estimates reported by the test publisher.

In order to balance good value for money with a rigorous trial methodology whilst keeping the research burden to a minimum for settings, it was decided that a subset of outcome data would be collected at baseline by setting practitioners. Thus, three outcomes (all of which were secondary outcomes) that were measured at baseline—early literacy, communication, and social-emotional development—were collected by teachers. No specialist training was required to administer these measures. However, knowledge of the child *was* required to complete the communication and social-emotional development measures, which is why the practitioners also administered these two measures at post-test. Independent fieldworkers administered the language (primary outcome) and literacy outcome measures at post-test. Specialist training and knowledge is required to administer the primary outcome measure (the CELF) and it would have been very costly to administer this measure at pre-test as well as post-test. For this reason, language skills (measured using the CELF) were assessed at post-test only. This means that a pre-test measure of language skills was not available for inclusion in the main analysis. Instead, the Concepts about Print pre-test score was used as a proxy and enabled the evaluation team to make at least some assertions regarding baseline equivalence on key observables in the absence of a pre-test CELF score.

Primary outcome

Language skills was the primary outcome and was measured by the Clinical Evaluation of Language Fundamentals (CELF) Preschool 2UK, core language subscale (Wiig, Secord, and Semel, 2004). The CELF measures children's knowledge about sentence structure, word structure, and expressive vocabulary to provide an overall indication of general language ability in terms of speaking and understanding, rather than reading.

On the basis of a pilot study conducted by the research team and in discussion with Peeple and the EEF, it was decided that the core language score of the CELF would be used as the primary outcome measure for this study. The core language score is made up of three subscales: sentence structure, word structure, and expressive vocabulary. The CELF was chosen because it offers a more comprehensive measure of overall language ability compared to both the British Picture Vocabulary Scale (BPVS: Dunn, Dunn, Whetton, and Burley, 1997) and the Renfrew Action Picture Test (RAPT: Renfrew, 2003). In addition, the scoring of the CELF is more standardised and straightforward than the RAPT, which in turn will facilitate greater inter-rater reliability between members of the fieldwork team. The CELF is a specialist language assessment and was administered by fieldworkers who were trained by the evaluation team prior to test administration and blind to condition. Furthermore, the majority of fieldworkers were speech and language therapists who had previous experience of administering the CELF in their own clinical practice. The CELF was administered at post-test.

Secondary outcomes

Three child outcomes were measured at both pre-test and post-test: early literacy development, communication skills, and social-emotional development. To ease the research burden on settings and to minimise data collection costs, these measures were administered and completed (prior to allocation) by nursery staff rather than independent fieldworkers or parents. It was considered that practitioners would have sufficient knowledge of the child to complete the measures and that this would also serve to minimise missing data as we did not have to rely on data being returned by parents. The remaining secondary outcomes (including the parent outcomes) were only measured at post-test.

Early literacy development was measured using Concepts About Print (Clay 2000). The Concepts About Print test measures how much children know about the conventions related to printed text—what they need to learn about books, letters, and words in order to be able to learn to read. This is a widely used and straightforward measure that ranges from a score of zero to a score of 22.

Communication skills were measured at pre-test and post-test using the communication subscale of the *Ages and Stages Questionnaire* (third edition, Squires and Bricker, 2009). The ASQ measures the extent to which children have reached appropriate milestones in communication. It is assessed by six items, for example: 'When you ask "What is your name?" does the child say both her first and last names?' The response categories for each item are 'yes', 'sometimes', or 'not yet'. Scores range from zero to 60 with a higher score indicating more advanced development.

Social emotional development was measured at both pre-test and post-test using the personal and social subscale of the *Ages and Stages Questionnaire* that uses a similar approach to measure social-emotional competencies—also assessed by six items. For example: 'Does the child take turns by waiting while another child or adult takes a turn?' The

response categories for each item are 'yes', 'sometimes', or 'not yet'. Scores range from zero to 60 with a higher score indicating more advanced development.

An additional and separate post-test measure of social-emotional development—the behavioural adjustment subscale of the Brief Early Years Skills and Support Index (Hughes, Daly, Foley, White, and Devine, 2015)—was included to provide an extended measure of social and emotional learning. The full measure contains 30 statements that respondents can 'strongly agree', 'agree', 'disagree', or 'strongly disagree' with. The behavioural adjustment subscale, used here, consists of 12 items which, in accordance with the manual, are converted into a binary score (0,1) and summed (Hughes and White, 2015), thus scores range from zero to 12 with a higher score indicating more advanced development.

The quality of the home learning environment was assessed using the Home Learning Environment Index (see Sylva, Melhuish, Sammons, Siraj-Blatchford, and Taggart, 2004). This scale was designed to measure parental involvement within certain activities in the home. This is a seven-item scale asking parents to state how often a particular activity is undertaken with their child. The scale ranges from zero ('not at all') to seven ('very frequently'). The maximum score is 49 and the higher the score, the higher the quality of the home learning environment.

Parenting confidence and self-efficacy was assessed using four subscales from the Tool to Measure Parental Self Efficacy (Kendall and Bloomfield, 2005)—'Play and enjoyment', 'Empathy and understanding', 'Self-acceptance', and 'Learning and knowledge'. Each subscale consists of six statements (for example, 'I am able to have fun with my child'). It is a self-completion measure with parents scoring statements from zero (completely disagree) to ten (completely agree). In the four subscales used, all scored were added up to give a subscale total with the exception of the 'Self-acceptance' subscale item three ('I am not doing that well as a parent'), which was reverse scored.

These outcomes were chosen because Peep-LTS aims to promote cognitive and social development for the child, thus the primary and secondary child outcomes were chosen to assess this aspect of child development. In doing so, the extent to which Peep-LTS fulfils its achievement-related aims can be evaluated. The mechanism through which Peep-LTS proposes to advance child development is by improving the home learning environment that the parent creates. The idea is that enriching the home learning environment and parenting skills in turn improves outcomes for the child. In order to evaluate whether any change in child outcomes could be as a result of these proposed mechanisms, the extent to which there were changes in the home learning environment and parental skills must also be assessed.

Data collection

To maximise the efficiency of the trial, the pre-test assessments were administered (via paper and pencil) by the early years settings prior to allocation (October–November 2017). The most feasible way of collecting the greater number of measurements during post-test phase (May–July 2018) was collaborative data collection by both early years practitioners and external, trained research fieldworkers (primarily speech and language therapists). Practitioners collected assessments that required knowledge of the child and family circumstances (ASQ and the BESSI) and fieldworkers conducted objective literacy assessments (CoP and CELF, the primary outcome). To minimise bias, fieldworkers were not informed whether the setting was part of the control or intervention group.

To reduce research burden on parents, only post-test data (and not pre-test data) was collected in the form of a post-test questionnaire administered to parents including the two measures of secondary outcomes (HLE and TOPSE). To maximise return, parents were offered the opportunity to complete the questionnaire online, by post, or over the telephone. In addition, parents who completed the post-test questionnaire were given a £15 voucher at the end of the evaluation.

Sample size

Effect sizes from previous quasi experimental evaluations of the Peep LTP have varied depending on the age of the children and the outcome in question. It is common for more rigorous designs to yield smaller effects and so, given this and the absence of any existing randomised controlled trials, the trial was originally powered to detect the smallest possible effect size. Thus, it was estimated that for the proposed trial to detect a minimum effect size of 0.2 of a standard deviation with approximately 80% power, a total sample size of 150 early years settings and a minimum of eight children and parents per setting (approximately 1,200 children in total) was required. These estimates were calculated using

Optimal Design (Version 3.01). They are based on a two-level cluster design (where level two is the setting and level one is the child) and the following assumptions:

- significance level (α) = 0.05;
- estimated intraclass correlation coefficient (ICC) = 0.10; and
- estimated variance shared between pre- and post-test scores (R^2) = 0.25.

A previous clustered trial testing language skills (using the British Picture Vocabulary Scale) of children aged four to six reported intraclass correlations in the region of 0.05 (Macdonald, et al., 2014), however given the lack of available data on ICCs for this outcome in this age group, a higher, more conservative estimate of ICC was used in this study. A separate study of language (measured using the CELF) and literacy (measured using the Single Word Reading Test) in young children (aged four) reported correlations between these two constructs in the region of 0.5 (R^2 = 0.25: Puglisi, et al., 2017). This data informed the estimates cited above (and those used in the sample size calculation).

In reality, 139 settings were recruited and randomised (n = 1,447 children); however, an average of ten (rather than eight) children and parents were recruited per setting, which meant that the MDES remained unchanged at 0.2 of a standard deviation. Attrition meant that only 134 settings were included in the analysis with an average of 8.6 children per setting. A higher than expected ICC of 0.25 and a lower than expected correlation of 0.37 between the pre- and post-test score for the primary outcome resulted in an MDES of 0.27. See Table 4 in the impact evaluation section of the report for further detail relating to these calculations.

As this trial was conducted in early years settings, the Early Years Pupil Premium (EYPP) from the National Pupil Database (NPD) was used instead of Free School Meal Eligibility (FSME) as a measure of deprivation. Children qualify for EYPP if they are three or four years old, receiving government-funded early education, and their parents receive benefits used to access eligibility for free school meals. Originally it was estimated that 20% of the sample would be eligible for EYPP, that is, approximately two of the ten participating children per setting. As such, power calculations indicated that this sample size would result in a MDES of 0.35 of a standard deviation (see Table 4). In total, 259 children in the sample were recorded as eligible for the EYPP (18% of the randomised sample) which, at the analysis stage, resulted in a MDES for the EYPP subsample of 0.39 (see Table 4).

Randomisation

Upon completion of baseline data collection, 139 settings were allocated to control (n = 74 settings) and intervention (n = 65 settings) using a one-to-one ratio. Allocation was carried out using the programme Minim, minimising by setting-level deprivation as measured by the IDACI decile of disadvantage. Allocation was conducted in batches and performed by the principal investigator of the evaluation team, who was not blinded to the analysis. Minimisation as a method of allocation is a widely accepted alternative to simple or stratified randomisation (Altman and Bland, 2005; Treasure and MacRae, 1998). Each setting was classified as' low', 'medium', or 'high' deprivation using the IDACI decile of disadvantage such that settings in the 50% least deprived areas were classified as 'low deprivation', settings in the 30% or 40% most deprived areas were classified as 'medium deprivation', and settings in the 10% and 20% most deprived areas were classified as 'high deprivation'. Although the intervention/control allocation produced unequal group sizes, the two groups are balanced in terms of the proportion of high, medium, and low deprivation:

- control: high (36%), med (28%), low (35%);
- intervention: high (38%), med (26%), low (35%).

The Peeple project delivery team recruited the settings that were allocated to intervention or control by the evaluation team. The evaluation team informed the Peeple project delivery team of the outcome of the allocation process, who subsequently informed the settings.

Statistical analysis

Primary outcome analysis

Analysis was conducted using Stata version 14 (Stata Corporation, College Station, Texas, USA) on an intention-to-treat basis (see Appendix G for the Stata code that was used in each stage of the analysis). The main effects of the intervention on the primary outcome—language skills as measured by the CELF core language scale—were estimated using multilevel modelling to take account of the clustered nature of the data (where pupil is level 1 and nursery setting is level 2). Within this model, the post-test CELF score formed the dependent variable and the independent variables included:

- dummy variable representing whether the child was a member of the intervention or control group (coded '1' and '0' respectively);
- pre-test score for Concepts About Print; and
- setting-level measure of deprivation (used in the allocation process and included in the main analysis as per EEF guidance).

The main focus for the analysis was the estimated coefficient associated with the dummy variable that represents the difference in mean scores on the respective outcome variable between the intervention and control groups, once baseline scores and other covariates are controlled for. This coefficient was used to estimate the effect size (see below) of the Programme in relation to the respective outcome variable as the standardised mean difference between the two groups at post-test (Hedges' *g*). The setting identifier (level 2) was included as a random effect within the model. The equation for the model is:

$$\text{LanguageScore}_{ij} = \beta_0 + \beta_1\text{AllocationVariable}_{ij} + \beta_2\text{PreTestScore}_{ij} + \beta_3\text{Deprivation}_{ij} + u_{0j} + e_{ij}$$

Where u_{0j} is the setting-level residual, that is, the effect of setting *j* on the outcome, and e_{ij} is a student-level residual. Residuals are assumed to be normally distributed with a mean of zero and variance σ^2_{u0}.

Secondary outcome analysis

The analysis of the secondary outcomes followed the same model specification used for the primary outcome. A series of models were estimated for each secondary outcome. which included:

Child secondary outcomes

- *early literacy development*, measured using Concepts About Print; and
- *social and emotional learning and communication*, measured using the Ages and Stages Questionnaire and the Brief Early Years Skills and Support Index.

For each outcome, the outcome score at post-test formed the dependent variable and the independent variables included:

- dummy variable representing whether the child was a member of the intervention or control group (coded '1' and '0' respectively);
- pre-test score for the outcome (the pre-test ASQ Social and Emotional Development also served as a baseline for the BESSI); and
- measure of deprivation (used in the allocation process).

Parent secondary outcomes

- *quality of the home learning environment*, measured using The Home Learning Environment scale; and
- *parenting skills,* measured using the Tool to Measure Parental Self Efficacy.

In order to minimise the research burden on parents, pre-test data for parent outcomes (quality of the home learning environment and parenting skills) were not collected. The models for these two outcomes therefore only included two covariates:

- dummy variable representing whether the child was a member of the intervention or control group (coded '1' and '0' respectively); and
- measure of deprivation (used in the allocation process).

Given the number of secondary outcomes being analysed, results should be interpreted with care to take account of a potentially increased risk of a Type I error.

Interim analyses

No interim analyses were planned or conducted.

Additional analyses

To determine whether the model was robust to the inclusion of additional covariates (known to be important in language development) further analyses were conducted. Specifically, for both the primary and secondary outcomes, the main models described above were re-run, except on this occasion the following covariates were also included: EYPP, EAL, and gender. The model equation becomes:

$$\text{OutcomeScore}_{ij} = \beta_0 + \beta_1\text{AllocationVariable}_{ij} + \beta_2\text{PreTestScore}_{ij} + \beta_3\text{Deprivation}_{ij} +$$

$$\beta_4\text{EYPP}_{ij} + \beta_5\text{EAL}_{ij} + \beta_6\text{Gender}_{ij} + u_{0j} + e_{ij}$$

An application to the NPD was made to obtain data relating to EYPP eligibility, EAL, and gender for each child.

Imbalance at baseline for analysed groups

At allocation, setting-level deprivation was used in the minimisation process to ensure balance between the intervention and control groups on this variable. As such, the intervention and control groups are compared at both baseline and analysis on this variable to examine any imbalance (using multilevel regression models to account for clustering).

In addition, core characteristics of the intervention and control groups (by setting, pupil, and parent) are compared, including:

- *setting characteristics*—setting type, setting/school size (based on the number of children on the register), OFSTED rating;
- *setting-level pupil characteristics*—proportion of pupils eligible for EYPP, proportion of pupils with English as an Additional Language (EAL), proportion of pupils with Special Educational Needs (SEN) or education and health care plans;
- *pupil characteristics*—age, gender, EAL status, EYPP eligibility;
- *parent characteristics*—age, highest level of parental education; and
- primary and secondary outcomes measured at pre-test.

Similarly, linear and logistic multilevel regression models were used to model the imbalance between the intervention and control groups, accounting for the clustered nature of the data. Summary statistics of these characteristics are presented in tabular format (see Table 6), disaggregated by control and intervention group. Setting- and pupil-level attrition are also reported from the point of randomisation to analysis. Imbalance at baseline attainment is reported as an effect size.

Missing data

Missing post-test data for language skills can occur if pupils are absent from school on the day of testing. This was minimised by a follow-up visit to any school with pupil absences. Missing data can also occur if a pupil leaves the school completely before the post-tests are administered, if a child does not assent to participate on the day of testing, or if parents withdraw consent after randomisation has taken place.

For outcomes measured using multi-item scales, there are two types of missing data: (1) complete missing data and (2) partial missing data where some but not all items of the measure are completed. Complete missing data was minimised by a second visit to the school to obtain data for any pupils who were absent on the main day of testing or a reminder email to parents to return the parent survey. Partial missing data was minimised during administration by ensuring that fieldworkers double check each test prior to leaving the school on the day of data collection. The extent of missing data within each scale was checked and cross-referenced with paper questionnaires to check for data entry errors.

For all variables, the proportion of, and reason for, missing data was assessed and is reported below. The proportion of each outcome lost to follow-up in the control and intervention groups was examined through cross-tabulations. If missing data was more than 5% then a complete case analysis was undertaken in addition to multiple imputation.

Multiple imputation was conducted as a sensitivity analysis. The pattern of missing data was explored by comparing the proportion of missing data in each of the control and intervention groups in addition to exploring how missingness is related to the outcomes in question. The missing data was judged to be 'missing not at random' (MNAR) on the basis that the level of missingness in some outcomes at post-test (mostly the parent outcomes) was statistically significantly associated with group allocation, thus rendering the missing data mechanism non-ignorable (see Appendix I). The imputation model imputed data separately for the control and intervention groups and included all relevant variables and auxiliary variables involved in the analysis and sampling design. The imputation was performed using chained equations, which fills in missing values in multiple variables iteratively by using a sequence of univariate imputation methods with fully conditional specification of prediction equations. This method accommodates arbitrary missing-value patterns. Twenty imputations were conducted in order to lessen the simulation (Monte Carlo) error. The analysis using the imputed datasets was compared to the complete case analysis. The sensitivity analysis constitutes a secondary analysis and the primary outcome analysis is presented without the multiple imputation.

Compliance

For the purpose of this evaluation, Peeple has defined compliance as 70% attendance by parents and children—that is, attending 14 of the 20 Programme sessions. This is useful in order to understand Peeple's perspective on the minimum number of sessions they consider parents should be attending. However, it was possible for the evaluation team to collect a continuous indicator of compliance through attendance registers; these were completed at every session by the Programme facilitator, supported and mentored by the Peeple project delivery team. The number of sessions attended by parents ranged from a minimum of zero (never attended) to 20 (attended every session) and it was this measure of dosage that was used as an indicator of compliance in the compliance analysis. The attendance data was provided to QUB by the Peeple project delivery team when the Programme was completed in the intervention settings. Following EEF guidance, an instrumental variable approach was used alongside the intention to treat (ITT) analysis to explore treatment effects in the presence of non-compliance. The analysis tested whether group allocation was endogenous with attendance (compliance). The other (exogenous) independent variables were retained in a two stage least squares instrumental variable model, that is, pre-test score and levels of deprivation. Clustering was accounted for by using cluster robust variance estimation.

Subgroup analyses

To estimate the effect of the intervention for children from deprived backgrounds, the main analysis described above was repeated on a subsample of the data relating to those identified as eligible for the EYPP. The models were run for both the primary and secondary outcomes.

Given that the intervention aims to improve language skills as the primary outcome, it was considered important by the developer and evaluation teams to explore whether the Programme is equally effective for children for whom English is an additional language (EAL). An interaction term was created - the product of the EAL variable, coded 1/0 and the intervention variable, coded 1/0 - and added as an independent variable to the main analysis models for each outcome.

Effect size calculation

Hedges' *g* was calculated using the following equation:

$$g = \frac{\text{coefficient}}{\text{pooled standard deviation}}$$

The standard deviation for each of the control and intervention group means was estimated using the standard errors from the null models, estimated for each group separately for each outcome. The pooled standard deviation was calculated using the following equation:

$$s = \frac{\sqrt{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}}{n_1 + n_2 - 2}$$

The standard error from the null models was also used to calculate the 95% confidence intervals, that is, coefficient +/- (1.96 x SE).

Implementation and process evaluation

A mixed-methods implementation and process evaluation (IPE) was undertaken alongside the trial to support understanding of the trial findings, explore Programme implementation and fidelity issues, and to understand control group activity. As recommended by guidance set by Humphrey et al. (2016), the IPE was designed to explore a number of dimensions of implementation namely fidelity, dosage, responsiveness, implementation support system, adaptation, and monitoring of the control group.

The IPE also explored the proposed mechanisms for change associated with the Programme (outlined in the logic model, Figure 1)—that enhancing parent skills and confidence will have a positive effect on the home learning environment, which in turn improves children's early language, literacy, and socio-emotional development.

