

# Common elements

## An innovative approach to improving children's outcomes in early childhood education

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## About PEDAL

The Centre for Research on Play in Education, Development, and Learning (PEDAL) was launched in 2015 with a donation from the LEGO Foundation. PEDAL is based in the Faculty of Education at the University of Cambridge. The centre carries out research on the value and impacts of play in children's lives, to develop support for families, schools, and communities, and to spark change in policy and practice. PEDAL's work aims to contribute to a happy and healthy foundation for babies, children, and young people.

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## About the Nuffield Foundation

The Nuffield Foundation is an independent charitable trust with a mission to advance social wellbeing. It funds research that informs social policy, primarily in education, welfare and justice. It also funds student programmes that provide opportunities for young people to develop skills in quantitative and scientific methods. The Nuffield Foundation is the founder and co-funder of the Nuffield Council on Bioethics, the Ada Lovelace Institute and the Nuffield Family Justice Observatory.

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The aim of this report is to support policymakers, practitioners and commissioners to make informed choices. We have reviewed data from authoritative sources but this analysis must be seen as a supplement to, rather than a substitute for, professional judgment. The What Works Network is not responsible for, and cannot guarantee the accuracy of, any analysis produced or cited herein.

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## About EIF

The Early Intervention Foundation (EIF) is an independent charity established in 2013 to champion and support the use of effective early intervention to improve the lives of children and young people at risk of experiencing poor outcomes.

Effective early intervention works to prevent problems occurring, or to tackle them head-on when they do, before problems get worse. It also helps to foster a whole set of personal strengths and skills that prepare a child for adult life.

EIF is a research charity, focused on promoting and enabling an evidence-based approach to early intervention. Our work focuses on the developmental issues that can arise during a child's life, from birth to the age of 18, including their physical, cognitive, behavioural and social and emotional development. As a result, our work covers a wide range of policy and service areas, including health, education, families and policing.

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# Introduction

## Early childhood education in the UK

In England there are approximately 62,000 Ofsted-registered early childhood education (ECE) providers for children aged 0–4 years. In 2021, providers offered over 1.5 million childcare places across group-based private providers, group-based voluntary providers, school-based providers, and childminders (DfE, 2021).

UK evidence consistently shows that high-quality early childhood education can have significant impact on children’s outcomes. Results from the Effective Pre-school, Primary and Secondary Education Project (EPPSE) – a longitudinal study carried out with 2,800 children in England between 1997 and 2014 – revealed that children who attended preschool had better attainment in language, pre-reading and early number concepts at age 5 in comparison with students who did not attend preschool, after controlling for the influence of background characteristics (Taggart et al., 2015). The study also identified long-term outcomes, with attendance at a high- or medium-quality preschool predicting better science outcomes and socio-emotional outcomes at age 14 (key stage 3), and a higher total GCSE score at age 16 (key stage 4).<sup>1</sup>

Evidence also suggests that high-quality ECE has a crucial positive influence on mitigating the effect of disadvantage, equipping children with essential school readiness skills which impact on later-life outcomes. Results from EPPSE indicated that for children from lower socioeconomic backgrounds (as determined by low parental qualification or poor home learning environment), high-quality preschool attendance enhanced maths outcomes at age 11, self-regulation skills at age 14 and GCSE maths and English scores at age 16 (ibid.).

The more recent Study of Early Education and Development (SEED), which collected data from over 6,000 children in England from the age of 2, reported similar findings. It found significant benefits to disadvantaged children starting and remaining in high-quality ECE at or before age 2, including an increase in the chances of achieving expected Early Years Foundation Stage profile (EYFSP) levels in school reception year and improvement in children’s verbal ability in school year 1 (Melhuish & Gardiner, 2021).

## Challenges in delivering high-quality early childhood education in the UK

Ensuring the delivery of high-quality services among the variety of providers in the UK remains a significant challenge. The current evidence base points to the efficacy of staff training in ensuring high-quality education and positive outcomes for children (Bonetti & Blanden, 2020), with a positive association between the presence of degree-qualified staff and children’s performance on EYFSP (Manning et al., 2019), including for disadvantaged children. ECE in the UK is, however, characterised by significant variation in practitioner qualifications and no mandated continuing professional development (CPD) for ECE practice.

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<sup>1</sup> Similarly, international evidence from US longitudinal studies shows the enduring benefits that high-quality ECE provides into adolescence and beyond (Campbell et al., 2012; Schweinhart et al., 2005).

Research has also demonstrated the importance of ECE programmes<sup>2</sup> aimed at enhancing children's school readiness. Systematic reviews find that well-designed, well-implemented ECE programmes are associated with improvements in children's socio-emotional, behavioural and early learning outcomes (Blewitt et al., 2018; Sim et al., 2018; Young Sun Joo et al., 2019). Meta-analysis research examining the impact of vocabulary programmes delivered in ECE settings has demonstrated an overall large effect size ( $d = .88$ ) on vocabulary measures (Marulis & Newman, 2010); and similar findings have been reported for numeracy programmes, with the average effect size across 29 experimental and quasi-experimental studies being moderate to large ( $d = 0.62$ ) (Aubrey et al., 2006).

Despite the progress that has been made in developing and evaluating ECE programmes, there are a number of obstacles to bringing programmes to scale in the UK.

- First, much of the evidence regarding effective programmes comes from experimental studies, which test programmes under highly controlled, well-resourced conditions. The results from these trials are difficult to replicate in real-world contexts and conditions, when external financial and logistical supports are removed.
- Second, structured manuals can be perceived as being too top-down or manualised, with prescriptive scripts and strict requirements for programme fidelity. As a result, early years settings lack a sense of ownership over the programme, with the result that it is unlikely to be sustained (Embry & Biglan, 2008).
- Costs are another challenge. Direct costs for comprehensive curricula incurred by early years settings include purchasing materials, training and in some cases ongoing consultation and support. There are also hidden costs such as temporary staff replacement to cover duties and administrative costs.
- An additional challenge relates to the embedding of practices or strategies from evidence-based programmes within real-time 'teachable moments' in the early year setting. Given that practitioners spend a considerable amount of time with children outside of programme activities and sessions, a significant proportion of daily practices that influence children's development tend to fall outside the scope of such programmes. Failing to improve these practices, it is argued, is a missed opportunity in children's skill development (Jones & Bouffard, 2012; Jones, Brown & Aber, 2011).

## Addressing these challenges

Recognising the potential barriers to delivering high-quality ECE, particularly the delivery of evidence-based ECE programmes, our research proposes an alternative approach, focused on identifying the common elements or core components of evidence-based programmes. These common elements represent discrete practices, routines, strategies and behaviours that can be integrated into practitioners' daily interactions with children.

Identifying these common elements offers the potential to work towards embedding strategies and routines that are common across existing evidence-based programmes within everyday practice. It is not intended that employing these strategies would replace evidence-based programmes, but instead that they might reach a wider population, especially those who would not traditionally be served.

Work in relation to the identification of common elements has been already carried out across several research fields, including the prevention and treatment of mental health and behavioural problems (Chorpita & Daleiden, 2009; Boustani et al., 2015), academic

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<sup>2</sup> ECE programmes are defined as manualised groups of activities, which have a beginning, middle and end, a set process for the activities, and eligibility requirements; which are delivered by practitioners, and which aim to improve children's school readiness.

programmes delivered in out-of-school time (Engell et al., 2020), and juvenile justice programmes (Lipsey, 2009). Several studies have used this data in order to test the effectiveness of singular elements (for example, Leijten et al., 2015) and in the development of modular programmes tailored to individual needs.

Chorpita and Daleiden (2009), for example, examined common practice elements embedded within evidence-based psychotherapy and mental health treatments, distilling the core components (both client attributes and treatment strategies) associated with the best outcomes. The purpose of this work was to enable practitioners to delivery responsive services based on a young person's unique needs, while at the same time using practices grounded in the evidence base. As part of this work, process guides (logic models or flow algorithms) were developed to help practitioners select the most appropriate treatment approach based on the child's needs. A randomised control trial examining the impact of this modular approach to treating depression, anxiety and conduct problems, compared to standard manualised treatment and usual care, revealed promising results. It found that the modular approach outperformed both the usual care group and standard manualised treatment group in terms of health outcomes and rates of improvement (Weisz et al., 2012). These results and other similar research (for example, Engell et al., 2021) point to the potential of adopting a more flexible approach to intervention work.

To our knowledge, no prior research has identified the common elements of evidence-based ECE programmes addressing children's addressing children's early literacy, numeracy, meta-cognition, executive functions and social-emotional skills. These outcomes, which form a core part of the EYFS, have been proven to provide a foundation for school readiness and effective learning (Hillman & Williams, 2015) and were, as a result, the focus of our research.

Our research sought to:

- take a transparent and systematic approach to identifying common elements associated with the most effective early childhood education programmes; and
- develop, in consultation with practitioners, practical guidance on the practices, routines, strategies and behaviours that practitioners can use to support children's skill development.

# Phase 1: Identification of evidence-based ECE programmes

We first conducted a systematic search of evidence-based ECE programmes aimed at enhancing children’s cognitive and social-emotional outcomes.