Data collection took place between January and July 2018 and was collected through the use of both quantitative and qualitative methods described below. For the most part, data was collected by the evaluation team with the exception of the weekly register.

Weekly registers

Each school in the intervention group was asked to complete a weekly attendance register of all the children and parents who attended their weekly Peep-LTS sessions to determine dosage (that is, how many sessions parents attended). This included details of who attended (mother, father, or other family member), whether their absence was explained or not, and how many sessions in total they attended.

Implementation survey

A survey was administered to all intervention schools (n = 65) during the Programme delivery to explore fidelity, any issues settings had with delivery and strategies used to overcome these, and any adaptations they needed to make and why. An online survey was sent to schools, with the option to complete on paper and return by post if requested. Follow-ups included both a link and electronic copy to print and return as well as a hard copy sent in the post at the time of sending out post-test materials.

Interviews

Interviews were undertaken by the evaluation team with a sample that included Peep practitioners, parents, and the Peeple project delivery team. All interviews were conducted by telephone, recorded (with participant consent), and transcribed verbatim. Interviews were used to explore fidelity issues, level of participant engagement, challenges of implementation, and benefits of the Programme to practitioners and families as well as exploring the relationship between the Programme and parent, practitioner, and child outcomes.

Based on the information in the implementation survey and feedback from the Peeple project delivery team, settings invited to take part in the interviews were chosen to reflect high, medium, and low fidelity. Fidelity was defined as adherence to the Programme as set out by Peeple. Fidelity was determined using the data available from the implementation survey, specifically: number of practitioners trained and delivering the Programme (two to three), issues raised while delivering the Programme, and the nature of adaptations made. Feedback from the mentoring team was also valuable in this respect as they were able to reflect on which settings were struggling with delivery and which ones

were exhibiting high fidelity in their delivery. A shortlist of 22 schools was drawn up representing settings of high, medium, and low fidelity, balanced across different levels of deprivation and distributed throughout different locations. Out of this shortlist, 12 schools were contacted in the first instance of which seven settings responded with consent and provided the interview samples. Nine practitioners across the seven schools were interviewed; practitioners at each school asked parents and carers if they would also like to be interviewed. In addition, five members of the Peeple project delivery team were interviewed. In all, 22 interviews were conducted. The characteristics of the seven schools that took part in interviews are outlined in Table 2.

Table 2: Characteristics of settings included in interviews

School	Fidelity	Deprivation	Practitioners interviewed	Parents/Carer interviewed	Total Interviewed
1	High	High	1 nursery manager	0	1
2	High	Medium	1 family worker	1 mother‡ 1 mother	3
3	High	Low	1 nursery teacher 1 headteacher	1 father 1 grandmother‡ 3 mothers	7
4	Medium	High	1 nursery teacher‡	1 mother	2
5	Medium	Low	1 nursery teacher	0	1
6	Low	High	1 deputy head1 1 nursery teacher5	0	1
7	Low	Low	1 family worker	0	1
Total			9	8	17

‡ Not recorded due to equipment problems—notes referred to in analysis.

Practitioners

A total of nine practitioners participated in the semi-structured interviews; these were all involved in the delivery of the Programme within the seven case-study schools. All practitioners were female and included many roles within the nursery—headteacher, deputy headteacher, nursery manager, nursery teacher, and family worker. Interviews focused on practitioners' experience with delivering the Programme, what they enjoyed and did not enjoy, and perceived benefits to the school, parents, and children.

Parents

Parents in all seven schools above were invited to take part in an interview; however, only eight parents/carers from three schools chose to take part. These parents were from schools that represented high and medium fidelity only. The interviews focused on parental expectations and experiences with the Programme and the perceived benefits the Programme had on their skills and confidence and their child's learning.

[5] Interviewed together

Mentoring team

Five members of the Peeple project delivery team who had close working relationships with, and acted as mentors to, the intervention schools were interviewed. These interviews focused on experiences supporting the schools and the problems with delivery and solutions to any problems that arose.

Control group activity

Prior to the start of the intervention, a questionnaire was sent to all intervention and control schools to ascertain 'usual practice' in participating schools in relation to language, literacy, and socio-emotional learning. At the end of the Programme, control schools were sent another questionnaire to inform us of any changes to usual practice.

Analysis

Following transcription of interviews, thematic analysis (Braun and Clarke, 2006) was undertaken to code data and sort it into overarching themes relating to implementation, fidelity, outcomes, and challenges. Through a systematic method of coding and organisation (Ose, 2016) data was effectively organised and relevant quotes were readily available for extraction as needed. A similar process was used to code open-ended questions in both the implementation and parental surveys. These were then grouped under similar themes and quantified.

Costs

Information relating to the cost of the intervention was collected directly from the developer (Peeple). Practitioners who were interviewed as part of the IPE were also asked about the time and resources required to implement the Programme. Data collected included direct marginal costs such as fees for training and materials, as well as any prerequisites in the form of existing resources that schools would need to have access to in order to fully implement the Peep-LTS Programme. Data was also collected on school staff time requirements related to attending training, teacher supply cover, and preparation and delivery time.

On the basis of this information, a cost per pupil estimate was calculated to provide an indication of the likely financial cost to schools should they choose to implement Peep-LTS. Calculations assumed that the Programme would be delivered to ten pupils per school. Staff time was not included in this cost estimate, instead this is described separately to provide an indication of the likely in-kind contribution that is required by schools to deliver the Programme. Thus, the cost is calculated from a school perspective and over a three-year period so that schools can better understand whether cost-effectiveness changes if the Programme is delivered over a longer period of time.

Timeline

Table 3: Timeline

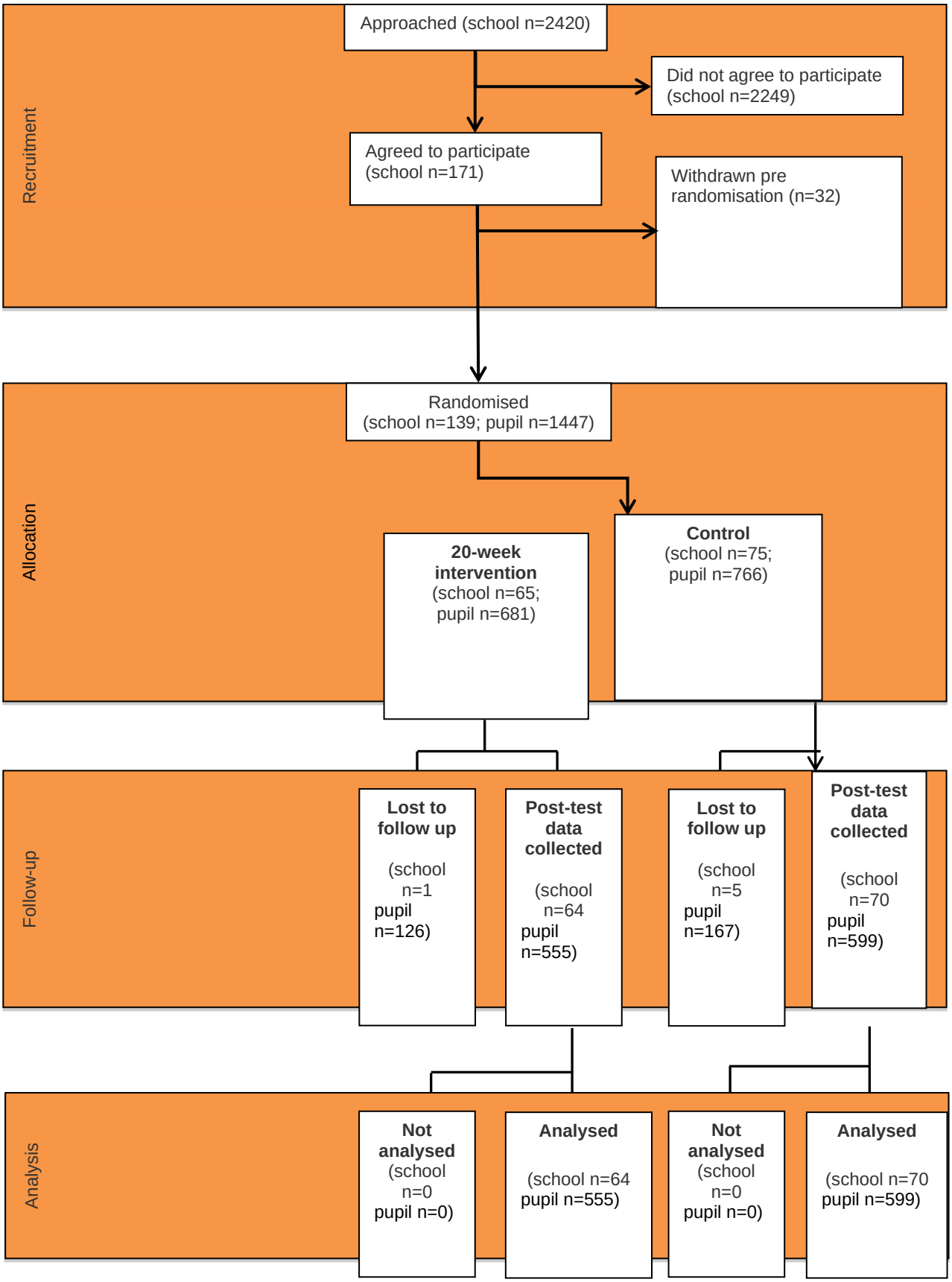
Date	Activity
Preparation for Programme delivery and evaluation set-up	
January 2017	Evaluation design (QUB)
March 2017	Ethical approval (QUB)
February–May 2017	Recruitment of settings (Peeple project delivery team)
October–November 2017	Pre-test data collection (QUB)
November 2017	Randomisation of settings
November–December 2017	Training of intervention settings by Peeple project delivery team
January–July 2018	Programme delivery (Peeple project delivery team)
January–March 2018	Input of pre-test data (QUB)
January–March 2018	Preparation for post-test data collection (QUB)
February–April 2018	Training fieldworkers (QUB)
May–June 2018	Interviews with practitioners, parents, and Peeple project delivery team (QUB)
May–July 2018	Post-test data collection of child outcomes (QUB)
May–July 2018	Post-test data collection of parent outcomes (QUB)
July–September 2018	Input of post-test data (QUB)
July 2018	Survey of settings (QUB)
September–October 2018	Quantitative data processing (QUB)
September–October 2018	Trial data analysis (QUB)
December 2018	Final report (QUB)[6]
October 2022	Accessed NPD Data
November 2022	Updated report submitted[7]

[6] The report was originally due in December 2018, however, due to delays in data from the National Pupil Database being released, the publication of the report was delayed. After further delays, it was decided that the analyses based on the NPD data would be included as an addendum to this report when available. The initial version of the report excluding the EYPP subgroup analysis was published in February 2020.
[7] NPD data accessed and report updated to include results of analyses of NPD data.

Impact evaluation

Participant flow including losses and exclusions

Figure 2: Participant flow diagram (primary outcome)



Effect sizes from previous quasi-experimental evaluations of the Peep Learning Together Programme have varied depending on the age of the children and the outcome in question. Given this and the absence of any existing randomised controlled trials, the trial was originally powered to detect a minimum effect size of 0.2 of a standard deviation. The estimates reported in Table 4 for the main trial (at the protocol, randomisation, and analysis stages of the study) have been calculated using Optimal Design (Version 3.01) and are based on a two-level cluster design (where level two is the setting and level one is the child).

After data analysis, the MDES was recalculated as 0.27 based on the actual parameters from the data:

- a sample of 134 schools with an average of 8.6 pupils per school;
- an ICC of 0.25; and
- a pre/post-test correlation of 0.37.

It is apparent, therefore, that the actual parameters were more conservative than the estimated parameters that were used in the sample size calculation at the protocol stage. A higher than expected ICC, a lower than expected pre/post-test correlation, and lower attrition meant that the MDES increased from 0.2 at the protocol and randomisation stages to 0.27 at the point of analysis. The actual MDES for the EYPP subsample at the point of analysis (0.39) was also more conservative than predicted (0.35) (see Table 4), likely due to a lower than expected correlation between pre and post test scores.

Table 4: Minimum detectable effect size (for the primary outcome) at different stages

		Protocol	Randomisation	Main Analysis	EYPP Analysis
MDES		0.20	0.20	0.27	0.39
Pre-test/ post-test correlations	level 1 (pupil)	0.50	0.50	0.37	0.28
		-	-	-	-
		-	-	-	-
Intracluster correlations (ICCs)	level 2 (setting)	0.10	0.10	0.25	0.11
		-	-	-	-
Alpha		0.05	0.05	0.05	0.05
Power		0.8	0.8	0.8	0.8
One-sided or two-sided?		Two	Two	Two	Two
Average cluster size		8	10	8.6	3
Number of schools	intervention	75	65	64	41
	control	75	74	70	41
	total	150	139	134	82
Number of pupils	intervention	600	681	555	103
	control	600	766	599	102
	total	1200	1447	1154	205

Attrition

Reasons for the drop-out of settings between recruitment and baseline testing (but prior to allocation) included concern around the feasibility of implementation, which was largely linked to doubts around the ability to recruit sufficient parents (approximately ten per setting) and staffing concerns.

Within the 139 participating settings, 1,447 children and their parents were recruited to the study. Sixty-five schools and 681 children were allocated to the intervention group; 74 schools and 766 children were allocated to the control group. Ultimately, 555 (81%) and 599 (78%) of children from the intervention and control groups respectively—80% of the sample overall—were included in the analysis of the primary outcome (these are the figures provided in Figure 2).

The most common reason for post-test data not being collected was the child being absent on the day of testing and on subsequent follow-up data collection days. One intervention school declined to participate in post-testing and four control schools did not respond to any communication about post-testing from the evaluation team or the Peeple project delivery team. Every effort was made by the evaluation team to ameliorate attrition, including repeated contact with schools via email, telephone, and letter.

Parent outcome data on the quality of the home learning environment and parenting skills were collected via a self-complete questionnaire (available online and in hard copy by post). In total, 55% of the parent sample returned a completed (or partially completed) questionnaire - 60% of the intervention group and 40% of the control group.

Table 5 below depicts the level of missing data for each outcome for the total sample (n = 1,447). Missing data is disaggregated by allocation group in subsequent reporting tables, where appropriate.

Table 5: Missing data for each outcome at pre and post test

Variable	Pre-test observations (missing)	Post-test observation (missing)
Language skills (CELF)	Not collected	1154 (293)
Early literacy (CoP)	1423 (24)	1167 (280)
Communication (ASQ)	1401 (46)	1137 (310)
Social emotional development (ASQ)	1388 (59)	1127 (320)
Social emotional development (BESSI)	Not collected	1085 (362)
Home learning environment (HLE)	Not collected	790 (657)
Parenting skills	Not collected	786 (661)
TOPSE play	Not collected	785 (662)
TOPSE empathy	Not collected	766 (681)
TOPSE self-acceptance	Not collected	766 (681)
TOPSE learning and knowledge	Not collected	775 (672)

Table 6: Pupil-level attrition from the trial (primary outcome)

		Intervention	Control	Total
Number of pupils	Randomised	681	766	1447
	Analysed	555	599	1154
Pupil attrition (from randomisation to analysis)	Number	126	167	293
	Percentage	18.5	21.8	20.2

Pupil and school characteristics

Table 7 provides a description of the early years settings and the pupils in the intervention and control groups. It can be seen that the majority of settings were Community Schools, albeit a higher proportion of this school type in the control group (50%) compared to the intervention group (38%), followed by Academy Converters (22% in the intervention group and 15% in the control group). The control group also had fewer Academy Sponsor Led (5% compared to 14%) and Foundation Schools (8% compared to 12%). The OFSTED ratings and school size represented within the two groups was approximately equivalent, as was the school-level proportion of children eligible for EYPP, statemented (SEN), or who spoke English as an additional language (EAL).

School-level data was not available for local authority nursery schools, which accounts for the missing data in the baseline comparison table above. Examination of the setting characteristics in each of the intervention and control groups demonstrates that the two groups are largely comparable and equivalent.

In terms of baseline equivalence on pupil-level outcomes (see Table 7), there was a pre-test difference in favour of the control group on the Concepts about Print measure of early literacy (Hedges' g = -0.18; 95% CI: -0.28, -0.07). However, there were no statistically significant baseline differences between groups on:

- age—Hedges' g = -0.06; 95% CI: -0.16, 0.04;
- the communication subscale of the ASQ—Hedges' g = -0.08; 95% CI: -0.18, 0.03; and
- the social-emotional (personal and social) subscale of the ASQ—Hedges' g = -0.02; 95% CI: -0.13, 0.08.

Using only the analysed sample (n = 1,154), baseline equivalence remained relatively unchanged. Thus, even though there was attrition between pre- and post-test, the characteristics of the sample remained largely unchanged:

- early literacy—Hedges' *g* = -0.17; 95% CI: -0.29, -0.06;
- age—Hedges' *g* = -0.00; 95% CI: -0.11, 0.11;
- the communication subscale of the ASQ—Hedges' *g* = -0.09; 95% CI: -0.21, 0.02; and
- the social-emotional (personal and social) subscale of the ASQ—Hedges' *g* = -0.03; 95% CI: -0.15, 0.09.

Examination of the histograms for the pre-test scores demonstrated that Concepts about Print was positively skewed. Previous literature indicates that the distribution of scores from this measure of early reading can be varied. Normal distributions have been reported (for example, Johnson, 2015), however, constrained skills theory would suggest that a non-normal distribution is also likely. As children are in a period of rapid acquisition of initial reading skills necessary for later, more advanced reading skills, data distributions of these initial reading skills are typically skewed (Paris, 2005). Communication and social-emotional development were negatively skewed. Importantly for the main analysis, the distribution of the post-test core language score (the primary outcome) was approximately normally distributed (Appendix G).

Table 7: Baseline comparison

Variable	Intervention group		Control group	
School-level (categorical)	n/N (missing)	Percentage	n/N (missing)	Percentage
Setting type				
Academy converter	14/65 (0)	22%	11/74 (0)	15%
Academy Sponsor Led	9/65 (0)	14%	4/74 (0)	5%
Children's Centre	0/65 (0)	0%	1/74 (0)	1%
Community School	25/65 (0)	38%	37/74 (0)	50%
Foundation School	8/65 (0)	12%	6/74 (0)	8%
LA Nursery School	4/65 (0)	6%	8/74 (0)	11%
Voluntary Aided School	5/65 (0)	8%	4/74 (0)	5%
Voluntary Controlled School	0/65 (0)	0%	3/74 (0)	4%
Ofsted rating				
Outstanding	11/65 (0)	17%	15/74 (0)	20%
Good	35/65 (0)	54%	43/74 (0)	58%
Satisfactory	1/65 (0)	2%	0/74 (0)	0%
Requires improvement	5/65 (0)	8%	6/74 (0)	8%
Inadequate	3/65 (0)	5%	1/74 (0)	1%
Not available	10/65 (0)	15%	9/74 (0)	12%
School-level (continuous)	n (missing)	Mean (SD)	n (missing)	Mean (SD)
Number enrolled (size)	61 (4)	365 (149)	65 (9)	348 (155)
Proportion of pupils eligible for EYPP	61 (4)	0.30 (0.16)	65 (9)	0.28 (0.14)
Proportion of pupils with EAL	61 (4)	0.14 (0.19)	65 (9)	0.16 (0.20)
Proportion of pupils with SEN	61 (4)	0.01 (0.02)	65 (9)	0.01 (0.01)
Pupil-level (categorical)	n/N (missing)	Percentage	n/N (missing)	Percentage
Female	312/681 (4)	45.8%	374/766 (6)	48.8%
Pupil-level (continuous)	n (missing)	Mean (SD)[1]	n (missing)	Mean (SD)[1]
Age (years)	674 (7)	3.58 (0.42)	749 (17)	3.61 (0.57)
Pretest Concepts About Print score	673 (8)	2.61 (4.31)	750 (16)	3.74 (7.86)
Pretest Ages and Stages Questionnaire Communication Score	662 (19)	40.55 (32.11)	739 (27)	42.93 (29.15)
Pretest Ages and Stages Questionnaire Personal and Social (SEL) Score	648 (33)	46.68 (21.48)	740 (26)	47.16 (23.62)

[1] SD adjusted to reflect clustering at the school level.

Outcomes and analysis

Primary analysis

The primary outcome analysis shows no effect of the intervention on core language skills at immediate post-test (Hedges' *g* = 0.03; 95% CI: [-0.09, 0.14] - see Table 8). The parameters used to estimate this effect are reported in Table 9.

Table 8: Primary analysis

	Raw means				Effect size			
	Intervention group		Control group					
Outcome	n (missing)	Mean (95% CI)	n (missing)	Mean (95% CI)	n in model (intervention; control)	Hedges *g* (95% CI)	p-value	ICC
Language skills	555 (126)	93.32 (91.92, 94.72)	599 (167)	95.12 (93.80, 96.45)	1154 (555, 599)	0.03 (-0.09, 0.14)	0.62	0.25

Table 9: Effect size estimation (primary outcome)

Outcome	Unadjusted differences in means	Adjusted differences in means	Intervention group		Control group		Pooled variance	Population variance (if available)
			n (missing)	Variance of outcome	n (missing)	Variance of outcome		
Language skills	-1.80	0.79	555 (126)	932	599 (167)	651	785	-

Secondary analysis

The analysis of the secondary, child-related outcomes showed a small, positive effect of the intervention on early literacy development, but this was not statistically significant (Hedges' *g* = 0.10, 95% CI: [-.02, .21]. There was no effect of the intervention on communication (Hedges' *g* = 0.03, 95% CI [-.08, .15]) or social-emotional development (ASQ: Hedges' *g* = -0.04, 95% CI [-.16, .08]; BESSI: Hedges' *g* = 0.03, 95% CI [-.09, .15]).

The analysis of the secondary, parent-related outcomes showed a positive, statistically significant effect of the intervention on parent self-acceptance (Hedges' g=0.17, 95% CI [.03, .31]) and confidence in learning and knowledge (Hedges' g=0.16, 95% CI [.02, .31]) as measured by the TOPSE. There were small, positive effects of the intervention on the home learning environment (Hedges' g=0.13, 95% CI [-.01, .27]) and parents' confidence in playing and enjoying their child (Hedges' g=0.11, 95% CI [-.03, .25]), however, these small improvements were not statistically significant. There was no evidence of an effect of the intervention on parental empathy (Hedges' g=0.03, 95% CI [-.11, .17]). The results of all the secondary analyses are reported in Table 10. The parameters used to estimate the effect sizes are reported in Table 11. All primary and secondary analyses were pre-specified in the statistical analysis plan.

Table 10: Secondary analysis

	Raw means				Effect size			
	Intervention group		Control group					
Outcome	n (missing)	Mean (95% CI)	n (missing)	Mean (95% CI)	n in model (intervention; control)	Hedges *g* (95% CI)	p-value	ICC
secondary Early literacy development	561 (120)	6.56 (6.20, 6.91)	605 (161)	6.71 (6.35, 7.06)	1166 (561, 605)	0.10 (-0.02, 0.21)	0.08	0.31
Communication	545 (136)	47.40 (46.08, 48.71)	580 (186)	47.98 (46.70, 49.26)	1125 (545, 580)	0.03, (-0.08, 0.15)	0.54	0.20
Social and emotional development (ASQ)	527 (154)	49.04 (48.08, 50.00)	577 (189)	50.02 (49.09, 50.95)	1104 (527, 577)	-0.04 (-0.16, 0.08)	0.48	0.14
Social and emotional development (BESSI)	518 (163)	2.46 (2.20, 2.73)	543 (223)	2.32 (2.08, 2.56)	1061 (518, 543)	0.03 (-0.09, 0.15)	0.61	0.09
Quality of the home learning environment	408 (273)	37.31 (36.66, 37.96)	382 (384)	36.30 (35.59, 37.01)	790 (408, 382)	0.13 (-0.01, 0.27)	0.07	0.05
Parenting skills *TOPSE play and enjoyment*	405 (276)	55.38 (54.82, 55.95)	381 (385)	54.60 (53.91, 55.30)	786 (405, 381)	0.11 (-0.03, 0.25)	0.11	0.02
TOPSE empathy	401 (280)	53.43 (52.85, 54.01)	384 (382)	53.24 (52.60, 53.88)	785 (401, 384)	0.03 (-0.11, 0.17)	0.69	0.04
TOPSE self-acceptance	393 (288)	53.33 (52.68, 53.98)	373 (393)	52.04 (51.27, 52.81)	766 (393, 373)	0.17 (0.03, 0.31)	0.02	0.01
TOPSE Learning and knowledge	394 (287)	53.33 (52.78, 53.89)	381 (385)	52.09 (51.37, 52.82)	775 (394, 381)	0.16 (0.02, 0.31)	0.02	0.05

Table 11: Effect size estimation (secondary outcomes)

Outcome	Unadjusted differences in means	Adjusted differences in means	Intervention group		Control group		Pooled variance	Population variance (if available)
			n (missing)	Variance of outcome	n (missing)	Variance of outcome		
Early literacy development	-0.15	0.76	561 (120)	61.94	605 (161)	64.32	63.17	Not available
Communication	-0.58	0.80	545 (136)	529	580 (186)	560	543	Not available
Social and emotional development (ASQ)	-0.98	-0.64	527 (154)	264	543 (223)	308	285	Not available
Social and emotional development (BESSI)	0.14	0.12	518 (163)	13.54	543 (223)	18.15	15.90	Not available
Quality of the home learning environment	1.01	1.02	408 (273)	59.60	382 (384)	64.32	61.88	Not available
Parenting skills *TOPSE play*	0.78	0.76	405 (276)	44.49	381 (385)	47.61	46.63	Not available
TOPSE empathy	0.09	0.20	401 (280)	48.72	384 (382)	43.43	46.13	Not available
TOPSE self acceptance	1.29	1.26	393 (288)	54.76	373 (393)	56.55	55.63	Not available
TOPSE Learning and knowledge	1.24	1.20	394 (287)	42.25	381 (385)	64.64	53.26	Not available

Additional analysis

To determine whether the model was robust to the inclusion of additional covariates (known to be important in language development), the main models reported above were re-run, but with the addition of the following covariates: EYPP, EAL, and gender. From Table 12: the inclusion of the additional covariates results in little difference in the effect size estimates and does not change the conclusions of the main analysis.

Table 12: Additional analysis: main analysis compared to analysis including additional covariates

	Main analysis Effect size			Additional covariate analysis Effect size		
Outcome	n in model (intervention; control)	Hedges *g* (95% CI)	p-value	n in model (intervention; control)	Hedges *g* (95% CI)	p-value
Language skills	1154 (555, 599)	0.03 (-0.09, 0.14)	0.62	1118 (547, 571)	<0.01 (-0.12, 0.12)	0.99
Early literacy development	1166 (561, 605)	0.10 (-0.02, 0.21)	0.08	1121 (553, 568)	0.08 (-0.04, 0.19)	0.17
Communication	1125 (545, 580)	0.03, (-0.08, 0.15)	0.54	1091 (546, 545)	0.02 (-0.10, 0.14)	0.68

Social and emotional development (ASQ)	1104 (527, 577)	-0.04 (-0.16, 0.08)	0.48	1070 (528, 542)	-0.04 (-0.16, 0.08)	0.43
Social and emotional development (BESSI)	1061 (518, 543)	0.03 (-0.09, 0.15)	0.61	1028 (519, 509)	0.01 (-0.12, 0.13)	0.92
Quality of the home learning environment	790 (408, 382)	0.13 (-0.01, 0.27)	0.07	766 (409, 357)	0.12 (-0.02, 0.26)	0.12
Parenting skills *TOPSE play*	786 (405, 381)	0.11 (-0.03, 0.25)	0.11	763 (406, 357)	0.10 (-0.04, 0.24)	0.15
TOPSE empathy	785 (401, 384)	0.03 (-0.11, 0.17)	0.69	761 (402, 359)	0.01 (-0.13, 0.15)	0.85
TOPSE self-acceptance	766 (393, 373)	0.17 (0.03, 0.31)	0.02	742 (394, 348)	0.16 (0.02, 0.31)	0.03
TOPSE Learning and knowledge	775 (394, 381)	0.16 (0.02, 0.31)	0.02	751 (395, 356)	0.14 (0.00, 0.28)	0.06

Sensitivity analysis

The sensitivity of the analyses reported above to missing data was tested by comparing the results from the complete case analysis with an analysis based on multiple imputation of missing data (see Table 12). The effect size estimates based on the imputed data were very similar to the effects observed in the complete case analysis in all of: magnitude, direction, and statistical significance. If anything, the estimates based on the imputed data were, in the main, more conservative. Thus, we can be confident in the reliability of the effect size estimates produced from the complete case analysis. This sensitivity analysis was pre-specified in the statistical analysis plan.

Table 13: Sensitivity analysis: complete case analysis compared to multiple imputation

	Complete case analysis Effect size			Multiple imputation		
Outcome	n in model (intervention; control)	Hedges *g* (95% CI)	p-value	n in model (intervention; control)	Hedges *g* (95% CI)	p-value
Language skills	1154 (555, 599)	0.03 (-0.09, 0.14)	0.62	1447 (681, 766)	0.07 (-0.03, 0.18)	0.36
secondary Early literacy development	1166 (561, 605)	0.10 (-0.02, 0.21)	0.08	1447 (681, 766)	0.08 (-0.03, 0.18)	0.05
Communication	1125 (545, 580)	0.03, (-0.08, 0.15)	0.54	1447 (681, 766)	0.02 (-0.08, 0.13)	0.58
Social and emotional development (ASQ)	1104 (527, 577)	-0.04 (-0.16, 0.08)	0.48	1447 (681, 766)	0.02 (-0.08, 0.13)	0.26
Social and emotional development (BESSI)	1061 (518, 543)	0.03 (-0.09, 0.15)	0.61	1447 (681, 766)	-0.02 (-0.12, 0.08)	0.51
Quality of the home learning environment	790 (408, 382)	0.13 (-0.01, 0.27)	0.07	1447 (681, 766)	0.11 (0.01, 0.21)	0.05
Parenting skills *TOPSE play*	786 (405, 381)	0.11 (-0.03, 0.25)	0.11	1447 (681, 766)	Model did not converge	Model did not converge
TOPSE empathy	785 (401, 384)	0.03 (-0.11, 0.17)	0.69	1447 (681, 766)	0.03 (-0.07, 0.14)	0.51
TOPSE self-acceptance	766 (393, 373)	0.17 (0.03, 0.31)	0.02	1447 (681, 766)	0.11 (0.01, 0.21)	0.03
TOPSE Learning and knowledge	775 (394, 381)	0.16 (0.02, 0.31)	0.02	1447 (681, 766)	0.12 (0.01, 0.22)	0.02

Compliance analysis

The intervention schools, supported by the Peeple project delivery team, kept records of parental attendance at the Peep-LTS sessions and returned this data to the evaluation team at the end of programme delivery. Of the 681 parents in the intervention group, we have data on the number of sessions attended for 463 (68%) of these parents (missing n = 218, 32%). On average, parents in the intervention group (for whom we have data) attended 10.2 of the 20 sessions (sd = 7.6: min = 0, max = 20 sessions). At the start of the trial, in discussion with the EEF and the evaluation team, the Peeple project delivery team indicated that if parents received 14 or more of the 20 Peep-LTS sessions (70%) then they considered this to be sufficient 'dosage' to achieve a positive impact on children's language skills. Thus, the term *compliance* is used to indicate parents' receipt of 70% or more of the intervention. Since not all of the intervention group received as much of the intervention as intended, it is possible that the main analysis reported above might underestimate the true effect of the intervention. The analyses reported below attempt to explore this possibility.

As per the statistical analysis plan, an alternative analytical technique, using an instrumental variable approach, was conducted to also try to ascertain whether children whose parents received more of the intervention (that is, attended more sessions) have better language skills at post-test. In this analysis, we make the assumption that group allocation is endogenous with the number of sessions attended, a continuous measure of dosage that we are using as an indicator for compliance, ranging in value from 0 to 20. Thus, compliance is used as an instrumental variable for group allocation. This means that we are testing whether receiving Peep-LTS and attending sessions is in fact a predictor of better outcomes compared to simply being offered Peep-LTS—that is, allocated to the intervention group (which we now know does not in itself mean that the intervention was received).

The instrumental variable analysis indicated that compliance was not a better (less biased) predictor of language outcomes (compared to group allocation) and in fact it was not endogenous with group allocation. As such, it is a weak instrument for group allocation (Wu Hausman F(1, 960) = 0.05; p = 0.81) and the resulting instrumental model (reported in Appendix K) was not valid. This means that we do not have any evidence to suggest that 'more' of the intervention (attending more sessions) means that children are likely to benefit any more, by way of improved language skills. This analysis was conducted on complete cases only.

Overall, 220 (32%) parents attended 14 or more sessions and as such could be described as 'compliant'. An on-treatment analysis was conducted to ascertain whether we might observe larger improvements in language skills for those 220 children whose parents were 'compliant' compared to all of the children in the control group. However, this was not the case and the difference between the 'compliant' intervention group and all of the control group on language scores at post-test was even smaller than reported in the primary analysis above (Hedges g=0.003 compared to Hedges g=0.03 in the main analysis of all intervention participants). This on-treatment analysis (see Appendix J for further details) was not specified in the statistical analysis plan and so should be considered exploratory only. The high proportion of missing data and the low proportion of parents who attended 14 or more sessions are additional reasons to be cautious about interpreting this particular finding.

Subgroup analyses

Primary analysis on the EYPP sub-sample

The main analysis was repeated on a subsample of pupils who were identified as eligible for the EYPP. Analysis for the primary outcome in this group shows a positive effect of the intervention on core language skills at immediate post-test (Hedges' *g* = 0.28; 95% CI: [0.01, 0.55] - see Table 14). The parameters used to estimate this effect are reported in Table 15.

Table 14: Primary analysis on the EYPP subsample

	Raw means				Effect size			
	Intervention group		Control group					
Outcome	n (missing)	Mean (95% CI)	n (missing)	Mean (95% CI)	n in model (intervention; control)	Hedges *g* (95% CI)	p-value	ICC
Language skills	102 (27)	89.10 (85.74, 92.46)	103 (26)	93.36 (89.79, 96.94)	205 (53)	0.28 (0.01, 0.55)	0.05	0.11

Table 14: Effect size estimation (primary outcome in the EYPP subsample)

Outcome	Unadjusted differences in means	Adjusted differences in means	Intervention group		Control group		Pooled variance	Population variance (if available)
			n (missing)	Variance of outcome	n (missing)	Variance of outcome		
Language skills	-4.27	5.04	102 (27)	300.00	103 (26)	342.68	321.45	-

Secondary analysis on the EYPP sample

The analysis of the secondary, child-related outcomes on the EYPP subsample showed a positive effect of the intervention on early literacy development.(Hedges' *g* = 0.25, 95% CI: [-.03, .52]. There was also a positive effect of the intervention on communication (Hedges' *g* = 0.28, 95% CI [.00, .56).

There was a small negative effect of the intervention on social-emotional development (ASQ: Hedges' *g* = -0.11, 95% CI [-.39, .17]; BESSI: Hedges' *g* = -0.03, 95% CI [-.32, .25]) which was not statistically significant.

Similar to the main analysis on the full sample, there was a positive, statistically significant effect of the intervention on parent self-acceptance (Hedges' g=0.45, 95% CI [.04, .85]). The remaining parent outcomes were not statistically significant, although there were small positive changes in parents' confidence in playing and enjoyment of their child (Hedges' g=0.27, 95% CI [-.11, .66] and parents' confidence in learning and knowledge (Hedges' g=0.22, 95% CI [-.17, .60]) as measured by the TOPSE.

There was no evidence of an effect of the intervention on parental empathy (Hedges' g=0.05, 95% CI [-.33, .43]) or the home learning environment (Hedges' g=-0.03, 95% CI [-.41, .35]). The results of the secondary analyses on the EYPP subsample are reported in Table 15. The parameters used to estimate the effect sizes are reported in Table 16.

Table 15: Secondary analysis on the EYPP subsample

	Raw means				Effect size			
	Intervention group		Control group					
Outcome	n (missing)	Mean (95% CI)	n (missing)	Mean (95% CI)	n in model (intervention; control)	Hedges *g* (95% CI)	p-value	ICC
Early literacy development	100 (29)	5.02 (4.18, 5.86)	104 (25)	5.95 (4.96, 6.94)	204 (54)	0.25 (-0.03, 0.52)	0.09	0.23
Communication	105 (24)	44.17 (41.00, 47.35)	97 (32)	47.84 (45.06, 50.61)	202 (56)	0.28 (0.00, 0.56)	0.02	0.00*
Social and emotional development (ASQ)	102 (26)	46.78 (44.26, 49.31)	95 (34)	46.29 (43.53, 49.06)	197 (59)	-0.11 (-0.39, 0.17)	0.39	0.07
Social and emotional development (BESSI)	92 (36)	3.11 (2.48, 3.74)	95 (34)	2.76 (2.10, 3.41)	187 (69)	-0.03 (-0.32, 0.25)	0.81	0.00*
Quality of the home learning environment	55 (74)	35.87 (33.92, 37.82)	48 (81)	36.11 (38.02	103 (55, 48)	-0.03 (-0.41, 0.35)	0.88	0.00*
Parenting skills *TOPSE play and enjoyment*	55 (74)	55.38 (53.92, 56.85)	48 (81)	53.13 (50.93, 55.32)	103 (55, 48)	0.27 (-0.11, 0.66)	0.16	0.00*
TOPSE empathy	55 (74)	52.24 (50.30, 54.17)	48 (81)	51.25 (48.98, 53.52)	103 (55, 48)	0.05 (-0.33, 0.43)	0.80	0.00*
TOPSE self-acceptance	52 (77)	54.46 (52.91, 56.01)	44 (85)	51.14 (48.48, 53.79)	97 (77, 85)	0.45 (0.04, 0.85)	0.03	0.11
TOPSE Learning and knowledge	55 (74)	53.40 (51.81, 54.99)	48 (81)	51.88 (49.67, 54.09)	103 (55, 48)	0.22 (-0.17, 0.60)	0.26	0.00*

*Truncated at zero

Table 16: Effect size estimation (secondary outcomes in the EYPP subsample)

Outcome	Unadjusted differences in means	Adjusted differences in means	Intervention group		Control group		Pooled variance	Population variance (if available)
			n (missing)	Variance of outcome	n (missing)	Variance of outcome		
Early literacy development	-0.93	1.19	100 (29)	18.32	104 (25)	26.63	22.56	Not available
Communication	-3.66	4.34	105 (24)	275.56	97 (32)	194.77	236.78	Not available
Social and emotional development (ASQ)	0.49	-1.57	102 (26)	203.36	95 (34)	189.41	196.63	Not available
Social and emotional development (BESSI)	0.35	-0.11	92 (36)	9.48	95 (34)	10.60	10.05	Not available
Quality of the home learning environment	-0.24	-0.22	55 (74)	54.33	48 (81)	45.59	50.26	Not available
Parenting skills *TOPSE play*	2.26	1.85	55 (74)	30.71	48 (81)	60.23	44.45	Not available

TOPSE empathy	0.99	0.39	55 (74)	53.78	48 (81)	64.31	58.68	Not available
TOPSE self acceptance	3.33	3.32	52 (77)	32.40	44 (85)	80.89	54.58	Not available
TOPSE Learning and knowledge	1.52	1.52	55 (74)	36.06	48 (81)	61.04	47.68	Not available

Subgroup analysis for pupils with English as an Additional Language (EAL)

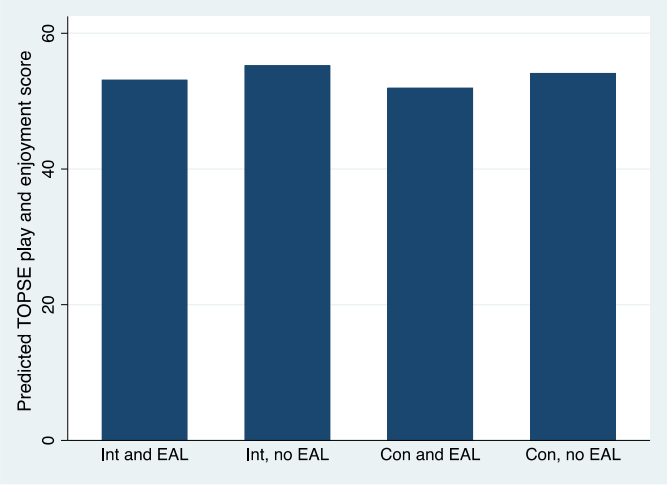
As described in the analysis section above, interaction terms were added to the main models for the primary and secondary outcomes to test if there was a differential impact of the intervention for children with EAL. There was no evidence of a differential effect for any of the outcomes, except for the play and enjoyment subscale of the TOPSE (Beta=-2.15, SE=0.90, p=0.02). Given the reduced sample sizes in the subgroups and the fact that this was the only interaction effect detected, we would caution against overinterpreting its importance.