## Methodology

Searches included:

- a search for systematic reviews/meta-analyses, published since 2000, examining the effectiveness of early childhood education programmes
- a search for all relevant programmes across various What Works databases, including:
  - the EIF Guidebook<sup>3</sup>
  - the Collaborative for Academic, Social, and Emotional Learning (CASEL) website<sup>4</sup>
  - the Blueprints for Healthy Youth Development website<sup>5</sup>
- a search for all relevant programmes across various curriculum consumer reports, including:
  - the Curriculum Consumer Report of the Early Childhood Learning and Knowledge Centre
  - the Early learning Curriculum Consumer Report of the Washington State Department of Children, Youth and Families
- a systematic search of electronic databases to identify recently published studies (2014–2019) that may not have been included in the systematic reviews published since 2000. The academic databases included in the search were:
  - Education Research Information Centre (ERIC)
  - PsycINFO
  - Embase
  - Scopus
  - Campbell collaboration trials register.

Table 1 includes the terms used as part of this systematic search.

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<sup>3</sup> See: <https://guidebook.eif.org.uk/>

<sup>4</sup> See: <https://casel.org/>

<sup>5</sup> See: <https://www.blueprintsprograms.org/>



**TABLE 1: SEARCH TERMS**

Search terms utilised, including truncated words and \* for wildcard searches

Outcomes	Setting	Programme	Study design
social	early childhood education	curricul*	random*control*
emotion*	kindergarten	intervention	quasi-experiment*
language	ECEC	program*	evaluation
literacy	early years		RCT
cognitive math*	early education		QED
math*	early childhood		trial
numeracy	pre-K		systematic review
executive function	preK		meta analysis
behavior*	preschool		
academic	pre-school		
school readiness	childcare		
development	reception		
memory	foundation stage		
reading	daycare		
	day care		
	creche		

### Eligibility criteria for evidence-based programmes

ECE programmes that fulfilled the following inclusion criteria were deemed relevant for our research study:

- **Programme outcomes:** programmes were considered relevant if they were aimed at improving cognitive outcomes (speech and language development, numeracy, or executive functions and meta-cognition skills) or social-emotional outcomes. See table 2 for the full list of outcomes of interest.
- **Programme manual:** programmes were included if they were manualised, that is, providing a curriculum with a set of activities, write-up/description of such activities, materials, and/or guidance for working with children in a classroom.
- **Age range:** programmes designed for children aged 2–5 years
- **Settings:** programmes had to be delivered in an early childhood setting
- **Language:** only programmes with the manual or curriculum published in English were included
- **Evidence of effectiveness:** programmes were required to have at least *two studies* published since 2000 that utilised experimental or quasi-experimental design with a control/comparison group and a sample size of over 50 participants. To be included, the studies had to use standardised measures and report statistically significant improvements with at least one relevant outcome.

**TABLE 2: OUTCOMES OF INTEREST**

Outcomes of interest included in the eligibility criteria

Cognitive outcomes			Social and emotional outcomes
Speech and language skills	Numeracy skills	Executive functions and meta-cognition	Social and emotional skills
Language development domain	Basic number concepts	Executive function	Self-awareness
Alphabetics domain	Number operations	Memory	Self-regulation/self-management
Fluency domain	Patterns and classification	Problem-solving	Relationship skills
Comprehension	Measurement	Cognitive processing	Social awareness
	Geometry	Flexibility	Responsible decision-making
		Engagement	

Searches were conducted between April and September 2020.

## Results

A total of 340 programmes were identified through our systematic search. After all programmes were screened for eligibility and duplicates were removed, 40 programmes fulfilled our inclusion criteria.

Table 3 provides a breakdown of the number of programmes identified across the four core domains. It is important to note that several programmes addressed multiple domains but for the purpose of categorising them, the primary domain targeted by the intervention was captured.

**TABLE 3: TOTAL NUMBER OF PROGRAMMES**

Total number of programmes that were identified through systematic search and total number of programmes that fulfilled inclusion criteria

	Literacy	Numeracy	Executive functions and meta-cognition	Social-emotional
Programmes identified in systematic search	111	30	58	141
Programmes that fulfilled inclusion criteria*	17	5	6	12

\* Within each domain one programme fulfilled all but one of the inclusion criteria.

### Purchasing eligible programmes

Consistent with published methods on identifying common elements (e.g. Engell et al., 2020; Garland et al., 2008, Chorpita & Daleiden, 2009), we sought to obtain programme manuals, which tend to contain more detailed information than published articles, for use in coding. Of the 40 programmes that fulfilled our inclusion criteria, we were successful in purchasing 22 programme manuals.

The main reasons for not obtaining manuals for programmes that fulfilled the inclusion criteria included that the distributor did not reply to contact queries, purchase of the programme was restricted to ECE providers, or the programme had been discontinued.

A list of the programmes that were coded as part of this research is provided in the appendix to this report.

# Phase 2: Data extraction and identification of common elements

## Methodology

Phase 2 of the research consisted of four core tasks:

- development of skills framework and codebook
- training coders
- coding of manual activities
- identification of common elements.

### Development of skills framework and codebook

We developed an overarching skills framework identifying the key skills/components of development within each of our core domains: (i) numeracy (ii), literacy, oral language and communication skills, (iii) executive functions and meta-cognition skills, and (iv) social and emotional skills (see table 4).

In developing our skills framework, we examined existing national and international frameworks, including Development Matters, MELQO: Measuring Early Learning Quality and Outcomes, and Headstart Early Learning Outcomes Framework. These frameworks describe the skills, behaviours and learning outcomes relevant to early childhood education.

We used these frameworks to identify the core skills that constitute our outcomes of interest. We sought expert advice from ECE practitioners and academics on the development and refinement of our framework to ensure the core skills were in line with statutory requirements.

The skills framework was then used to develop a codebook for the programme manuals. The codebook consisted of two parts: skills codes and instructional method codes. For each skill, the codebook provided a code number, working definition, examples of activities that are used to support the development of this skill, and coding tips to help coders differentiate between skills that may overlap. The codebook was continuously developed and improved during training and the duration of the project to further specify distinction between codes and to provide examples from coded manuals. Table 5 provides an example of the codebook entry for the skill 'Counting and set production' within early numeracy.

**TABLE 4: SKILLS FRAMEWORK**

Emerging academic skills	Executive functions and meta-cognition skills	Social and emotional skills	Language and communication
<p><b>Early numeracy</b></p> <ul style="list-style-type: none"> <li>Counting and set production</li> <li>Numeral identification</li> <li>Mental addition</li> <li>Measurement vocabulary</li> <li>Spatial and relational thinking</li> <li>Pattern and categorical thinking</li> </ul> <p><b>Early literacy</b></p> <ul style="list-style-type: none"> <li>Alphabet knowledge</li> <li>Phonological awareness</li> <li>Listening comprehension</li> <li>Writing</li> </ul>	<p><b>Executive functions</b></p> <ul style="list-style-type: none"> <li>Working memory</li> <li>Inhibitory control</li> <li>Flexibility</li> </ul> <p><b>Meta-cognition</b></p> <ul style="list-style-type: none"> <li>Engagement and persistence</li> <li>Planning and self-evaluation</li> <li>Self-confidence and self-efficacy</li> </ul>	<p><b>Self-regulation</b></p> <ul style="list-style-type: none"> <li>Emotional self-regulation</li> <li>Behavioural self-regulation</li> </ul> <p><b>Social cognition</b></p> <ul style="list-style-type: none"> <li>Emotional knowledge</li> <li>Emotional expression</li> <li>Empathy and perspective taking</li> </ul> <p><b>Social competence</b></p> <ul style="list-style-type: none"> <li>Relationship-building</li> <li>Communication</li> <li>Prosocial cooperative behaviour</li> <li>Conflict resolution skills</li> </ul>	<p><b>Oral communication</b></p> <ul style="list-style-type: none"> <li>Words</li> <li>Grammar and morphology</li> <li>Sentences</li> <li>Conversation</li> </ul> <p><b>Listening</b></p> <ul style="list-style-type: none"> <li>Attending and understanding</li> </ul>

**TABLE 5: EXAMPLE CODEBOOK ENTRY**

Example codebook entry for the skill ‘Counting and set production’

Emerging Academic Skills	
1. Early numeracy	
<i>Code</i>	
<b>101</b>	<p><b>Counting and set production</b></p> <p>Child understands that numbers refer to quantities. Child has knowledge of words for numbers and sequences. This can be either verbal or non-verbal, but does not involve written numerals.</p> <p>Specifically, the child can:</p> <ul style="list-style-type: none"> <li>count accurately, out loud or on their fingers</li> <li>learn ordinal numbers (first, second, etc)</li> <li>use the last number as representing the whole set (cardinality)</li> <li>count objects in any order, correcting themselves as they go</li> <li>use counting for different types of things</li> <li>understand 1:1 correspondence between the number label and the object counted (cannot count the same object twice, and cannot use the same label twice to count different objects)</li> <li>put number cards in order / identify what number comes before or after (identify spatial relations using number lines).</li> </ul> <p><i>Coding tip:</i></p> <p>Code this if activity refers to verbal or non-verbal counting and set production (in contrast to the use of printed numerals, which is a separate code). This code specifically refers to counting (‘one’, ‘two’, etc.). Note this is distinct from code 104 for ‘measurement vocabulary’.</p>

The codebook also specified the type of instructional methods that were used as part of the activities. For each instructional method, the codebook included a code, a definition of the instructional method and examples of what this might look like in manuals. Table 6 provides the list of instructional methods that were used to code activities in the manuals.