To better visualise the effect of the interaction, the regression model equation was used to calculate predicted mean scores on the outcome variable (TOPSE play and enjoyment) for:

- Parents in the intervention group for whom English was *not* an additional language scored on average: 53.30
- Parents in the intervention group for whom English was an additional language scored on average: 53.15
- Parents in the control group for whom English was *not* additional language scored on average: 54.16
- Parents in the control group for whom English was an additional language scored on average: 52.01

In both the intervention and control groups, parents with English as an additional language scored lower than parents for whom English was not an additional language. The group that scored the lowest overall were parents in the control group with English as an additional language.

Figure 3: Bar chart depicting predicted TOPSE play and enjoyment scores for parents of children with and without EAL in the control and intervention groups



Cost

The Peep-LTS Programme costs schools £474 (including VAT) per practitioner, to buy. This cost includes online access to all the resources needed to implement the Programme as well as two days training for one practitioner. The online materials can be printed off by schools as many times as they need to and they can purchase hard copies of the resources for an additional £85, if they choose to do so. Peeple can deliver the training in a variety of flexible ways such that it can be delivered over two full days or, for example, four twilight sessions. The mentoring that was implemented

by the Peeple project delivery team, for the purposes of the trial is not typical for programme delivery (and is not included in this cost analysis), although settings can choose to pay for individual consultancy sessions if they want or need to.

The costs that are not included in the cost estimate include the potential cost to the school of supply cover for the practitioner(s) attending the two days of training and the time required by practitioners to prepare for each session. Peeple recommend that for every hour of programme delivery, practitioners spend two additional hours on preparation (of materials and resources, for example), contacting or engaging with parents, reviewing sessions, and reflecting on practice. For the period of the intervention (five months), which consisted of 20 weekly sessions, this equates to 20 hours delivery time in addition to 40 hours preparation and reflection time, overall. Once a package of materials and resources is developed and practitioners' experience of delivery increases, it is anticipated that preparation time will decrease. Peep-LTS is typically delivered during school time, but it can, if the school decides to, be delivered after school and this associated staff time is covered by the school.

The cost estimates below (Table 17) are based on a setting paying for the online Peep-LTS materials and two practitioners to be trained (£474 x 2) and deliver the Programme to a group of ten children and parents per year. There are no ongoing direct costs unless a setting chooses to train an additional practitioner. Thus, the total cost per pupil per year over three years is £31.60. As there are no ongoing or recurring costs, the cumulative cost of delivering Peep-LTS over a three-year period remains unchanged after the first year, that is, £948, based on two practitioners being trained (Table 18). This cost will increase if the school decides to train more practitioners. Schools taking part in the evaluation did not have to pay the training and materials cost as this was included within the developer's grant from the EEF.

Table 17: Cost of delivering Peep-LTS

Item	Type of cost	Cost	Total cost over 3 years	Total cost per pupil per year over 3 years
Materials and training for one practitioner	Direct cost to the school	£948	£948	£31.60

Table 18: Cumulative costs of delivering Peep-LTS

	Year 1	Year 2	Year 3
Peep-LTS	£948	£948	£948

Implementation and process evaluation

This section presents findings from the Implementation and Process Evaluation (IPE) of the Learning Together Programme. The purpose of the IPE was to explore the necessary conditions for successful implementation, assess fidelity (whether the Programme delivered as intended), consider the facilitators and barriers to parents' engagement with the Programme, and monitor control group activity. Data was collected through surveys and interviews with nursery staff, parents, and the Peeple project delivery team through weekly attendance logs completed by the intervention settings, pre and post-intervention, business as usual surveys, and specific questions in the parent questionnaire.

The response rate of these methods was as follows: from the intervention settings (n = 65) we received 44 weekly registers (67.7%); 60 settings returned the implementation survey (92.3%), and 410 out of 681 parental questionnaires (60.2%) were returned. A total of 22 interviews were also conducted with practitioners (n = 9), parents/carers (n = 8), and Peep-LTS project delivery team (n=5). Control group activity was monitored through a usual practice survey sent out to control settings (n = 74) at pre- and post-intervention; 84.9% of settings returned the pre-test survey, and 36.5% of settings returned the post-test survey—24 settings (32.4%) returned both.

A summary of findings is presented under the main headings of Implementation, Fidelity, Outcomes, Formative Findings and Control Group Activity.

Implementation

Factors affecting implementation

Through interviews and the survey it was possible to explore the factors that contribute to successful implementation and barriers faced. Key factors identified that supported successful implementation were the training delivered by the Peeple project delivery team at the start of the intervention, support from school leaders, the structure of the Programme, and time and resources being available for practitioners to deliver. Ongoing support was also available to practitioners through Peeple 'mentors', trained and experienced Peep practitioners who were part of the delivery team and were assigned geographical regions to supported schools through the set-up of the study and training. They became the first point of contact for settings delivering the Programme. This mentoring support is included in this section; while it is not a current part of the Programme delivery, it is external support that helped settings to deliver the Programme.

Facilitators to successful implementation

Training

In the implementation survey, practitioners were asked how well-equipped they felt before and after the training. A small proportion of practitioners (8.3%) indicated that they felt 'very well equipped' to recruit parents and 46.7% felt somewhat equipped, prior to the training. After training, all respondents indicated that they felt well equipped in their ability to deliver the Programme, with 81.7% stating they felt 'very well equipped'. This was also reflected in the interview data:

> *I thought the training was lovely, I really enjoyed the training, I thought it gave detail, it gave structure, it gave focus. I came away from the training feeling extremely confident about delivering it but I think the way that it was delivered was extremely strong in the sense that actually it was modelled well enough for us just to come back into class and think identically in the same way.*

A description of the training received is included in the 'intervention' section of this report. As described here, during training, practitioners had the chance to also take part in a role-play session and practice the delivery of a Peep-LTS session with their colleagues. Practitioners found this to be a very useful part of the training, which was reflected in both the survey responses and the interview data:

> *We had a practice of running a Peep session within the training actually, because then we had in our head what that structure actually looked like. So we took it in turns to be the Peep practitioners within the session as well, that was really useful, because I think until you've had a go you can't envisage what that's going to look like, so that was really useful.*

Support from leaders

Interviews with practitioners and mentors highlighted that support from the nursery, the overall school buy-in, and particularly support from senior management was essential to the successful implementation of the Programme within nurseries. Without the support of the headteacher or senior management, many felt there would be a problem delivering the Programme. As schools could be busy places, having the commitment from senior staff to spend time planning and delivering the Programme was essential:

> *If the headteacher wasn't on board, and she was rather you were spending that time [planning for Peep sessions] doing something else, there would be absolutely no chance.*

Most of the practitioners interviewed were encouraged by their headteacher, provided with rooms, and had access to the additional resources needed to deliver the weekly Peep-LTS sessions (such as books and craft supplies). The Peeple project delivery team also observed the time given to practitioners was an important part of successful delivery of the Programme. When discussing one school in particular, one of the delivery team observed:

> *They have a Peep morning, so they can plan—they can set up, they can get their teas and coffees and biscuits ready, be all nice, they're relaxed; they then get the children and the parents in, they've then got time at the end where they can have a general chit-chat to the parents before they tidy up, and they then sit down, review, and then plan for the next week, before they have to go back into the nursery. I mean, that's just massive buy-in from her [headteacher].*

Mentors developed close relationships with the settings and were able to reflect on a number of issues faced by practitioners. In some instances, the practitioners who were trained and delivering the Programme had not been involved in the recruitment of parents, or the initial signing-up of the setting to the study. They felt as if they were 'dropped' into the Programme, causing some lack of confidence with delivery:

> *And what had happened the Deputy had recruited parents of children … children where the parents were working. She hadn't really understood what she was signing up for and what the involvement had to be. So, when it came to the nursery teacher regrouping with these parents in January they were obviously at work and not able to attend, so that was a really tricky situation that the nursery teacher was feeling a little bit let down that she hadn't been involved in the recruitment and she couldn't get this group together and we tried lots of things to reengage them and she's managed to get a couple and then we agreed that she could invite different parents just so that she could deliver the programme and enjoy the sessions without them being part of it [the study].*

This illustrates the importance of school leader support to successful implementation of the Programme. Those settings where the Programme was integrated into the weekly routine—something that was managed through leadership support—found implementation easier.

Programme content and resources

The majority of practitioners agreed that the resources provided by the Peeple project delivery team were 'very useful' (90% of survey respondents). The resources included a plan for each weekly session along with home activity sheets to give to parents. For each of the 20 weeks, practitioners were given:

- **strand key ideas**—based on the latest research in child development, these are shared by the practitioner with parents during their Peep Learning Together session in a variety of ways that value and build on existing practices within the home;
- **topic—**providing the practitioner with a variety of content from which they could select to create each individual Peep session and topic-specific **key ideas**; every Peep session includes a welcome and goodbye song, a Talk Time discussion with parents, songs and rhymes, books and/or stories, and ideas for things to do at home;
- **session plan**—providing the practitioner with a ready-made session plan;
- **topic handouts for parents—** summarising the **key ideas** in parent-friendly language and providing different levels of detail so parents/practitioners can select the most appropriate;
- **things to do at home**—to help parents consolidate and/or extend the learning from the session; and

- **activity sheets**—for parents to take home.

In the interviews, practitioners appreciated the 'structure' of the Programme, especially having everything set out for them:

> *It was such a blessing to have all the planning there and all the hand-outs. We sit down every half term where we plan for the next five or six weeks, however long the half term is, so we know what book we are going to be doing and what songs we are going to sing, and the activity and stuff. So, we kind of use the planning and just take it from that really.*

Peep sessions require minimal equipment; a mat on the floor with cushions to sit on is required in the initial set up. Book and song/rhyme suggestions are given in the session plan, and practitioners provide a suggested activity for each session to fit the topic. In order to deliver the Programme successfully, space is needed for the group, and practitioners need to gather together the books and activity resources. In some of the larger nurseries, practitioners found this was easy enough to do:

> *We just literally have a mat, some cushions, and then we have a few tables with the activities out on. It is not a lot of setting up, because, as I say, we are really lucky with the space that we have here, so you have got dedicated family rooms which you can get in and out of as and when we like, so it is not like it could be a classroom one minute and then you have got to change that for something else, so for us it has been not too bad.*

While practitioners agreed the resources provided by the Peeple project delivery team were helpful, some of the activities required extra resources (books, craft supplies, and so on) that required additional time and effort from practitioners to acquire. The Peeple project delivery team also observed this: they found that while schools found the session plans easy to use and enjoyed delivering the Programme, they underestimated 'the extra time for planning' (delivery team). The time spent planning, however, varied widely from practitioner to practitioner: some required lots of time, holding group meetings to discuss what was happening, and others spent less time planning.

Implementation support

Included in the delivery of the Programme for the study was ongoing support for settings in the form of mentoring. This is not currently part of actual implementation of the Programme—it was an additional element of delivery that Peeple wished to explore. Five trained and experienced Peep practitioners were assigned different geographical regions and were involved in recruiting settings, supporting them to sign up to the study, training practitioners in the intervention group, and being the first point of contact for schools delivering the Programme.

Mentors got in touch with their assigned settings at least once a month and practitioners were encouraged to reach out to mentors with any issues they had. In the implementation survey, 98.3% of schools indicated that they felt they could reach out to their Peep mentor for ongoing support during the study and indeed did reach out on a number of issues, particularly those relating to delivery and retention of parents throughout the course of the study. Where possible, mentors also held cluster meetings for their intervention settings, which was valued by practitioners as providing an opportunity to share best practice and talk through issues that may be common among schools:

> *It's that little bit extra, and going to speak to people who are actually delivering it makes it good because we'd found the same [issues with delivery]: we could talk through how we were feeling about it and then other people said, 'Oh we've tried this and we've tried that', and it just gave you a chance to look at what other people have done and other ways of recording it.*

Mentors themselves felt that mentoring helped with the delivery, particularly with regards to keeping schools involved in delivery for the benefit of the study:

> *Some have said that they wouldn't have actually carried on with the Programme if they hadn't have had continual support because it's just an additional thing to do and they've found it difficult at times to find the time and to think about the resources, but I was continually emailing support and reminding and asking if they needed anything and then the monthly face-to-face—they've appreciated that. To know that I was always at the end of the phone or an email has been beneficial generally.*

Barriers to Programme delivery

Overall, schools found the Programme easy to use and implement (91.7%), although there were some problems with delivery. Some barriers to delivery have already been mentioned such as lack of support from senior staff and resources. From the implementation survey, organising a time for the sessions and maintaining parental attendance were found to be the biggest challenges during the study: 43.3% of respondents found organising a time to deliver sessions either challenging or very challenging and 48.3% found keeping parents attending to be challenging/very challenging. The actual delivery of the Programme was largely reported to be easy: 78.3% of respondents said keeping parents engaged during sessions was easy/very easy and 76.7% found delivering sessions with colleagues was also easy/very easy.

An open-ended question in the implementation survey asked schools what problems they encountered with delivery; 45 schools mentioned problems which can be summarised into nine main issues (see Table 19).

Table 19: Reported problems with Programme delivery

Problems reported in survey	Number of schools reporting issue	% of 45 schools reporting issue
1. Maintaining parental engagement on a weekly basis	18	40
2. Time spent planning and preparing sessions/finding time to plan sessions with practitioners	13	28.9
3. Issues with staff shortage, cover, and sickness	7	15.6
4. Finding a time to deliver session that works for parents	5	11.1
5. Finding space to deliver	4	8.9
6. Gathering resources and finding resources to fit theme	4	8.9
7. Parents reluctant to share ideas/talk during sessions	2	4.4
8. Delivering sessions on own	2	4.4
9. Length of time of Programme	2	4.4

The single biggest issue faced by schools was keeping parents attending sessions (reported by 40% of schools). After this, the majority of problems encountered related to planning sessions, such as finding time to plan, staffing issues, finding a time to deliver that worked for everyone, collecting resources, and finding a regular space to deliver the Programme within the nursery day. Thirty-three out of 45 schools (73.3%) faced planning problems. Issues relating to the actual delivery of the Programme (for example, parents reluctant to talk during sessions, practitioners delivering sessions on their own) were only brought up by four schools (8.9%). The length of time of the Programme was also cited as an issue by 2 schools (4.4%).

In the survey, 30% of the 60 responding schools (n = 18) stated Peep-LTS competed with other priorities in the nursery. The majority of this was related to staffing, including a shortage of staff during nursery time, teachers needing to leave class, running Peep-LTS sessions during class time, or children needing to leave their lessons. Other competing priorities mentioned by practitioners were time spent planning sessions or sessions eating into teachers' own planning time, timetabling clashes such as PE, or other parent events that ran during the week such as 'stay and plays'.

These findings were also reflected in the interviews with both practitioners and mentors. Parental attendance was also related to the number of working families in the school:

> *Two families moved away and various people have dropped out, but we had problems recruiting people because we deliver the 30 hours child care for working families here, so the majority of our families are working families and aren't able to access courses during the day, [so] we are slightly unusual to most other nurseries because the majority of our children qualify for the 30 hours, whereas other settings might only have a few families that qualify for it.*

Parental engagement with Peep-LTS

Parental engagement with Peep-LTS was explored through interviews (n = 8) and the parental questionnaire which was completed by 410 (out of 681) parents in the intervention group. The weekly registers included 463 parents in the intervention group who signed up to the study originally; 355 parents attended at least one session. On average, parents attended 10.2 sessions, however, of those parents who attended at least one session, the average number of sessions attended was 13.3. Through the open-ended questions and interviews, the length of the Programme was brought up as a potential barrier to parental engagement and may account for the lower than expected average number of sessions attended by parents.

In the questionnaire, parents were asked open-ended questions about any barriers they faced taking part in the Programme. Just over half of parents either reported no barriers or did not state any barriers. The most common barriers reported by parents were work commitments, sessions clashing with personal and other commitments, or issues with finding childcare for their other children not involved in Peep-LTS. The length of the Programme was also specifically mentioned.

Parents were also asked about how these barriers were overcome, if at all. This helped examine facilitators to parental engagement with the Programme. Parents reported being able to swap shifts at work or be granted time off to attend sessions. Family support was also common with either partners, spouses, or family members attending sessions in the parents' place or looking after other children if needed. Schools were also mentioned as a source of support and facilitation to the Programme through allowing siblings of Peep-LTS children to attend, arranging sessions to suit parents, and providing parents who could not attend with the home activity sheets and information. These facilitators were also reflected in the interviews, with parents planning work schedules around Peep-LTS sessions or having other family members attend a session if required.

> *Fortunately I was quite lucky. I work permanent nights so when the headteacher sat down and spoke to all the parents who'd said that they'd attend and try to figure out which one was going to be the most convenient day, it gave me plenty of pre-warning that it was going to be the Thursday so I could just organise my shifts so either I wasn't working a Wednesday night so I could always attend basically.*

Setting buy-in

Prior to signing up to the study, only six respondents (10%) had heard of the Peep Learning Together Programme previously. The majority of practitioners were enthusiastic about the Programme and 58 of survey respondents (96.7%) indicated that they would continue using the Programme in their school. The Programme's potential to improve children's language and literacy was the biggest influence on schools taking part in the study (73.3% of respondents to survey). This was followed by the Programme's potential to help engage parents (65%) and the fact that it looked interesting (48.3%). The chance to try the Programme for free and a training opportunity for staff were rated lowest (35% and 31.7%).

Fidelity

Fidelity was defined as how well intervention settings adhered to the intended delivery of the Peep-LTS Programme. The main elements included in this were how many sessions were delivered by schools, how many practitioners delivered the sessions, and what adaptations were made to the Programme. Fidelity was explored through the implementation survey, weekly registers sent to the research team at the end of programme delivery, and through the interviews.

Delivery and Programme structure.

Out of the 65 schools in the intervention group, one did not deliver the Programme, leaving 64 settings delivering at least part of the Programme. Attendance registers were received from 44 schools (68% of the total intervention cohort). The Programme under study conditions was designed to be delivered in 20 one-hour sessions per week. In the 44 schools that returned their attendance records, the average number of sessions schools delivered was 18 out of 20 sessions. Despite missing data from 32% of settings, the returned data shows that the majority of (all) intervention settings (65%) delivered at least 14 of the sessions, with over a third (34%) delivering the full Programme (see Table 20).

Table 20: Number of sessions delivered by schools

Number of sessions delivered	Number of schools	Cumulative percent (of all 65 intervention schools)
20	22	34%
19	5	42%
18	6	51%
17	5	58%
16	3	63%
15	0	-
14	1	65%
13	0	-
12	0	-
11	0	-
10	0	-
9	1	66%
8	1	68%
7	0	-
6	0	-
5	0	-
4	0	-
3	0	-
2	0	-
1	0	-
Total returned data	44	68%
Missing data	21	32%

The Peep-LTS Programme is designed to be delivered by at least two members of staff. From the implementation survey (of 60 respondents out of 65), six schools reported having only one member of staff delivering the Programme (10%); the majority had between two and three members of staff delivering the Programme in line with recommendations from Peeple.

Peeple considers all the elements of a Peep session to be important to its delivery. The elements include:[8]

- a welcome/hello song;
- talk time—sharing key ideas with parents through asking a question, sharing a message, or doing an activity, plus an activity for children, if appropriate;
- songs and rhymes;
- books and stories;

[8] Peep Learning Together Programme Manual provided to all practitioners

- things to try later at home; and
- a farewell/goodbye song.