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## TABLE 6: INSTRUCTIONAL METHODS

List of instructional methods used to code activities

Code	
1	Didactic instruction and teacher modelling
2	Strategy practice and physical learning
3	Q&A and discussion
4	Game / icebreaker / role-play / child-modelling
5	Drawing and writing
6	Generalisation and repeated events as part of school timetable
7	Visual display, materials or tools embedded in class environment
8	Art / creative project
9	Book / story / song / nursery rhyme
10	Multimedia
11	Repetition of sounds, syllables or words

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### Training coders

The codebook was piloted during coder training to ensure its replicability. As part of the training, coders independently coded a social emotional learning (SEL) manual and discrepancies in coding were resolved through discussion. The same training process was then adopted for early numeracy, literacy, and executive function and meta-cognition manuals.

### Coding of manual activities

To extract raw data from each manual, coders read the manual, and segmented lessons into a set of core activities. For each activity, the following information was extracted by a coder:

- **Programme name and lesson number**
- **Aim of lesson:** as reported in the manual, or in the absence of this information as identified by the coder through the included activities
- **Section of lesson:** introduction, transition, main activity or a closing activity
- **Page number**
- **Repetition:** whether the activity was a repetition of a previous activity
- **Skill and subskill codes:** as listed in the codebook. For each activity, it was possible to include two primary skills and subskill codes respectively, and two secondary skill and subskill codes respectively.
- **Instructional methods:** as listed in the codebook. For each activity, it was possible to include up to four instructional method codes.
- **Concept being taught:** as reported in the manual, or in the absence of this information as identified by the coder
- **Practice description:** a qualitative descriptive summary of the activity as reported in the manual
- **Implementation tips:** a qualitative description of advice provided as part of the lesson to support high-quality implementation / generalisation of the strategy taught.

### **Inter-rater reliability**

To ensure consistency across the team of coders, 5% of the overall number of all lessons in a manual were double-coded. The specific lessons were selected using a random number generator. If the percentage agreement for skill and instructional method codes dropped below 80%, discrepancies were discussed by the research team and resolved through consensus, to ensure reliability. Discussions on discrepancies helped to clarify the codebook definitions and informed the update of the codebook to ensure it included recommendations on how to code recurring complex activities. This process ensured an acceptable rate of inter-rater reliability was maintained throughout all coding, ranging from 70–90%.

### **Identification of common elements**

Practice descriptions were used to identify common elements across programme manuals. These descriptions were qualitatively analysed to identify the main strategy/practice used to teach the relevant skill. The strategies extracted through this approach were discussed within the team to reach an agreement on the level of specificity of each strategy, their relevance, and their appropriateness as standalone strategies.

To establish whether these practices were common across manuals, the number of times a practice was taught within a manual and across manuals was recorded. To be classified as a 'common element', a practice had to be present in at least 51% of manuals of that outcome area.

We found many more manuals focused on language and early literacy, early numeracy and social and emotional skills, relative to executive functions and meta-cognition skills. This made it difficult to apply the common elements approach to the latter. In this chapter, we present findings for the first three domains together, and we present our findings for executive functions and meta-cognition skills separately due to the relatively smaller evidence base.

## **Results**

### **Common practice elements**

In total, we identified 55 discrete practice elements that were common across early childhood education programmes: 18 for language and early literacy skills, 16 for early numeracy skills, and 21 for social and emotional skills. Tables 7–9 provide an overview of the common practice elements identified.

**TABLE 7: COMMON PRACTICE ELEMENTS FOR LANGUAGE AND EARLY LITERACY SKILLS**

Language and early literacy skills	Common elements	Prevalence across literacy manuals
<b>Phonological awareness</b>	Identifying a word's first and last sounds	88%
	Recognising rhyming sounds by listening	88%
	Producing rhyming sounds and words	88%
	Syllable awareness	75%
	Oral segmenting (from words to sounds)	88%
	Oral blending (from sounds to words)	88%
<b>Print and letter knowledge</b>	Identifying letters of the alphabet	88%
	Identifying lowercase and uppercase letters	75%
	Understanding that print conveys meaning	63%
	Understanding print as a system	63%
<b>Early writing</b>	Mark making for meaning	75%
	Forming letters	75%
	Writing your name	63%
<b>Language and listening</b>	Learning new words	100%
	Using new words in context	88%
	Listening and responding	100%
	Remembering stories	88%
	Answering questions about a story	100%