From the implementation survey, it was found that the Programme was largely adhered to as intended by Peeple. In the survey, practitioners were asked if they changed or added any elements and the survey included an open-response box for further details. The majority of schools stated they followed the Programme as set out by Peeple (56%);16.6% of schools stated they did not deliver all elements—from the open-ended responses, these were mostly the singing at the start and end of sessions. A quarter of the settings added new elements—these were mostly added activities, citing increased relevance for parents, activities to keep children/parents attention, or quieter activities for children when talking to parents. Sometimes it also included bringing in other professionals or adding coffee morning type feedback every month. Schools also reported using the sessions to link to activities done in school. These were mostly adaptations that complemented the Programme aims. The Programme as set out for the study is derived from the larger Peep Learning Together Programme curriculum. This includes over 74 topics in total, however, for the purposes of the study, Peeple identified a set programme of 20 sessions that focused specifically on literacy and socio-emotional development. Unlike the way in which the Programme is typically delivered, this study prescribed that all intervention settings follow the 20-week sessions in a particular order. Feedback from schools indicated that in the majority of cases this was adhered to. In a minority of schools, practitioners chose the sessions they thought were useful to their parents.

Sometimes parents were unable to attend the sessions or had originally signed up but could no longer attend fully. Mentors suggested that practitioners give the handouts to parents when they collect the children from nursery. This was to ensure that parents still benefited from the home learning activities and the key learning points from the session despite having missed out on the group learning component.

Challenges to delivery

The two low-fidelity schools that were interviewed both struggled with recruitment, and in the case of one of them, struggled with retaining parents. The practitioners reflected that parents' own negative experiences with school may have impacted on their ability to feel confident engaging with the school and sitting down to talk, compounded by being working parents.

Some schools needed to adapt the way in which they delivered the Programme to meet the needs of the parents. Peeple identifies this flexibility as integral to the Learning Together Programme. One school reflected that the way that Peep-LTS is set out did not suit their intake of parents:

> Practitioner 1: *Yeah, we do it as like an open morning, so they can come in any time from like 8.40am to like 9.30am. Do the activities with the child, they get to chat with other parents, so might sort of like drop-in session, you know, the session talk and but then they'd all get the handouts as well, so … At least that's keeping some of the parents involved so I think if we sat them down on the carpet and done the proper way … they wouldn't come back again the next week.*
>
> Interviewer: *Okay. So, you wouldn't do a sit-down in the circle with the songs and the sort of the structure?*
>
> Practitioner 2: *You did that, didn't you?*
>
> Practitioner 1: *We done the singing one but sitting them down on the carpet and getting the parents to talk to each other or even speak back to the teacher they'll be up and gone, you know, they avoid the … they just like to come in and they chat to the children and look around. I don't think they realise how much sitting down with them in the beginning, if you know what I mean, then they find out.*

This change of strategy was developed alongside their mentor. While the mentor acknowledged it was different to the intended programme delivery, it helped the practitioners' confidence:

> *[By] making it more of a … workshop style approach open to everybody and actually not really using the word 'Peep' but using the materials and delivering it in a more sort of relaxed way, she managed to reengage parents as an open drop-in sort of a session and has built it up slightly differently, not really how we wanted from the study, but did get the parents back in, and looking at Megan from when she started, I remember her on the training and she was talking away to Sophie and I was worried that there*

was something going on at the back and thinking back now it was because she just felt overloaded and uncomfortable on the training (Peeple project delivery team).

Adaptability of Programme

Whilst the Programme is clearly structured and manualised, there was a degree of allowable adaptability built into the Programme—from the strategy of recruiting parents, to the engagement and activities with parents. The Peeple project delivery team provided practitioners with suggestions on adapting activities to meet the needs and interests of the group as well as providing flexibility regarding the choice of books, songs, and activities. In interviews with the delivery team, it emerged that all the elements of each session were considered important, but it did not matter what order they were delivered in. This is consistent with the Programme manual:

I don't think it matters. We say that in the training. It doesn't matter what the order is as long as there's hellos at the beginning and the goodbyes at the end. What goes on in the middle is quite flexible as long as every element is in there. So, it doesn't really affect anything. We're always quite strict about every element must be in there, so it doesn't matter on the order.

In this respect, the programme structure of the individual sessions (not the content) was relatively flexible. While many schools found the session plans easy to use, some schools adapted the language to help parents understand better, which is encouraged by Peeple.

As mentioned above, some schools brought in more activities or adapted the activities to suit parents.

We've actually followed the structure identical to what was expected: we've done obviously the meet and greet, we've done the ORIM, we've then gone into the questions about the previous session's learning, we've then introduced the new session. We've modelled a lot more I think, I think we've had lots of activities and modelled lots of things for the parents so that we could have lots of differentiation. A lot of our parents found some of them a little bit low level for the needs of the children or they felt they were so what we've done with that is we've added sort of similar activities but with more challenge within them for the children.

The 'talk time' element of the session provides an opportunity to share the key ideas of a topic. It can be delivered in a number of ways: through a question to parents/carers, sharing a message, and/or doing an activity with the children. Many schools did the activity with children as this was seen as an enjoyable part of the Programme for parents and children alike. For some schools, talk time gave practitioners an opportunity to talk to the parents, particularly during periods when children were engaged in activities. They found this worked better for the parents so they are not distracted by the children and their attention can be focused on the aim of the Peep-LTS session:

So it is quite structured, and it lasts about an hour, so we do our 'hello' song, and then we have our story of the week, and then we have a talk time, and we are very lucky to have—I have got an assistant so she takes the children away and it is myself and my other practitioner who is doing this with me—we have a talk time with the parents which lasts anything up to ten minutes really, nothing too stressful for them. And then we bring the children back and do an activity, and then we finish off with singing and a 'goodbye' song.

At the end of our talk time I explain to the parents what we're going to do with the children and we go and get the children then, our children aren't there for the talk time; we found that's worked a lot better for the parents because they can really relax and talk without having to worry about a child. And then we go and get the children and we do our hello song, then we read the story, normally the one that's been recommended by the Peep Panel.

In this sense the sessions are flexible to the extent they can be adapted to fit around the parents. However, it is clear from the Peeple project delivery team that there are certain (core) elements of the Programme (in terms of both content and delivery) that need to be implemented.

Summary

The findings from the IPE regarding fidelity and adherence to the intended structure and content of the Programme indicate that the majority of settings delivered the Programme as intended and with a high degree of fidelity. The

elements taken into account in our determination of fidelity relate to how many sessions were delivered, the number of practitioners delivering, and amendments made to the Programme delivery and content (derived from the implementation survey). From the available data on 68% of the intervention settings, on average, 18 out of 20 sessions were delivered, with the majority of settings (65%) delivering at least 14 sessions and 34% delivering the full 20-week Programme. Of the 34% (n = 22) of settings that delivered the full Programme, all but two had at least two practitioners (as recommended), and over half made no adaptations. As stated above, adaptations made to the Programme (and discussed in more detail below), made little impact on the overall aims of the Programme. Out of those settings that delivered between 14 and 19 sessions (n = 20), 16 settings delivered 17 or more sessions. All had two or more practitioners delivering and half made no adaptations. This shows a high degree of adherence to the delivery instructions and structure of the Programme as recommended. The two settings that returned low attendance data started the Programme delivery late and struggled throughout the intervention due to staffing issues. Both only had one practitioner delivering (of which one was not Peep-LTS trained due to their trained staff member leaving) and struggled with delivery due to the identified staffing issues.

Outcomes

Child outcomes

Perceived benefits to children were discussed in the interviews with practitioners and parents. Practitioners felt that the children who were part of the group felt 'special' and they developed a stronger bond with those children who were part of the Peep-LTS group. Some felt the children taking part had become more confident and more engaged in class:

> *I think the children are more talkative, they're bringing things in more to school on a better basis, they're actually bringing activities to share or objects to share or books to share and some of the children were very quiet originally and they're much more talkative*

Parents also discussed some changes they had seen in their children since starting Peep-LTS. They noticed their child picking up on things from the sessions:

> *We do a lot of baking, he really enjoys to do baking. Not so much the craft things because he's not really interested in craft things. But he likes to be outside a lot, so we tend to do a lot of outside activity. I mean the other session that he really liked was the environment … with the signs. He really liked that one, so at the moment when we go out with the dog, he's constantly looking for signs everywhere, like logos and things like that.*

Parents also noted that they found their child taking pride in some of the objects they created during the activities, which for some parents was surprising:

> *The other session that she's really enjoyed recently was making a book, which again was something I thought she wouldn't be interested in at all, and she made two in the end … and she sat and read them to herself and she's really proud of them and that was lovely because I was sort of like … we went over to do the activity and I thought, no, I'm not sure about this, I think she's going to want to eat biscuits and she was like, 'Give me a felt tip, I'm drawing some pictures' (laughs), so that was lovely.*

Both parents and practitioners felt children were more confident and commented on feeling that some children who would have been restless or badly behaved showed improvements in their behaviour. Parents felt they were doing more with their children (discussed further below), which may be driving some of the child behaviours (related to language, literacy, and social-emotional development) observed above (and reflected in the logic model).

Benefits for practitioners

According to practitioners, taking part in the training and delivery of the Peep-LTS Programme had increased confidence in their role in school. In the implementation survey, 60% of practitioners found they had 'very much' increased their confidence; 10% stated the Programme had 'not really' or 'not at all' impacted on their confidence. Similarly, 41.7% of practitioners reported that the Programme had 'very much' increased their skills, with 48.3% stating the Programme had increased their skills 'in some ways' and 10% stating that the Programme had little impact on their skills.

Practitioners also reported that their relationships with parents in the Peep-LTS group were improved and became less formal as a consequence of taking part in the Programme. In the case of those practitioners who were not nursery teachers but support staff, some reported benefits their role too:

> *I think parents are definitely more open and they talk to me more because I am not in the classroom, I am not based with their children. I kind of do overall family work and I have specific parents that I see, because of situations, but definitely more interaction and [they] feel more comfortable with the school and I think more able to be open and talk to us about anything.*

Practitioners felt the Peep-LTS Programme gave them tools for their own lives. One practitioner, for example, found she read more with her own grandchildren and it had a 'benefit beyond the classroom'. Another practitioner shared some of the learning from her session with school support staff, particularly the concept of ORIM:

> *Yes, because that really opened my eyes to the way that you can interact with children anyway. Even though you might not necessarily be doing the activity that you've planned, because a lot of the time they go with their own interests anyway, you can use that in lots of different things. I shared it with all the support staff and the reception team as well, just highlighting that these are the things that we do, but actually, if you really think about all of these, with the ORIM you can get in so much more.*

Parent outcomes

Practitioners in schools with high deprivation felt that parents may have low confidence in their parenting skills, but they found that the Peep-LTS Programme's emphasis on positive praise and showing parents that 'what they were doing actually had meaning and purpose' was encouraging to them. One practitioner reported that not only was parent confidence growing but parents were becoming more involved in the school. This was evidenced by—

> *the confidence of parents; [not only] the confidence as a parent but also their confidence with each other and their confidence at the nursery, their confidence to approach me and talk to me about absolutely anything and realise that that's okay and just they want to join in with things, they've attended things in the nursery.*

Eight parents/carers were interviewed in total and were all from high- and medium-fidelity schools. They had also attended most if not all sessions that were run by their settings so exhibit a higher than average level of engagement than the wider group of participating parents. Due to their consent to be interviewed, it is perhaps unsurprising that they all felt very positive about their experience of Peep-LTS. Nevertheless, their experiences help to illustrate some of the benefits that attending Peep-LTS sessions had for parents.

While many of the parents said they were proactive with undertaking activities with their children, the provision of 'take home' ideas was useful as they included activities they had not considered before:

> *I don't think that if we'd have been left to do something from our own mind to do with the activity, it's nice to have something set there that you can do with them. That you can check back on as well, and I've kept all the sheets as well, that we got, so it's nice that I could go back to them and do them at a future point as well.*

Parents found themselves applying the learning from the sessions in their interactions with children. While many parents had often engaged in activities with their children previously, some found they played with them more, understanding better how play was helpful to a child's learning—and were surprised at how often they could use everyday objects to play with such as making puppets out of wooden spoons. Parents found that they were more aware of the potential for learning opportunities in their everyday interactions with their child:

> *Well, I always try … I'd like to think I was more proactive than not, you know, that we would always be counting the steps and seeing what we can see as we're out and about and talking about things. But little different things like we did an exercise where they were doing sort of structures and making lines and like practising their lines and stuff like that and we were just doing some baking and we made a mess with flour all over the worktops and I said, 'Oh look, we can practise doing our shapes in the flour on the worktop.' So, yeah, yeah, so just I'd say just more aware of opportunities for things.*

In addition to improving their confidence, parents found the social interaction with other parents important. Some of the parents interviewed were new to the area, or single parents, and valued the social side of the sessions. There was also the realisation that other parents are going through similar things to them:

> *One of the things that I found most helpful is finding out that everybody else's children are at similar stages to mine and that we're all going through similar things with our children and I've also really enjoyed learning what other parents are doing with their children and sort of I think being able to reflect on that and work out whether it's something that I would want to pursue or whether I think that what we're already doing is good enough.*

Certain topics were mentioned by parents as being particularly useful and giving them ways to deal with parenting-related issues that may have been problematic or difficult previously. One parent reflected on a session about choices, which they found very helpful with their daughter:

> *[Breakfast] was always a bit of a problematic situation, 'What would you like for breakfast?' because it'd be one thing after another after another then it was like, well, instead of giving them that many options, how about, 'Right sweetheart, Weetabix or toast for breakfast?' Just changing the way we worded things was very helpful.*

Parent interviews suggested that those who attended sessions were finding benefits in terms of their increased awareness of learning opportunities and increased confidence in their parenting skills. While parental attendance was low overall, 66.3% of those who responded to the parental questionnaire from the intervention group (272 out of 410) felt the LTP was 'very' or 'extremely' helpful. Only ten parents (2.4%) stated the Programme was 'not helpful at all'; an analysis of barriers reported in the open-ended responses found that these parents were unable to attend the sessions.

Formative findings

In all interviews with parents and practitioners, the length of the Programme (20 weeks) was raised as a barrier to parental commitment. The parents who were interviewed took part for the full duration of the study, however it was still seen as a very long commitment, especially as it ran over two terms. They suggested that a shorter Programme may work better, either through condensing some of the sessions that dealt with similar issues into one session, or running two sessions a week to shorten the overall length of the Programme

> *Personally I think that's a long, long time … I think if the school could structure it that they could try and fit in two sessions a week … but I just think a 20-week period is a long time, especially when you're breaking it over so many different terms.*

> *I think everyone felt the same, but maybe some of the sessions could have been condensed a little bit and maybe do activities in one week or make it just a few weeks shorter, perhaps, because I think also the children were starting to drift their attention a little bit [by the last week]—but that's probably the only thing I would say.*

There were also comments from both practitioners and parents that the sessions could be a little repetitive:

> *I think there's some repetition between weeks. I feel that some of the weeks you feel like you're doing the same thing and I know the parents felt for a couple of weeks, 'Oh, we've already done this and it was slightly different.' But some weeks weren't different enough and right at the beginning we used a hell of a lot of boxes [for activities]; it was box after box after box which got a bit repetitive as well.*

Practitioners reflected that for some of their parents—particularly those with more than one child—the sessions felt like 'parenting school' and telling them what they already knew. While, overall, parents interviewed found the Programme helpful and informative, this sentiment was also reflected, particularly in relation to the first few sessions:

> *Well, initially when we first started I found that it sort of almost felt like parenting school and I was a bit like, 'Oh, I just feel like I'm doing everything wrong', and I found that it was … basically it just made me question my parenting skills I think initially, but then the more we settled into it, that feeling went away.*

The ORIM framework (opportunities, recognition, interaction, and modelling) which the Peep-LTS Programme is based upon, was mentioned by some practitioners as a useful concept. However, the framework was not mentioned by parents

who were interviewed. When it was brought up by the researchers during the interviews, parents recognised the 'modelling' concept that forms part of the framework. Some had found this a 'tricky concept' in the past, so found its application useful. However, most did not understand or remember the acronym, except when explained further in the interview. Practitioners recognised that parents were using the various elements of the framework more— particularly modelling and recognition—so were learning from it, even if they may not have acknowledged the acronym. Even so, it may be useful for ORIM to be further explained and reinforced explicitly throughout the Programme.

Practitioners reflected that finding time to plan and deliver sessions was a challenge and, going forward, suggested that they would run the Peep-LTS sessions in shorter bursts rather than a 20-week Programme. Despite some of the pressures faced by practitioners in delivering the sessions during nursery hours, parents valued the fact that the group sessions were run in the nursery as they may not have heard about it otherwise:

> *I haven't done, as I say, apart from sort of, you know, early days mum baby groups, you know, toddler groups, things like that—I don't think I would have sort of committed to that sort of thing if it hadn't had been available through the nursery.*

> *It is good to have the offer of the courses because … I wouldn't have a clue where to go to do these courses anyway so it is good that they [the nursery] offer them to you. And I recommend that everyone does them because it gives you something to do as well, and it is like a skill as well, a life skill really. It gives you a lot of confidence being a parent. It did to me, because I am a single parent so I didn't—I was a bit lost sometimes! They offered me these courses and I was like okay that is what you do, so I have learnt quite a lot!*

One area from which the Programme benefited—and is something that could be developed further—is the mentor support that was provided to schools (and outlined in earlier sections). Mentors reflected that the support given to schools was helpful, however they felt that it would have been more helpful to be involved at the beginning of the study, particularly in the recruitment of parents. Being experienced Peep practitioners, they felt they could have helped to promote the Programme to parents and explained it better than teachers, who knew very little about it in the early stages. All mentors interviewed would have liked to have assisted in recruitment:

> *Do you know, it would have been better if we could have been there at the beginning, because we know the Programme inside out, so we know what we're selling; and we're already enthusiastic about it, so it boils down to that enthusiasm. If you capture it, if you understand the Programme and you're enthused about it, you can then transfer that to the people in the room; so I think that was one of the missing ingredients—that we weren't able to be there at that beginning.*

Peep-LTS was particularly valued by the practitioners for helping them to engage with parents and improving practitioner/setting and parent relationships. Many practitioners, however, expressed a need for a programme that helped them to engage with 'hard to reach' families; the extent to which the Peep-LTS Programme enabled them to do this (particularly considering the voluntary opt-in nature of the study conditions) is debatable. In the interviews, practitioners reflected that many of the engaged parents were those who would attend events anyway and acknowledged that engaging those who would benefit most from it was harder. It is important to note, however, that engaging with vulnerable families was not a specific aim of the study, nor a component of the sampling frame.

> *We have really enjoyed it and we will definitely like to do it again. It is just engaging those parents, I suppose, that would benefit most from it, which you don't necessarily always do, because I think the parents that have come along are possibly parents that are very supportive anyway and they're doing lots of things with the children. But I suppose it's looking for ways that we can engage those other parents too.*

For this study, settings—with mentor support—were responsible for the recruitment of parents, a departure from normal Peeple practice. Parental participation was voluntary, but there was variation in the way settings offered participation to parents. This was not specifically addressed in the survey, however, in the interviews, practitioners mentioned how they had recruited parents. While some offered participation to all parents of children of the appropriate age, others (with larger cohorts) picked parents who they thought would benefit, either to increase engagement or because children had a lower level of language and communication.

> *I think all of our children could benefit from it in one way or another, and parents! But we went through a list and we chose children who are low in their communication and literacy, the communication and language data, and some of our Pupil Premium children as well, so we did specifically get children who were low in communication and Pupil Premium. So, that is how we kind of chose our cohort of children really.*

As seen from the parental attendance data, attendance was lower than anticipated, driven largely by a considerable proportion of the sample (23%) not attending a single session. Of those parents who did attend, they typically attended close to the 67% of sessions. When exploring barriers to parental engagement, those that were identified included work commitments, personal commitments, childcare issues, and the length of programme. The data from the parental survey showed that when these barriers were overcome it was due to support in at least one of three ways: support from work, support from family/partner/peer group, and/or support from their child's school. Those who do not have the support in these areas—particularly in relation to work and family—may find it more difficult to attend this and similar parenting programmes.

Control group activity

Randomisation took place at school level thereby minimising the risk of contamination between groups. The Peeple project delivery team ensured that the Peep-LTS Programme was not made available to control schools and there was no evidence to suggest that schools in the control group (n = 74) delivered the Peep-LTS Programme. Monitoring of usual practice occurred at two times during the study: once prior to the start of the intervention (all settings) and again after the Programme ended (control settings only).

Supporting learning

Using an open-ended question in the pre-test usual practice survey, practitioners were asked to describe their daily practice in supporting language and literacy in the classroom. At baseline there were few differences between the control and intervention groups in this regard. In both groups, the most frequently mentioned elements of usual practice were daily reading or story time, identifying children for extra support or intervention, singing songs or nursery rhymes, and encouraging parental involvement though workshops or sending activities or books home.

Specific named language and literacy programmes were used in 76 (64.4%) settings. These were 40 intervention settings and 36 control setting. There were 25 recognisable programmes named across the 76 schools (Table 21). The most popular programmes used in both groups were Early Talk Boost and Read, Write, Inc.

Specific, named social and emotional learning and development programmes were less popular, with only 30 (25.4%) schools using a specific named programme: 16 intervention schools and 14 control schools. There was more of a spread of these programmes across the schools. A total of 23 programmes were named, with only four programmes undertaken in both groups: Theraplay (2 schools), Thrive (3 schools), Narrative Therapy (2 schools), and Jigsaw PHSE (2 schools).

Table 21: Language and literacy programmes implemented by settings (baseline)

Named language and literacy programme	Intervention (%)	Control (%)
Early Talk Boost	14.3	9.7
Read, Write Inc	17.9	8.1
LEAP	5.4	8.1
BLAST	1.8	6.5
Elkan S&L Programme	3.6	0.0
Talk for writing	3.6	0.0
Nursery Narrative	1.8	6.5
Stories for Talking	1.8	4.8
Time to Talk	1.8	4.8
Letters and Sounds Phonics	16.1	3.2
Lola the Listening Leopard	1.8	3.2
Narrative therapy	1.8	3.2
Jolly Phonics	1.8	1.6
Learning Language and Loving It	1.8	1.6
REAL	1.8	1.6
Early Words together	1.8	0.0
Every Child a Talker	1.8	0.0
Foundations of literacy	1.8	0.0
Spirals	1.8	0.0
Success for All	1.8	0.0
Table Talk	1.8	0.0
Wordsmith	1.8	0.0
Talk for Writing	0.0	8.1
Pre School Start	0.0	1.6
Reading Together	0.0	1.6

Parental engagement

There were few baseline differences between intervention and control groups regarding parental engagement activities. Practitioners were asked how much they agreed or disagreed with the following statements: ‘Our nursery has high levels of parent involvement and engagement’, ‘Our nursery could be better at engaging parents in their child’s learning’, and, ‘Most parents come in and talk to the nursery about their child’s learning.’ Practitioners were also asked to state whether or not they undertook specific activities for engaging parents and these are detailed in Table 22.

Table 22: Parental engagement activities by settings (baseline)

Activity	Intervention %	Control %
Communicating with parents about their child's learning progress and achievements (written, verbal, text message, or social media)	100.0	98.4
Meeting with parents when their child is dropped off/picked up from nursery	98.2	96.8
Sharing information about the curriculum and what their child is learning	92.9	90.3
Displaying parent information in the nursery	80.4	87.1
Providing resources, ideas, and activities for parents to undertake at home with their children	73.2	85.5
Providing books that can be borrowed by parents to read with their children at home	91.1	83.9
Key worker involvement/parent and key worker meetings	62.5	79.0
Home visits	78.6	74.2
Inviting parents to a 'stay and play'	75.0	74.2
Providing guides for parents in supporting their child's learning	69.6	72.6
Organising parent and child groups	53.6	48.4
Inviting parents to coffee mornings	30.4	38.7
Offering translating/interpretation services where there may be a language barrier between nursery and parent	57.1	35.5

On some activities, control group settings more frequently reported key worker involvement or parent and key worker meetings, providing resources to undertake with children at home, and displaying parent information at school. Intervention settings more frequently reported offering translating/interpretation services for parents, providing books for parents to borrow to take home, and sharing information from the curriculum.

The most popular activity for settings in both the intervention and control group was communication with parents about their child's learning—an activity more prevalent in intervention settings. This was followed by meeting parents at drop-off or pick-up time and sharing information about the curriculum. The least common activity on the list for intervention settings was inviting parents to coffee mornings, and for control settings it was offering translation services.

Overall, these findings show that both groups were active in their engagement with parents as part of their usual practice and may well explain their motivation for taking part in the study in the first place. At the end of the intervention period, control settings were asked to complete a survey on usual practice for the year of the intervention. Out of the 24 schools (out of 74 control group settings) that completed both pre- and post-test 'usual practice' surveys, ten had altered their usual practice. A third of schools (n = 8) had introduced a new named language programme, and four (16.7%) had introduced a new named socio-emotional development programme. From the post-test usual practice survey there was

no evidence to suggest that a parental engagement programme similar to Peep-LTS was undertaken in control settings during the course of the study. Due to the small number of post-test control surveys received (32.4%), it is difficult to ascertain control group activity at post-test with any certainty.

Conclusion

Key conclusions
1. Pupils in the Peep-LTS Programme made, on average, no additional progress in core language skills (the primary outcome) in comparison to those in the control group, equivalent to zero months. This finding has a moderate to high security rating.
2. The analysis of the secondary outcomes showed a positive effect of the intervention on early literacy development. Pupils in the intervention group made, on average, two months' additional progress compared to those in the control group. This finding is less secure than the estimate for the primary outcome.
3. Parents reported small improvements in the home learning environment and their confidence in enjoying and playing with their child, following the Programme. There were moderate improvements reported in parental self-acceptance and parents' confidence in their own parenting knowledge and learning.
4. Nursery settings, supported by mentors, delivered the Programme with high fidelity. Engaging parents was a key challenge for settings: 23% of parents who signed up to the intervention did not attend a single session (parents who did attend the Programme joined, on average, 70% of sessions).
5. Although more than 90% of practitioners reported that the Peep-LTS Programme was easy to use and implement, practitioners also felt that the length of the Programme—20 weekly sessions—may have been a barrier to commitment for parents.
6. Exploratory subgroup analysis showed that children eligible for Early Years Pupil Premium (EYPP) in the Peep-LTS Programme made progress in core language skills (the primary outcome) and communication (secondary outcome) equivalent to 4 months' additional progress for each outcome, and for early literacy development (secondary outcome) equivalent to 3 months' additional progress, in comparison to children eligible for EYPP in the control group. The sample sizes were small in these subgroup analyses, and so these effects have lower security than overall findings.
7. Parents of children eligible for EYPP reported improvements in their self-acceptance following the programme. Parents of children for whom English is an additional language reported lower scores on the TOPSE play and enjoyment scale, regardless of whether they were in the intervention or control group. The sample sizes were small in these subgroup analyses, and so these effects have lower security than overall findings.[9]

Interpretation

The current study sought to answer a series of research questions using a cluster randomised controlled trial and an implementation and process evaluation. This section focuses on how the data and analyses addressed each research question in turn.

What is the impact of Peep-LTS on child and parent outcomes?

The logic model (Figure 1) hypothesised that parent skills and confidence outcomes would improve first, resulting in positive changes in the home learning environment. The logic model further hypothesised that these initial changes in parent outcomes would lead to subsequent changes in child outcomes, primarily children's language skills and early literacy. The data provide mixed evidence in support of this.

Overall, the children who took part in the Peep-LTS Programme did not have better language skills than the children in the control group by the end of the study. Similarly, there was no evidence of any additional improvement in communication skills or social and emotional development. However, a small improvement—two months' additional progress—in early literacy skills was observed for children who took part in Peep-LTS compared to those who did not.

This notwithstanding, the subgroup analysis showed that the intervention did have positive effects for children in receipt of EYPP in relation to core language skills (the primary outcome) and communication and early literacy development (secondary outcomes). These subgroup results are positive but should be treated with caution given the small sample size and the inevitable uncertainty in the estimates.

There was a small improvement in the home learning environment for parents who participated in Peep-LTS compared to those who did not. There was also a small improvement in parents' confidence in enjoying and playing with their child and larger improvements observed in parents' perceived self-acceptance and confidence in their parenting knowledge and learning. There was no evidence of any improvements above and beyond the control group in terms of parental

[9] Additional key conclusions 6 and 7 added in March 2023 to reflect new subgroup analysis on EYPP pupils added to the report.

empathy. This observed quantitative improvement in parent outcomes was also reflected in the interviews with parents, who specifically referenced an increase in their confidence around learning and knowledge and activities to enhance the home learning environment. In addition, and particularly for parents of children in receipt of EYPP, the programme resulted in improvements in parental reports of self-acceptance.

Although the data did not show improved language skills (the primary outcome) or social-emotional outcomes in the immediate term, it may be that improvements in these outcomes take time to develop and detect. Such changes might be captured by follow-up data collection as little is known about the long-term effects of parenting programmes on the social-emotional development of young children (see, for example, Barlow et al., 2016).

Was the intervention implemented with fidelity?

The intervention schools delivered on average 18 of the 20 intended Peep-LTS sessions and the data suggests that the Programme was delivered as intended. Schools received a high degree of support from dedicated mentors who provided regular and timely advice and support throughout the period of implementation. The role of the mentor seemed critical in the high-quality delivery of the Programme. The majority of settings did not adapt the Programme and delivered it according to the manual. There were examples of schools adapting the Programme in acceptable ways, for example introducing their own activities to support the Peep-LTS curriculum. There was also an example of one school that adapted the structure and implementation of the sessions, with the support of their mentor, in order to encourage parents to attend. Overall, practitioners reported that they found the Programme easy to use and implement (91.7%).

There was no evidence that the control group exercised compensation rivalry. The intervention and control groups reported implementing a similar range and number of early literacy and social-emotional learning programmes at the start of the study and there was no evidence that this changed for the control group over the period of implementation (although the return rate for control schools at post-test was low).

Despite the settings delivering the Peep-LTS Programme as intended and with fidelity, examination of the Programme attendance data revealed that parents attended on average only 10.2 of the 20 sessions. This falls below Peeple's threshold of 70% attendance (or greater) indicating compliance. Many parents recruited to the study did not attend even a single session. Of those that did attend sessions, they attended on average 67% of sessions—close to the 70% threshold. A compliance analysis was conducted and showed that variability in implementation was not associated with variability in the primary outcome (language skills).

What were the facilitators and/or barriers to parental engagement with the Programme?

Parent engagement was perceived by schools to be a key barrier to delivery and this is important to understand given the evidence that transmission of learning to the home learning environment is known to be a cornerstone of many preschool programmes (for example, Son and Morrison, 2010). The lower than expected parent engagement is reflected in the attendance data and also the compliance analysis and, given that this is a key component of the Peep-LTS Programme, is a likely threat to our understanding of whether the Programme can work or not to improve language skills. Thirty per cent (30%) of intervention settings cited parental attendance and engagement as a problem with 48.3% of respondents to the implementation survey reporting that maintaining parental attendance was either challenging or very challenging. In response to this, settings attempted to facilitate parents as much as possible to remove barriers to engagement, for example, by arranging sessions to suit parents' work and family commitments or making provision for parents' other children who were not in the Peep-LTS Programme.

The length of the Programme, 20 weekly sessions, was considered by both parents and practitioners to be a downside. Practitioners felt the duration of the Programme overall was a barrier to commitment for some parents; a finding that was confirmed by the parent interviews. Time to prepare sessions was also cited as a key barrier by practitioners and it was acknowledged by mentors that, on reflection, they had perhaps underestimated this for schools. Despite this, more than 90% of practitioners reported that the Peep-LTS Programme was easy to use and implement. Settings are clearly keen to buy-in and implement programmes to improve language and literacy and the Peep-LTS Programme represents a novel way to harness this enthusiasm whilst also enhancing parental engagement. The data certainly suggests that practitioners regularly engage with parents about their child's learning progress and achievements (written, verbal, text message, or social media) and this is also reported to happen in person when caregivers leave and collect children from the settings (Table 18). Opportunities may be available to alter engagement with parents to fit around existing communication strategies, and to attempt to understand what may underlie reticence to engage with

the Programme. It is also possible that parents who are happy to engage peripherally or remotely with staff may be reluctant to come into settings and participate in the Programme (Evangelou, Coxon, Sylva, Smith, and Chan, 2013).

Other studies report similar challenges around parental engagement in early years programmes. However, despite less than optimal engagement, some positive effects of programmes have been found (Sheridan, Knoche, Edwards, Bovaird, and Kupzyk, 2010). Some researchers have suggested, as a solution, that non-familial adults can be called upon to engage in early language and literacy programmes where parents are unavailable (Reese, Sparks, and Leyva, 2010). Perhaps, in the current study, the level of preparation and additional commitment required by practitioners and parents was too great and developers could look at ways of adapting or compressing content for this age group. The Peep-LTS Programme has been delivered in varying formats in the past (Evangelou, Coxon and Sylva, 2008) and Peeple's commitment to flexible modes of implementation continues to be a useful means of making the Programme available to as many parents as possible.

An important facilitator of successful programme delivery was the mentoring support provided to schools by the Peeple project delivery team and the school leadership teams. The support of leadership and teachers is crucial to the quality implementation of school-based programmes (Kam, Greenberg, and Walls 2003; Flaspohler, Meehan, Maras and Keller, 2012). The quality of school-level implementation was generally high, however, this may have implications for scaling-up the Programme as the mentoring support was only present for the period of the research study and does not constitute normal practice for the implementation of the Peep Learning Together Programme.

Limitations

The current study implemented a robust methodological design, used valid and reliable outcome measures, collected data independently using trained fieldworkers (largely speech and language therapists) who were blind to condition, and used appropriate statistical methods and controls to address the pre-specified research questions.

This notwithstanding, there were some limitations to the trial. The power to detect effects was compromised because of a higher than expected intraclass correlation and lower than expected pre/post-test correlations. Attrition of 20%, overall, between pre- and post-test meant that the analysed sample was smaller than anticipated, which may also have negatively impacted on (that is, lowered) the achieved power of the study. However, multiple imputation, used as a sensitivity analysis, suggests that the complete case analysis is not sensitive to missing data, which increases our confidence that the missing data has not resulted in misleading results. The non-normal distribution of some of the outcome means that we need to exercise care when interpreting the analyses for these outcomes.

One aim of the implementation and process evaluation (IPE) was to explore the parental experience of taking part in the Programme and the research team endeavoured to recruit a representative sample of parents to interview across low, medium, and high fidelity settings. Perhaps not surprisingly, those who self-selected to take part were those who took part more readily in the Programme. Alongside this, low data returns for the parent outcome data suggest that findings in relation to parental engagement and satisfaction need to be interpreted with caution.

The ASQ was completed by teachers who knew the child's group allocation and this may have biased the results in favour of the intervention group. While the ASQ has long been used as a parent-completed measure, increasing support has been reported for the use of the tool as an objective teacher-completed screening measure. Recently, comparable reliability and validity data has been reported for parent and teacher groups (Pooch, Natale and Hidalgo 2019). It is likely that return rates in the case of parent completion would have been very low, thus the decision was taken to ask teachers to complete and confer with parents, where necessary, to fill in missing information.

The intervention and control groups were largely equivalent at baseline providing reassurance that the intervention and control groups were similar at the outset. One exception to this was the measure of early literacy (Concepts about Print), which showed a standardised mean difference of 0.18 in favour of the control group. The impact of this baseline difference was mitigated by using the pre-test scores as a covariate in all (relevant) analyses. The magnitude and direction of baseline differences remained unchanged at the analysis stage, despite attrition. An important limitation to consider is that pre-test early literacy scores were used as a proxy for language in the absence of a language pre-test score (as measured by the CELF). Whilst it was not financially viable to collect pre-test data using the CELF, doing so would have added rigour and power to the analysis.

The Programme was delivered across a range of contexts, local authorities, and regions across England. Thus, we can have confidence that the findings are generalisable and that the study has external validity. However, as with most RCTs, the sample is self-selecting and this should be borne in mind. It did not appear that the control group tried to compensate for not being chosen to receive the intervention, which offers assurance that they were not 'boosting' their chance of improvement when compared with the intervention group.

Future research and publications

This study was unable to answer the question around the relationship between the Peep-LTS Programme, the home learning environment, and language skills. Further study is warranted to determine whether the Programme can be modified to ensure higher parental compliance so that a better test of efficacy of the whole Programme can be conducted and more sound conclusions drawn.

As per the study's subgroup analysis, positive effects on child and parent outcomes were observed for families in receipt of EYPP, which warrants replication with a larger sample to determine a more accurate estimate of the likely magnitude of these effects.

The evaluators and Peeple plan to co-publish the results of this trial in a peer reviewed academic publication.

References

Altman, D. G. and Bland, M. (2005) 'Treatment Allocation by Minimisation', *British Medical Journal*, 330, p. 843.

Asmussen, K., Feinstein, L., Martin, J., Chowdry, H. and Cox, D. (2016) 'Foundations for Life: What Works to Support Parent Child Interaction in the Early Years', Dartington Social Research Unit, University of Warwick and Coventry University.

Barlow, J., Bergman, H., Kornør, H., Wei, Y. and Bennett, C. (2016) 'Group-Based Parent Training Programmes for Improving Emotional and Behavioural Adjustment in Young Children', *Cochrane Database of Systematic Reviews*, 8, Art. No. CD003680. DOI: 10.1002/14651858.CD003680.pub3.

Braun, V. and Clarke, V. (2006) 'Using Thematic Analysis in Psychology', *Qualitative Research in Psychology*, 3 (2), pp. 77–101.

Clay, M. M. (2000) *Concepts About Print: What Have Children Learned About Printed Language?* Portsmouth, NH: Heinemann.

Cox, D. D. (2005) 'Evidence-Based Interventions Using Home-School Collaboration', *School Psychology Quarterly*, 20 (4), pp. 473–497.

Department for Education (2018) *Improving the Home Learning Environment: A Behaviour Change Approach.* HM Government, The National Literacy Trust. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/756020/Improving_the_home_learning_environment.pdf

Dunn, L., Dunn, L., Whetton, C. and Burley, J. (1997) 'British Picture Vocabulary Scale II', London: GL Assessment.

Early Intervention Foundation (2015) 'Best Start at Home', Dartington Social Research Unit, University of Warwick and Coventry University.

Evangelou, M., Brooks, G., Smith, S., Jennings, D. and Roberts, F. (2005) 'The Birth to School Study: A Longitudinal Evaluation of the Peers Early Education Partnership (PEEP) 1998–2005', London: DfES.

Evangelou, M., Coxon, K. and Sylva, K. (2008) 'Sutton Trust Evaluation Project (STEP): Phase 3 Research Report, an Evaluation of PEEP Provision for "Excluded" Families: Room to Play', University of Oxford Department of Education.

Evangelou, M. and Sylva, K. (2007) 'Evidence on Effective Early Childhood Interventions from the United Kingdom: An Evaluation of the Peers Early Education Partnership (PEEP)', *Early Childhood Research and Practice*, 9 (1).

Evangelou, M., Sylva, K., Edwards, A. and Smith, T. (2008) 'Supporting Parents in Promoting Early Learning: The Evaluation of the Early Learning Partnership Project (ELPP)', Department for Children, Schools and Families. https://www.researchconnections.org/childcare/resources/14905

Evangelou, M., Coxon, K., Sylva, K., Smith, S. and Chan, L. L. (2013) 'Seeking to Engage "Hard-to-Reach" Families: Towards a Transferable Model of Intervention', *Children and Society*, 27 (2), pp. 127–138.

Flaspohler, P. D., Meehan, C., Maras, M. A. and Keller, K. E. (2012) Ready, Willing, and Able: Developing a Support System to Promote Implementation of School-Based Prevention Programs', *American Journal of Community Psychology*, 50 (3-4), pp. 428–444.

Foster, M. A., Lambert, R., Abbott-Shim, M., McCarty, F. and Franze, S. (2005) 'A Model of Home Learning Environment and Social Risk Factors in Relation to Children's Emergent Literacy and Social Outcomes', *Early Childhood Research Quarterly*, 20 (1), pp. 13–36.