**TABLE 8: COMMON PRACTICE ELEMENTS FOR EARLY NUMERACY SKILLS**

Early numeracy skills	Common elements	Prevalence across numeracy manuals
<b>Pattern and shapes</b>	Properties of shapes	80%
	Spatial awareness	60%
	Sorting and matching objects	60%
	Identifying and repeating patterns	60%
<b>Numbers and counting</b>	Learning to count out loud	80%
	Recognising numerals	100%
	Learning the order of numbers	80%
	Matching numbers to quantity	80%
	Comparing and matching quantity	80%
	Counting and set production	100%
	Ordinal numbers	80%
<b>Measurement</b>	Becoming familiar with how to measure	60%
	Becoming familiar with charts and graphs	60%
<b>Adding and taking away</b>	Plus or minus one from a number	100%
	Adding two numbers together	80%
	Subtracting numbers from each other	80%

**TABLE 9: COMMON PRACTICE ELEMENTS FOR SOCIAL AND EMOTIONAL SKILLS**

<b>Social and emotional learning skills</b>	<b>Common elements</b>	<b>Prevalence across SEL manuals</b>
<b>Recognising and expressing emotions</b>	Learning feeling words	78%
	Identifying feelings using facial expressions and body language	78%
	Describing how we feel	78%
	Recognising other people's feelings	89%
<b>Regulating emotions</b>	Calming down	56%
	Generating, choosing and implementing solutions to cope with strong emotions	67%
<b>Communicating with others</b>	Communicating non-verbally	56%
	Engaging in conversation	56%
	Listening	56%
	Greeting others and introducing yourself	67%
	Using polite language	78%
<b>Working together</b>	Sharing and taking turns	78%
	Teamwork	67%
	Being helpful	56%
	Asking for help	67%
<b>Developing positive relationships</b>	Developing friendships	78%
	Valuing similarities and differences	56%
	Being kind and caring	56%
<b>Resolving conflict</b>	Speaking up during conflict	56%
	Finding solutions for conflict	78%

### **Common elements for self-regulation (part of executive function and meta-cognition skills)**

Self-regulated learning skills are key components of executive functions and meta-cognition skills. Self-regulation enables children to adapt to new situations, control their behaviours and focus attention, remember instructions, and plan and juggle multiple and new tasks successfully. Due to the limited number of manuals and activities supporting executive functions and meta-cognition skills, the common elements methodology described above could not be used in the same way for this set. Instead, we identified five self-regulated learning skills based on the activities aimed at improving executive functions and meta-cognition skills:

- being an adaptable learner
- being able to self-control and focus attention
- having a good working memory
- being able to plan and be an independent learner
- being mindful.

Data from the manuals was used to extract evidence-informed recommendations on how to promote each of the five skills in everyday activities, including activities aimed at supporting early numeracy, language and early literacy, and social-emotional skills. Recommendations were used to develop brief guidance on supporting children's self-regulation.



## **Common instructional methods**

We employed quantitative analysis to identify the most commonly used instructional methods (such as didactic instruction and teacher modelling, role-play, or songs) for each common element. Across the domains, Q&A sessions and discussion was used most frequently, followed by didactic instructions and teacher modelling. Most of the time, Q&A and discussion and didactic instructions were used together.

Differences emerged in the use of instructional methods when we examined it at the subskill level. For example, visual display, materials or tools embedded in class environment were used most frequently to teach 'Pattern and shape' within early numeracy. Q&A and discussion and Art/creative projects were used most frequently to teach 'Cooperating with others' within social and emotional skills.

Tables 10–12 (following pages) provide an overview of the common instructional elements identified across the three domains.

**TABLE 10: PREVALENCE OF COMMON INSTRUCTIONAL ELEMENTS FOR LANGUAGE AND EARLY LITERACY SKILLS**

	1	2	3	4	5	6	7	8	9	10	11
	Didactic instruction and teacher modelling	Strategy practice and physical learning	Q&A and discussion	Game / icebreaker / role-play...	Drawing and writing	Generalisation and repeated events...	Visual display, materials...	Art / creative project	Book / poem / song / nursery rhyme	Multimedia	Repetition of sounds, syllables or words
Early writing	69.33%	0.71%	44.54%	1.76%	66.63%	0.00%	59.69%	13.40%	7.76%	1.29%	14.92%
Print and letter knowledge	95.23%	0.37%	79.00%	18.47%	20.18%	0.07%	51.97%	7.07%	30.38%	2.16%	15.56%
Language and listening	87.75%	0.93%	83.09%	31.54%	8.22%	3.38%	40.26%	2.21%	42.19%	6.12%	9.11%
Phonological awareness	83.42%	0.37%	81.79%	24.81%	4.56%	0.12%	36.70%	3.58%	38.17%	2.69%	55.80%