Hannon, P. (1995) *Literacy, Home and School: Research and Practice in Teaching Literacy with Parents*, London: The Falmer Press.

Hughes, C., Daly, I., Foley, S., White, N. and Devine, R. T. (2015) Measuring the Foundations of School Readiness: Introducing a New Questionnaire for Teachers—The Brief Early Skills and Support Index (BESSI)', *British Journal of Educational Psychology*, 85, pp. 332–356.

Hughes, C. and White, N. (2015) 'The Brief Early Skills and Support Index (BESSI) Manual', Centre for Family Research: University of Cambridge.

Humphrey, N., Lendrum, A., Ashworth, E., Frearson, K., Buck, R. and Kerr, K. (2016*)* 'Implementation and Process Evaluation (IPE) for Interventions in Education Settings: An Introductory Handbook', Education Endowment Foundation: University of Manchester.

Jeynes, W. (2007) 'The Relationship Between Parental Involvement and Urban Secondary School Student Academic Achievement: A Meta-Analysis', *Urban Education*, 42, pp. 82–110.

Johnson, C. (2015) 'Concepts About Print and Literacy Skill Acquisition of Preschool Students (doctoral dissertation), retrieved from ScholarWorks.

Kam, C. M., Greenberg, M. T. and Walls, C. T. (2003) 'Examining the Role of Implementation Quality in School-Based Prevention Using the PATHS Curriculum', *Prevention Science*, 4 (1), pp. 55–63.

Kendall, S. and Bloomfield, L. (2005) 'Developing and Validating a Tool to Measure Parenting Self Efficacy, *Journal of Advanced Nursing*, 51, pp. 174–81.

Kelly, Y., Sacker, A., Del Bono, E., Francesconi, M. and Marmot, M. (2011) 'What Role for the Home Learning Environment and Parenting in Reducing the Socioeconomic Gradient in Child Development? Findings from the Millennium Cohort Study. *Archives of Disease in Childhood,* archdischild195917.

Miller, S., Dunne, L., Millen, S., Neeson, L., McGeady, C. (2015) 'A Randomised Controlled Trial Evaluation of the Lifestart Parenting Programme', Belfast: Centre for Effective Education.

Melhuish, E. C., Phan, M. B., Sylva, K., Sammons, P., Siraj-Blatchford, I. and Taggart, B. (2008) 'Effects of the Home Learning Environment and Preschool Center Experience Upon Literacy and Numeracy Development in Early Primary School', *Journal of Social Issues*, 64 (1), pp.95–114.

Nye, C., Schwartz, J. and Turner, H. (2006) 'Approaches to Parent Involvement for Improving the Academic Performance of Elementary School Age Children: A Systematic Review', *Campbell Systematic Reviews*, 2 (4), pp. 1–49.

Ose, S. O. (2016) 'Using Excel and Word to Structure Qualitative Data', *Journal of Applied Social Science,* 10 (2), pp. 147–162.

Paris, S. G. (2005) 'Reinterpreting the Development of Reading Skills', *Reading Research Quarterly*, 40 (2), pp. 184–202.

Pomerantz, E. M., Moorman, E. A. and Litwack, S. (2007) 'The How, Whom and Why of Parents' Involvement in Children's Academic Lives: More is not Always Better', *Review of Educational Research,* 77 (3), pp. 373–410.

Pooch, A., Natale, R. and Hidalgo, T. (2019) 'Ages and Stages Questionnaire: Social–Emotional as a Teacher-Report Measure', *Journal of Early Intervention*, 41 (1), pp.3–12.

Reese, E., Sparks, A. and Leyva, D. (2010) 'A Review of Parent Interventions for Preschool Children's Language and Emergent Literacy', *Journal of Early Childhood Literacy*, 10 (1), pp. 97–117.

Renfrew, C. (2003) *The Action Picture Test* (4th edn), Oxford: Speechmark Publishing Ltd.

Sheridan, S. M., Knoche, L. L., Edwards, C. P., Bovaird, J. A., and Kupzyk, K. A. (2010) 'Parent Engagement and School Readiness: Effects of the Getting Ready Intervention on Preschool Children's Social–Emotional Competencies', *Early Education and Development*, 21(1), pp. 125–156.

Son, S. and Morrison, F. (2010) 'The Nature and Impact of Changes in Home Learning Environment on Development of Language and Academic Skills in Preschool Children', *Developmental Psychology*, 46, 1pp. 103–1118. https://doi. org/10.1037/a0020065

Squires, J. and Bricker, D. (2009) *Ages and Stages Questionnaire (ASQ): A Parent Completed Child Monitoring System, Third Edition*, Baltimore, MD: Brooks Publishing Company.

Sylva, K., Evangelou, M., Taylor, R., Rothwell, A. and Brooks, G. (2004) 'Enabling Parents: the Role of PEEP in Supporting Parents as Adult Learners', Oxford: Oxford University Department of Education.

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I. and Taggart, B. (2004) 'The Effective Provision of Pre-school Education (EPPE) Project. Final report', London: DfES/Institute of Education, University of London.

Treasure, T. and MacRea, K. D. (1998) 'Minimisation: The Platinum Standard For Trials? Randomisation Doesn't Guarantee Similarity of Groups: Minimisation Does', *British Medical Journal*, 317 (7155), pp. 362–63.

Wiig, E., Secord, W. A. and Semel, E. (2004) 'The Clinical Evaluation of Language Fundamentals – Preschool (2nd edn)', San Antonio, TX: Harcourt Assessment.

Appendix A: EEF cost rating

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

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

Appendix B: Security classification of trial findings

OUTCOME: ***Language skills (CELF Core language score)***

Rating	Criteria for rating			Initial score		Adjust		Final score
	Design	**MDES**	**Attrition**					
5	Randomised design	<= 0.2	0-10%					
4	Design for comparison that considers some type of selection on unobservable characteristics (e.g. RDD, Diff-in-Diffs, Matched Diff-in-Diffs)	0.21 - 0.29	11-20%	**4**				
3	Design for comparison that considers selection on all relevant observable confounders (e.g. Matching or Regression Analysis with variables descriptive of the selection mechanism)	0.30 - 0.39	21-30%			Adjustment for threats to internal validity **[-1]**		**3**
2	Design for comparison that considers selection only on some relevant confounders	0.40 - 0.49	31-40%					
1	Design for comparison that does not consider selection on any relevant confounders	0.50 - 0.59	41-50%					
0	No comparator	>=0.6	>50%					

Threats to validity	Threat to internal validity?	Comments
Threat 1: Confounding	High	Substitute measure used as baseline for the primary outcome showed imbalance > 0.1. Balance on key observable could not be assessed directly.
Threat 2: Concurrent interventions	Low	N/A
Threat 3: Experimental effects	Low	N/A
Threat 4: Implementation fidelity	Low	The number of sessions delivered was documented and was high. Even though parental attendance was much lower than expected, IV analyses demonstrated robustly that this made no difference to intervention outcomes.
Threat 5: Missing data	Moderate	Moderate missingness (20%) but this was explored and MI used in sensitivity analyses, which demonstrated the same pattern of findings as the complete case analysis.
Threat 6: Measurement of outcomes	Low	Primary outcome testing was conducted by researchers blind to treatment status; appropriate test used.
Threat 7: Selective reporting	Low	Analyses pre-specified. One new analysis (on treatment based on developer threshold) clearly labelled as exploratory and its benefit justified.

- **Initial padlock score:** 4 padlocks (randomised design, MDES at randomisation 0.2, but attrition of 20% resulted in dropping one padlock)

- **Reason for adjustment for threats to validity**: -1 (high risk of confounding due to imbalance at baseline of -0.17 in favour of the control group)
- **Final padlock score:** initial score adjusted for threats to validity = 3 padlocks

Appendix C: Memorandum of Understanding

Agreement to participate in the Peep Learning Together Study

Please sign both copies, retaining one and returning the second copy to [NAME OF CONTACT] at [PROJECT DELIVERY ADDRESS/EMAIL] by [ADD DATE]

Setting name …….

Setting postcode …….

Head Teacher/Executive Principal/Manager

Name …….

Aims of the evaluation

The aim of this study is to evaluate the impact of the Peep Learning Together Programme on the quality of young children's learning environment at home and on their vocabulary and early literacy skills. The results of this research will make an important contribution to understanding what works in improving support for parents as educators and the effect this has on children's outcomes in the early years.

The Peep Learning Together Programme and Training

The Peep Learning Together Programme is an early intervention which supports parents to understand more about how children learn - and to do more of the things at home which make a difference to children's outcomes like singing, sharing books and stories and talking about a wide range of ideas, thoughts and feelings. The Programme has been developed by the charity, Peeple.

In the study, Peeple will train practitioners from nursery settings to deliver the Programme to parents and children together. The Programme will start with a single home visit followed by 20 group-based sessions. The study is funded by the Education Endowment Foundation (EEF).

The training comprises a two-day course (or four twilight sessions). Programme resources will be supplied. Settings and individual practitioners will be provided with a mentor (an experienced Peep trainer/practitioner) to provide support with parental recruitment, planning and delivery of the Programme.

At least two practitioners will be trained from each setting (maximum of four per setting).

The evaluation

The evaluation is being carried out by Queen's University Belfast (the Research Team). The study is a randomised controlled trial. This means that half the settings, chosen at random, will receive the intervention (the Programme). These are the Intervention Settings. The other half will not receive the intervention. These are the Control Settings. Once the intervention (the Programme) is completed, outcomes from parents and children in the Intervention Settings will be compared to those in the Control Settings to find out whether the intervention has made a measurable difference. The random allocation of settings is essential to the evaluation as it is the best and most rigorous way to find out the effects of the Programme on parents and children. It is therefore important that settings understand, and consent to, the random allocation process.

Practitioners from the Intervention Settings will be trained to deliver the Programme in the Autumn term 2017 and will deliver the Programme during the Spring and Summer terms, 2018. Delivery of the Programme is mandatory for Intervention Settings. Control Settings will receive a payment of £500 on completion of the study. They may spend this on Peep Learning Together Programme Training once the study is completed.

At the beginning of the study the Research Team will:

- contact ALL settings (Intervention and Control) to gather data about participating children (names, dates of birth and Unique Pupil Numbers) once parents have signed opt-in consent. This will help with the evaluation and enable linkage to the National Pupil Database
- support practitioners to carry out a simple vocabulary test with all children whose parents have said they would like to take part in the intervention
- ask all practitioners and managers to complete a short questionnaire.

At the end of the study the Research Team will:

- send a short questionnaire to parents from ALL settings to complete and return by post/electronically to the University
- visit ALL settings and carry out two or three short assessments with each child whose parents opted-in to the study
- ask all practitioners and managers to complete a short questionnaire.

Throughout the study, the Research Team will visit a small number of schools to carry out case studies of the intervention.

Use of data

All data, including children's test responses and any other pupil data, will be treated with the strictest confidence. Child assessments will be administered and analysed by the Research Team from Queen's University Belfast. Named data will be matched with the National Pupil Database and shared with Peeple, the Department for Education, EEF, EEF's data contractor FFT Education and, in an anonymised form, with the UK Data Archive. No individual setting, parent or child will be identified in any report arising from the research. The study has received full ethical approval from the School of Social Sciences, Education and Social Work Research Ethics Committee at Queen's University Belfast.

Responsibilities

Peeple will:

- deliver the two-day Peep Learning Together Programme Training, and provide access to the Programme online and in hard copy
- provide support for all settings from a project mentor
- provide up to £500 per intervention setting to provide backfill for practitioners to be trained and deliver the Programme
- be the first point of contact for any questions about delivery of the Programme

The Research Team will:

- be the first point of contact for any questions about the research
- support ALL settings to carry out initial pupil assessments
- conduct the random allocation of settings to either the Intervention Group or the Control Group and inform the setting and Peeple of the outcome

- collect and analyse the data from the study
- ensure all members of the Research Team are appropriately trained and have full Disclosure and Barring Service (DBS) clearance
- publish a report on the findings of the study and disseminate the research findings.

The intervention settings will:

- consent to randomised allocation and commit to the outcome
- collect opt-in consent from parents
- carry out the child assessments at the beginning of the study (with support from the Research Team)
- promote the Peep Learning Together Programme to parents and recruit them to the study
- release practitioners so they can attend the two-day Learning Together Programme Training
- release practitioners so they can plan, prepare for and deliver the home visit and 20-week Programme to parents and children together
- provide a room or venue in which the group sessions can be delivered
- release practitioners to attend support meetings with their mentor
- ensure the shared understanding and support of all setting staff for the study and those involved.

The control settings will:

- consent to randomised allocation and commit to the outcome
- collect opt-in consent from parents
- carry out the child assessments at the beginning of the study (with support from the Research Team)
- ensure the shared understanding and support of all setting staff for the study and those involved.

Timescales

2017 March - July 2017	Peeple recruits Settings.
Sept - Oct 2017	Settings recruit families.
Oct 2017	Settings gather consent forms from families.
Oct 2017 (by half term)	Settings assess children on vocabulary. Research team randomly assign Settings to Control or Intervention.
Nov / Dec 2017	Peeple delivers Learning Together Programme (LTP) Training to Intervention Settings.
2018 Spring term 2018	Intervention Settings deliver Peep sessions for parents and children together. Peeple provides mentoring to Intervention Settings.
Summer term 2018	Intervention Settings continue to deliver Peep session for parents and children together. Peeple provides mentoring to Intervention Settings.
July 2018	Research team assess children and ask parents to fill in questionnaires in Control and Intervention Settings.

We commit to the evaluation of the Peep Learning Together Programme as set out above.

Headteacher/Executive Principal/Manager

Signature…… Date ……

Appendix D: Parent consent form (trial)

Learning Together Study

Dear Parent

Your child's school is taking part in an exciting new research study that is looking at how the *Peep Learning Together Programme* affects the quality of young children's learning environment at home and also their vocabulary and early literacy skills. The results of this evaluation will make an important contribution to understanding what works in improving support for parents as educators and the effect this has on children's outcomes in the early years.

The evaluation

The study is being carried out by Queen's University Belfast (the Research Team). It is a randomised controlled trial. This means that half the schools taking part in the study, chosen at random, will deliver the Peep Learning Together Programme to three year olds and their parents who would like to take part in the study. These are the *intervention settings*. The other half of the schools in the study will not deliver the Peep Programme. These are the *control settings*. There is a 50:50 chance that your child's school will be allocated to the intervention group and offer you the Peep programme.

Once the Peep Programme is finished in May 2018, outcomes from parents and children in the Intervention Settings will be compared to those in the Control Settings to find out whether Peep has made a measurable difference. The random allocation of settings is very important to the evaluation as it is the best way to find out if the programme works.

The study is funded by the Education Endowment Foundation (EEF).

What is the Learning Together Programme?

The Peep Learning Together Programme supports parents to understand more about how children learn - and to do more of the things at home which make a difference to children's outcomes like singing, sharing books and stories and talking about a wide range of ideas, thoughts and feelings. The Programme has been developed by the charity, Peeple. It starts with a single home visit followed by 20 group-based sessions which take place in or near the school.

What will it involve if I agree to take part?

If you would like to take part in the study (and have a 50:50 chance of also taking part in the Peep Programme):

- Sign this form and return it to your child's school – by doing so, you are agreeing to take part in the study regardless of whether your child's school is chosen to deliver the Peep Programme (i.e. an intervention setting) or not (i.e. a control setting).
- A practitioner at your child's school will do a short assessment of your child's literacy and communication skills (October/November 2017) and send this information (securely), along with your child's name, date of birth and Unique Pupil Number, to the research team.
- A member of the research team will conduct two or three short assessments with your child again, in your child's school, in May 2018.
- Also in May 2018, the research team will send *you* a short questionnaire to complete (either in hard copy, online or over the telephone, whichever you prefer).

If you complete all elements of the research as outlined above, you will receive a £15 gift voucher to say thank you.

Will I get to take part in the Peep Programme?

You will only be offered the Peep Programme if your child's school is allocated to the intervention group. There is a 50:50 chance that this will be the outcome of the allocation process (which is done by the research team).

If your child's school is chosen to be part of the control group you will not be offered the Peep Programme but will still take part in the study as explained in the section above.

Do I have to take part?

It is up to you whether you take part in the study or not. If you do decide to take part, you can change your mind at any time up until the point at which your data is anonymised and archived. You do not even have to give a reason why. Your decision to take part will in no way impact on your relationship with your child's school, Queen's University Belfast or Peeple, now or in the future.

Will my participation in the study be kept confidential?

All information which is collected about you and your child will be kept strictly confidential. Research folders will be kept in a locked office at all times. Access to these folders will be restricted to study investigators and statisticians. Any information that is stored electronically will be kept securely on a Queen's University computer.

Use of data

All data, including children's assessment responses and any other pupil data, will be treated with the strictest confidence. Child assessments will be analysed by the Research Team from Queen's University Belfast. Named data will be matched with the National Pupil Database and shared with Peeple, the Department for Education, EEF, EEF's data contractor FFT Education and, in an anonymised form, with the UK Data Archive. No individual setting, parent or child will be identified in any report arising from the research. The study has received full ethical approval from the School of Social Sciences, Education and Social Work Research Ethics Committee at Queen's University Belfast.

How to contact us to find out more about the study

If you would like to find out more about the study please contact Dr Sarah Miller, at the address or phone number below:

Dr Sarah Miller
School of Social Sciences, Education and Social Work
Queen's University Belfast
69/71 University Street
Belfast
BT7 1HL

Telephone: 028 9097 5944
E-mail: s.j.miller@qub.ac.uk

The Learning Together Study

Parent Trial Consent Form

Please complete and sign the consent form below to indicate that you have read the information sheet and whether or not you consent to take part in this part of the study.

- **I understand that if I agree to take part in this study:**
  - ✓ I am agreeing to take part in the study regardless of whether my child's school is chosen to deliver the Peep Programme or not.
  - ✓ A practitioner at my child's school will do a short assessment of my child's communication and language skills in October/November 2017.
  - ✓ A member of the research team will conduct two or three short assessments with my child again in May 2018.
  - ✓ Also in May 2018, the research team will send *me* a short questionnaire to complete.

- **I understand that my participation is voluntary and that I can withdraw at any time**

I do / do not (delete as appropriate) consent to my child and I taking part in this study.

Parent Name……..

Signature……..
Date……

Parent contact number……

Parent email address…….

Child's Name……...

School……...…..

****Please return this completed form to your child's teacher****

Appendix E: Parent consent form (IPE)

The Learning Together Study

Dear Parent

As you will know, the Peep Learning Together Study is evaluating the impact of the Peep Learning Together Programme on the quality of young children's learning environment at home and on their vocabulary and early literacy skills. The results of this research will make an important contribution to understanding what works in improving support for parents as educators and the effect this has on children's outcomes in the early years.

You have already signed up to the main part of the evaluation and we are very grateful for this, thank you. Another important part of this study involves interviewing a small number of parents who have taken part in the programme and we would like to speak to you to hear about your own views and experiences of the Peep Learning Together Programme so far.

What will it involve if I agree to take part?
If you agree to take part in this small additional part of the research a member of our research team will arrange a time that suits you to telephone you and ask you some questions about your experience of taking part in Peep with your child. This interview will last around 20 minutes and with your agreement it will be audio recorded.

Do I have to take part?
It is up to you whether you take part in the telephone interview or not. If you do decide to take part, you can change your mind at any time. You do not even have to give a reason why. Your decision to take part will in no way impact on your relationship with your child's school, Queen's University Belfast or Peeple, now or in the future.

Will my participation in the study be kept confidential?
All information which is collected about you will be kept strictly confidential. Research folders will be kept in a locked office at all times. Access to these folders will be restricted to study investigators and statisticians. Any information that is stored electronically will be kept securely on a Queen's University computer. Interviews will be audio recorded, only with your permission. Interview transcripts will be anonymised and recordings will be deleted five years after completion of the study in accordance with the University guidelines.

How to contact us to find out more about the study
If you would like to find out more about the study please contact Dr Sarah Miller, at the address or phone number below:

Dr Sarah Miller
School of Social Sciences, Education and Social Work
Queen's University Belfast
69/71 University Street
Belfast
BT7 1HL

Telephone: 028 90 975944
E-mail: s.j.miller@qub.ac.uk

The Learning Together Study

Parent Interview Consent Form

Please complete and sign the consent form below to indicate that you have read the information sheet and whether or not you consent to take part in this part of the study.