**TABLE 11: PREVALENCE OF COMMON INSTRUCTIONAL ELEMENTS FOR EARLY NUMERACY SKILLS**

	1	2	3	4	5	6	7	8	9	10
	Didactic instruction and teacher modelling	Strategy practice and physical learning	Q&A and discussion	Game / icebreaker / role-play...	Drawing and writing	Generalisation and repeated events...	Visual display, materials...	Art / creative project	Book / poem / song / nursery rhyme	Multimedia
Pattern and shape	68.36%	7.21%	66.76%	5.87%	17.22%	4.81%	79.44%	6.28%	0.93%	13.75%
Measurement	81.65%	9.49%	82.91%	1.27%	11.39%	2.53%	92.41%	0.63%	0.63%	15.82%
Numerals and counting	66.47%	16.71%	62.81%	7.33%	16.01%	2.21%	77.01%	0.00%	0.70%	11.87%
Adding and taking away	86.50%	21.49%	82.42%	7.82%	33.57%	0.53%	84.01%	0.36%	0.36%	1.24%

**TABLE 12: PREVALENCE OF COMMON INSTRUCTIONAL ELEMENTS FOR SOCIAL AND EMOTIONAL SKILLS**

	1	2	3	4	5	6	7	8	9	10
	Didactic instruction and teacher modelling	Strategy practice and physical learning	Q&A and discussion	Game / icebreaker / role-play...	Drawing and writing	Generalisation and repeated events...	Visual display, materials...	Art / creative project	Book / poem / song / nursery rhyme	Multimedia
Recognising and expressing emotions	59.69%	11.99%	77.55%	37.24%	3.83%	1.02%	68.88%	4.85%	20.15%	3.06%
Regulating emotions	64.63%	41.46%	63.41%	30.49%	4.88%	0.00%	62.80%	2.44%	23.17%	4.88%
Communicating with others	39.87%	11.30%	53.49%	26.91%	9.97%	1.66%	30.23%	46.18%	7.97%	1.33%
Cooperating with others	40.22%	8.78%	48.69%	30.82%	11.09%	0.15%	41.76%	44.38%	5.70%	2.62%
Developing positive relationships	53.29%	12.50%	59.21%	22.37%	6.58%	5.26%	48.68%	7.24%	45.39%	7.24%
Resolving conflict	48.08%	12.50%	66.35%	34.62%	0.96%	0.00%	47.12%	1.92%	45.19%	0.00%

## Common implementation elements

Implementation tips identified during the data extraction phase were qualitatively analysed to understand commonalities across the manuals. Three core implementation tips emerged:

- supporting high-quality teaching
- enhancing the classroom environment
- promoting positive teacher–child interactions.

Implementation elements aimed at supporting high-quality teaching included:

- tips to ensure activities can be used flexibly to meet children’s needs, such as through scaffolding strategies
- strategies to correct child errors, such as immediately correcting children, implicitly reformulating the child’s answer to model the correct answer, supporting children to repeat the task
- tips to support children’s self-confidence, such as praising strategies, use of stickers, use of small tasks that children are allowed to do when they solve problems correctly, (e.g. colouring objects they have already counted), alternatives to indiscriminate praise, (i.e. not praising whatever children do or say).

Implementation elements aimed at enhancing the learning environment included:

- tips on how to create space for whole-group activities
- tips on how to create space for small-group activities, such as arranging the seats so that no child has to see materials upside down
- tips on how to create space for individual activities, such as space for children to read and explore books independently, or a place in the classroom where children can go if they need time to take care of their feelings.

Implementation elements aimed at promoting positive teacher–child interactions included:

- tips to use warm and nurturing non-verbal behaviours, such as encouraging and reinforcing eye contact, using different inclusive strategies throughout the day if children are not comfortable in making eye contact, monitoring use of gestures
- tips to show children that the practitioner values talking with them, such as encouraging children to talk about their interests, encouraging taking turns as a speaker and a listener.

This data informed the development of the implementation tips included in the booklets. In addition to examining implementation elements across programme manuals, we also conducted a rapid review of implementation elements identified through previous studies of early childhood education programmes which have been shown to influence child outcomes. The purpose of this research was to identify process and structural elements which influence the quality of early childhood education (including factors at classroom level and teacher level that influence child outcomes). Relevant articles have been identified and an initial extraction of the data has been carried out. Further analysis of this data is needed and will be used as part of the next phase of the research, which will examine how to embed the Early Years Library within ECE practice.

# Phase 3: Development of the Early Years Library

## Methodology

Following the identification of common elements of evidence-based ECE programmes, we worked with early years practitioners and other key stakeholders in the development of our Early Years Library. The Library consists of a series of practitioner booklets which describe the key skills relevant to children's cognitive and social-emotional development, and the common elements / core components of evidence-based programmes which support the development of these skills. As part of the Library, practitioners are provided with a comprehensive set of low-burden practices and activities which are designed to support skills development and can be integrated into everyday practice

Download the full Early Years Library at [www.EIF.org.uk/EarlyYearsLibrary](http://www.EIF.org.uk/EarlyYearsLibrary)

### Expert panel of practitioners

An expert panel of 15 practitioners was formed to support the development of the Early Years Library. An early years practitioner was also recruited as a research assistant to help develop the content of the Library.