- I understand that if I agree to take part in this study that I will be interviewed about my experience of the Peep Learning Together Programme
- I understand that my participation is voluntary and that I can withdraw at any time

I do / do not (delete as appropriate) consent to being interviewed as part of this study.

I do / do not (delete as appropriate) consent to my interviews being audio recorded.

Print Name……..

Signature…… Date ……

School……..

Please return the completed form to:

Dr Sarah Miller
School of Social Sciences, Education and Social Work
Queen's University Belfast
69/71 University Street
Belfast
BT7 1HL

Telephone: 028 90 975944
E-mail: s.j.miller@qub.ac.uk

Appendix F: Practitioner consent form (IPE)

The Learning Together Study

Dear Practitioner

As you will know, the Learning Together Study is evaluating the impact of the Peep Learning Together Programme on the quality of young children's learning environment at home and on their vocabulary and early literacy skills. The results of this research will make an important contribution to understanding what works in improving support for parents as educators and the effect this has on children's outcomes in the early years.

You have already been contributing to the main part of the evaluation and we are very grateful for this, thank you. Another important part of this study involves interviewing a small number of practitioners who have been delivering the programme and we would like to speak to you to hear about your own views and experiences of the Peep Learning Together Programme so far.

What will it involve if I agree to take part?
If you agree to take part in this small additional part of the research a member of our research team will arrange a time that suits you to telephone you and ask you some questions about your experience of delivering Peep Learning Together Programme in your school. This interview will last around 20 minutes and with your agreement it will be audio recorded.

Do I have to take part?
It is up to you whether you take part in the telephone interview or not. If you do decide to take part, you can change your mind at any time. You do not even have to give a reason why. Your decision to take part will in no way impact on your relationship with your school, Queen's University Belfast or Peeple, now or in the future.

Will my participation in the study be kept confidential?
All information which is collected about you will be kept strictly confidential. Research folders will be kept in a locked office at all times. Access to these folders will be restricted to study investigators and statisticians. Any information that is stored electronically will be kept securely on a Queen's University computer. Interviews will be audio recorded, only with your permission. Interview transcripts will be anonymised and recordings will be deleted five years after completion of the study in accordance with the University guidelines.

How to contact us to find out more
If you would like to find out more about this part of the study please contact Dr Sarah Miller, at the address or phone number below:

Dr Sarah Miller
School of Social Sciences, Education and Social Work
Queen's University Belfast
69/71 University Street
Belfast
BT7 1HL

Telephone: 028 90 975944
E-mail: s.j.miller@qub.ac.uk

The Learning Together Study

Practitioner Interview Consent Form

Please complete and sign the consent form below to indicate that you have read the information sheet and whether or not you consent to take part in this part of the study.

- I understand that if I agree to take part in this study that I will be interviewed about my experience of the Peep Learning Together Programme
- I understand that my participation is voluntary and that I can withdraw at any time

I do / do not (delete as appropriate) consent to being interviewed as part of this study.

I do / do not (delete as appropriate) consent to my interviews being audio recorded.

Print Name……..

Signature…… Date ……

School……..

Please return the completed form to:

Dr Sarah Miller
School of Social Sciences, Education and Social Work
Queen's University Belfast
69/71 University Street
Belfast
BT7 1HL

Telephone: 028 90 975944
E-mail: s.j.miller@qub.ac.uk

Appendix G: Histograms of the pre-test outcomes and primary outcome at post-test

Figure F.1: Distribution of early literacy score (Concepts about Print) at pre-test

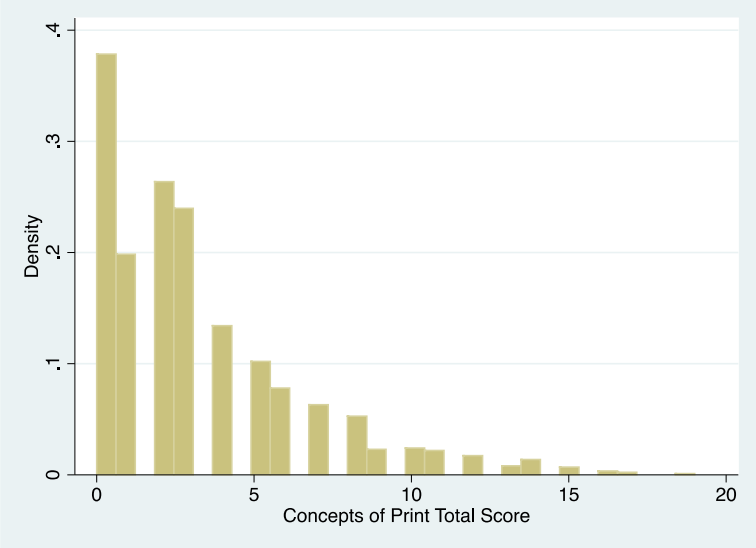


Figure F.2: Distribution of communication subscale score (ASQ) at pre-test

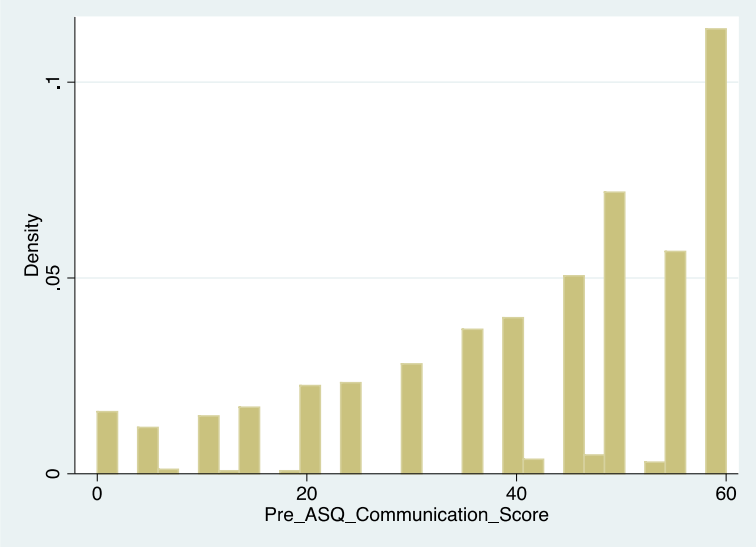


Figure F.3: Distribution of social emotional development score (ASQ) at pre-test

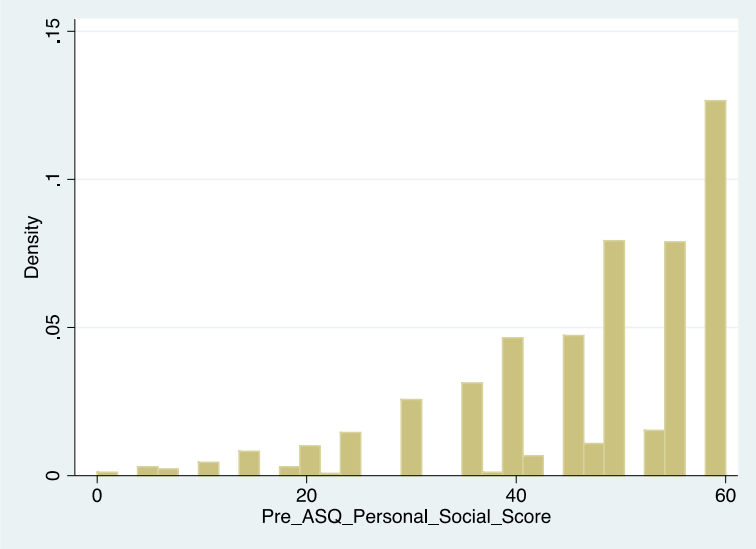
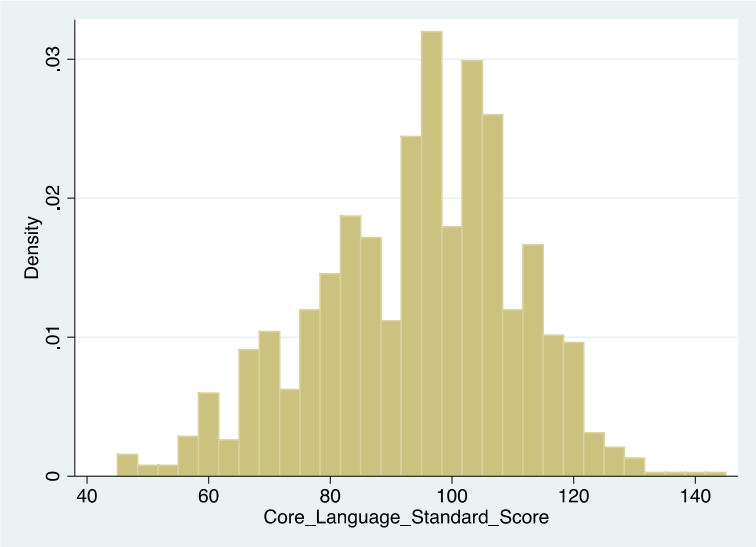


Figure F.4: Distribution of the core language score (CELF) at post-test



Appendix H: Stata code used in the analysis of the main models, multiple imputation and the compliance analysis

Main multilevel models

```
mixed Core_Language_Standard_Score Pre_CoP_Score Group High_Dep Med_Dep || School_Id:

mixed Post_CoP_Score Pre_CoP_Score Group High_Dep Med_Dep || School_Id:

mixed Post_ASQ_Communication_Score Pre_ASQ_Communication_Score Group High_Dep Med_Dep || School_Id:

mixed Post_ASQ_Personal_Social_Score Pre_ASQ_Personal_Social_Score Group High_Dep Med_Dep || School_Id:

mixed HLE_Total Group High_Dep Med_Dep || School_Id:

mixed TOPSE_Play_Total  Group High_Dep Med_Dep || School_Id:

mixed TOPSE_Empathy_Total  Group High_Dep Med_Dep || School_Id:

mixed TOPSE_SelfAcceptance_Total  Group High_Dep Med_Dep || School_Id:

mixed TOPSE_Learning_Total  Group High_Dep Med_Dep || School_Id:
```

Compliance analysis

```
ivregress 2sls Core_Language_Standard_Score Pre_CoP_Score High_Dep Med_Dep (Group=sessionsparent)
```

Multiple imputation

```
mi set mlong

mi register imputed Pre_CoP_Score Pre_ASQ_Communication_Score Pre_ASQ_Personal_Social_Score
Post_ASQ_Communication_Score Post_ASQ_Personal_Social_Sc Post_CoP_Score BESSI_BA_Score
Core_Language_Standard_Score HLE_Total TOPSE_Play_Total TOPSE_Empathy_Total TOPSE_SelfAcceptance_Total
TOPSE_Learning_Total Female

mi register regular Group Med_Dep High_Dep

mi impute chained (logit) Female (regress) Pre_CoP_Score Pre_ASQ_Communication_Score
Pre_ASQ_Personal_Social_Score Post_ASQ_Communication_Score Post_ASQ_Personal_Social_Sc Post_CoP_Score
BESSI_BA_Score Core_Language_Standard_Score HLE_Total TOPSE_Play_Total TOPSE_Empathy_Total
TOPSE_SelfAcceptance_Total TOPSE_Learning_Total, add(20) rseed(3228) by(Group) augment dryrun

mi impute chained (logit) Female (regress) Pre_CoP_Score Pre_ASQ_Communication_Score
Pre_ASQ_Personal_Social_Score Post_ASQ_Communication_Score Post_ASQ_Personal_Social_Sc Post_CoP_Score
BESSI_BA_Score Core_Language_Standard_Score HLE_Total TOPSE_Play_Total TOPSE_Empathy_Total
TOPSE_SelfAcceptance_Total TOPSE_Learning_Total, add(20) rseed(3228) by(Group) augment

mi estimate: mixed Core_Language_Standard_Score Pre_CoP_Score Group High_Dep Med_Dep || School_Id: //(adjusted
post-test mean) p=.36

mi estimate: mixed Post_CoP_Score Pre_CoP_Score Group High_Dep Med_Dep || School_Id: //p=.05

mi estimate: mixed Post_ASQ_Communication_Score Pre_ASQ_Communication_Score Group High_Dep Med_Dep ||
School_Id: //p=.58

mi estimate: mixed Post_ASQ_Personal_Social_Sc Pre_ASQ_Personal_Social_Score Group High_Dep Med_Dep ||
School_Id: //p=.26

mi estimate: mixed BESSI_BA_Score Pre_ASQ_Personal_Social_Score Group High_Dep Med_Dep || School_Id: //p=.51

mi estimate: mixed HLE_Total Group High_Dep Med_Dep || School_Id: //p=.05
```

```
mi estimate: mixed TOPSE_Play_Total  Group High_Dep Med_Dep || School_Id: //wont converge?

mi estimate: mixed TOPSE_Empathy_Total  Group High_Dep Med_Dep || School_Id: //p=.51

mi estimate: mixed TOPSE_SelfAcceptance_Total  Group High_Dep Med_Dep || School_Id: //p=.03

mi estimate: mixed TOPSE_Learning_Total  Group High_Dep Med_Dep || School_Id: //p=.02
```

Appendix I: Missing data per group for each outcome (at pre- and post-test)

Pre-test outcomes

Table I.1 Missing data for the Concepts about Print Pre-test Score

Concepts about Print Pre-test Score	Control N %	Intervention N %	Total N %
Not missing	750 97.91	673 98.93	1423 98.34
Missing	16 2.09	8 1.17	24 1.66
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 1.8465$, p= 0.174			

Table I.2 Missing data for the ASQ Communication Pre-test Score

ASQ Communication Pre-test Score	Control N %	Intervention N %	Total N %
Not missing	739 96.48	662 97.21	1401 96.82
Missing	27 3.52	19 2.79	46 3.18
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 0.6324$, p= 0.426			

Table I.3 Missing data for the ASQ Personal Social Pre-test Score

ASQ Personal Social Pre-test Score	Control N %	Intervention N %	Total N %
Not missing	740 96.61	648 95.15	1388 95.92
Missing	26 3.39	33 4.85	59 4.08
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 1.9421$, p= 0.163			

Post-test outcomes

Table I.4 Missing data for the Concepts about Print Post-test Score

Concepts about Print Post-test Score	Control N %	Intervention N %	Total N %
Not missing	605 78.98	562 82.53	1167 80.65
Missing	161 21.02	119 17.47	280 19.35
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 2.9031$, p=0.089			

Table I.5 Missing data for the CELF Core Language Post-test Score

CELF Core Language Post-test Score	Control N %	Intervention N %	Total N %
Not missing	599 78.20	555 81.50	1154 79.75
Missing	167 21.80	126 18.50	293 20.25
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 2.4301$, p= 0.119			

Table I.6 Missing data for the ASQ Communication Post-test Score

ASQ Communication Post-test Score	Control N %	Intervention N %	Total N %
Not missing	585 76.37	552 81.06	1137 78.58
Missing	181 23.63	129 18.94	310 21.42
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 4.7035$, p= 0.030			

Table I.7 Missing data for the ASQ Personal Social Post-test Score

ASQ Personal Social Post-test Score	Control N %	Intervention N %	Total N %
Not missing	582 75.98	545 80.03	1127 77.89
Missing	184 24.02	136 19.97	320 22.11
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 3.4335$, p= 0.064			

Table I.8 Missing data for the BESSI BA Post-test Score

BESSI BA Post-test Score	Control N %	Intervention N %	Total N %
Not missing	548 71.54	537 78.85	1085 74.98
Missing	218 28.46	144 21.15	362 25.02
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 10.2810$, p= 0.001			

Table I.9 Missing data for the Home Learning Environment Post-test Score

Home Learning Environment Post-test Score	Control N %	Intervention N %	Total N %
Not missing	382 49.87	408 59.91	790 54.60
Missing	384 50.13	273 40.09	657 45.40
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 14.6666$, p< 0.001			

Table I.10 Missing data for the TOPSE Play Post-test Score

TOPSE Play Post-test Score	Control N %	Intervention N %	Total N %
Not missing	381 49.74	405 59.47	786 54.32
Missing	385 50.26	276 40.53	661 45.68
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 13.7615$, p< 0.001			

Table I.11 Missing data for the TOPSE Empathy Post-test Score

TOPSE Empathy Post-test Score	Control N %	Intervention N %	Total N %
Not missing	384 50.13	401 58.88	785 54.25
Missing	382 49.87	280 41.12	662 45.75
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 11.1295$, p=0.001			

Table I.12 Missing data for the TOPSE Self-acceptance Post-test Score

TOPSE Self-acceptance Post-test Score	Control N %	Intervention N %	Total N %
Not missing	373 48.69	393 57.71	766 52.94
Missing	393 51.31	288 42.29	681 47.06
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 11.7591$, $p=0.001$			

Table I.13 Missing data for the TOPSE Learning Post-test Score

TOPSE Learning Post-test Score	Control N %	Intervention N %	Total N %
Not missing	381 49.74	394 57.86	775 53.56
Missing	385 50.26	287 42.14	672 46.44
Total	766 100	681 100	1447 100
Pearson $chi^2(1) = 9.5496$, $p=0.002$			

Appendix J: On treatment analysis conducted to explore the impact of compliance on the primary outcome

On treatment analysis for language skills

Overall, 220 (32%) parents attended 14 or more sessions. An on treatment analysis was conducted to ascertain whether the intervention might work better for those 220 parents in the intervention group that we know were 'compliant', however, it did not and the difference between the intervention and control groups on language scores was even smaller than reported in the primary analysis above (Hedges g=0.003 compared to Hedges g=0.03]. The analysis below is a repeat of the main analysis but in the current analysis the intervention groups consists only of those children whose parents attended 14 or more Peep sessions.

Table J.1 On treatment analysis

	Raw means				Effect size			
	Intervention group		Control group					
Outcome	n (missing)	Mean (95% CI)	n (missing)	Mean (95% CI)	n in model (intervention; control)	Hedges g (95% CI)	p-value	ICC
Language skills	199 (482)	93.30 (90.91, 95.69)	599 (167)	95.12 (93.80, 96.45)	798 (199, 599)	0.003 (-0.16, 0.16)	0.97	0.21

Table J.2 Effect size estimation

Outcome	Unadjusted differences in means	Adjusted differences in means	Intervention group		Control group		Pooled variance
			n (missing)	Variance of outcome	n (missing)	Variance of outcome	
Language skills	-1.82	0.07	199 (482)	599	599 (167)	651	638

Appendix K: Instrumental variable analysis to explore the impact of compliance on the primary outcome

The instrumental variable analysis indicated that compliance was not a better (less biased) predictor of language outcomes (compared to group allocation) and in fact it was not endogenous with group allocation. As such, it is a weak instrument for group allocation (Wu Hausman F(1, 960)=0.05; p=0.81) and the resulting instrumental model (output reported below) was not valid. This means that we do not have any evidence to suggest that 'more' of the intervention (i.e. attending more sessions) means that children are likely to benefit any more, by way of improved language skills.

```
ivregress 2sls Core_Language_Standard_Score Pre_CoP_Score High_Dep Med_Dep (Group=sessionsparent)

Instrumental variables (2SLS) regression          Number of obs   =        966
                                                  Wald chi2(4)    =     173.51
                                                  Prob > chi2     =     0.0000
                                                  R-squared       =     0.1528
                                                  Root MSE        =     15.451

------------------------------------------------------------------------------
 Post-testLanguage |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------------+----------------------------------------------------------------
             Group |  -.9625092   1.340864    -0.72   0.473    -3.590554    1.665535
Pre-test Literacy  |   1.817331   .1553194    11.70   0.000     1.512911    2.121752
  High_Deprivation |  -3.540617   1.176648    -3.01   0.003    -5.846805   -1.234429
   Med_Deprivation |  -2.760082   1.265164    -2.18   0.029    -5.239758   -.2804057
          constant |   90.15553   1.209612    74.53   0.000     87.78473    92.52633
------------------------------------------------------------------------------
Instrumented:  Group
Instruments:   Pre-test Literacy High_Deprivation Med_Deprivation sessionsparent

estat endog

  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1) =  .055212  (p = 0.8142)
  Wu-Hausman F(1,960) =  .054872  (p = 0.8148)
```

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