The expert panel consisted of nursery workers, managers and childminders from both maintained and private settings across England and Wales. We met with practitioners bi-monthly and received input on a range of topics including the techniques and resources practitioners are currently using, how practitioners currently receive training, and what is feasible for practitioners in terms of continuing professional development. Through interactive online workshops, practitioners were consulted on the tone, language, content and design of the Early Years Library.

In between workshops, practitioners piloted the booklets in their setting and provided feedback on feasibility, usability and overall satisfaction. This feedback was used to further refine the booklets.

### Consultation with early years stakeholders

In addition to working with the expert panel of practitioners on the development of the Library, we consulted with experts from universities and interested organisations with expertise in ECE and early literacy and numeracy skills, including the Department for Education (DfE), Education Endowment Foundation (EEF), LEGO Foundation, Nuffield Foundation, Empowering Parents Empowering Communities, and Chartered College of Teaching. The purpose of these consultations was to ensure that that content within our Library was aligned with the latest evidence on what works to enhance children's early literacy and numeracy skills.

# Results

## Early Years Library content and format

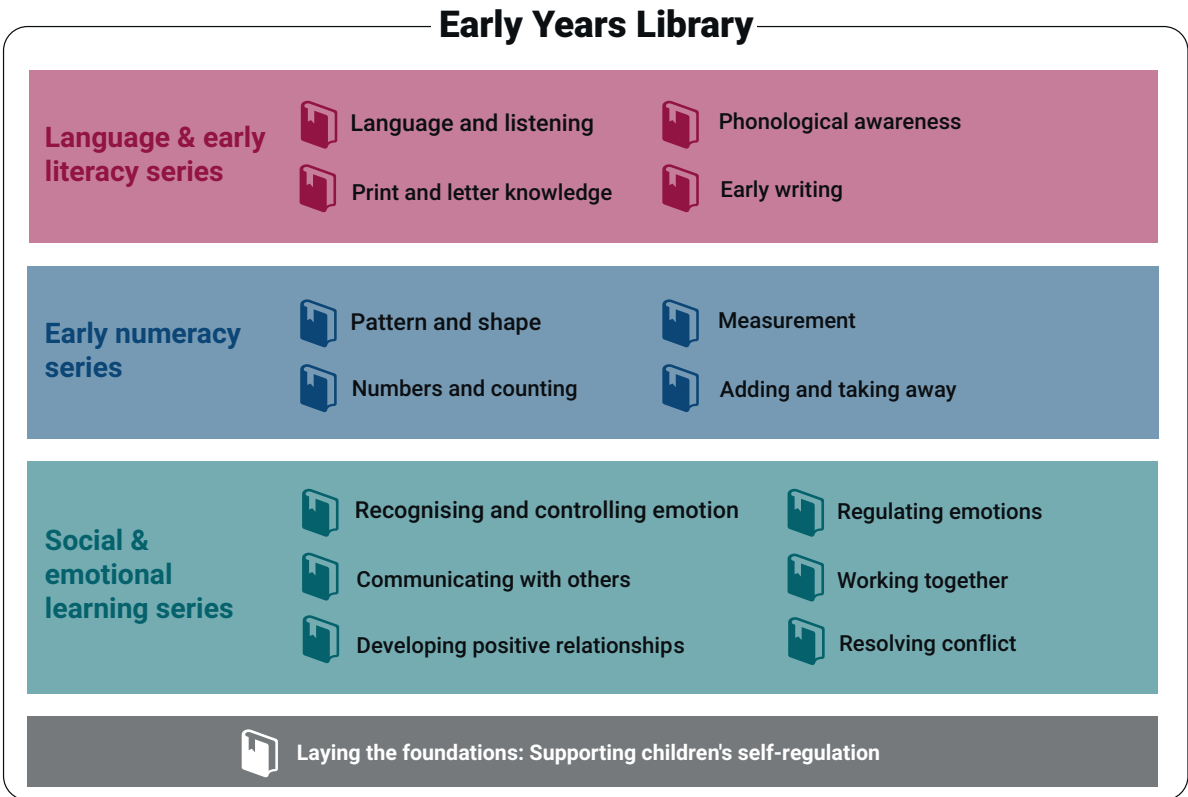
The Library addresses three domains:

- language and early literacy
- early numeracy
- social and emotional skills.

Each domain consists of a series of booklets, with each booklet targeting a particular skill. The booklets provide practical information about what the skill is, why it is important and the common practices and instructional methods used across evidence-based manuals to develop this skill.

### FIGURE 1: LIBRARY STRUCTURE

An overview of the structure and content of the Early Years Library

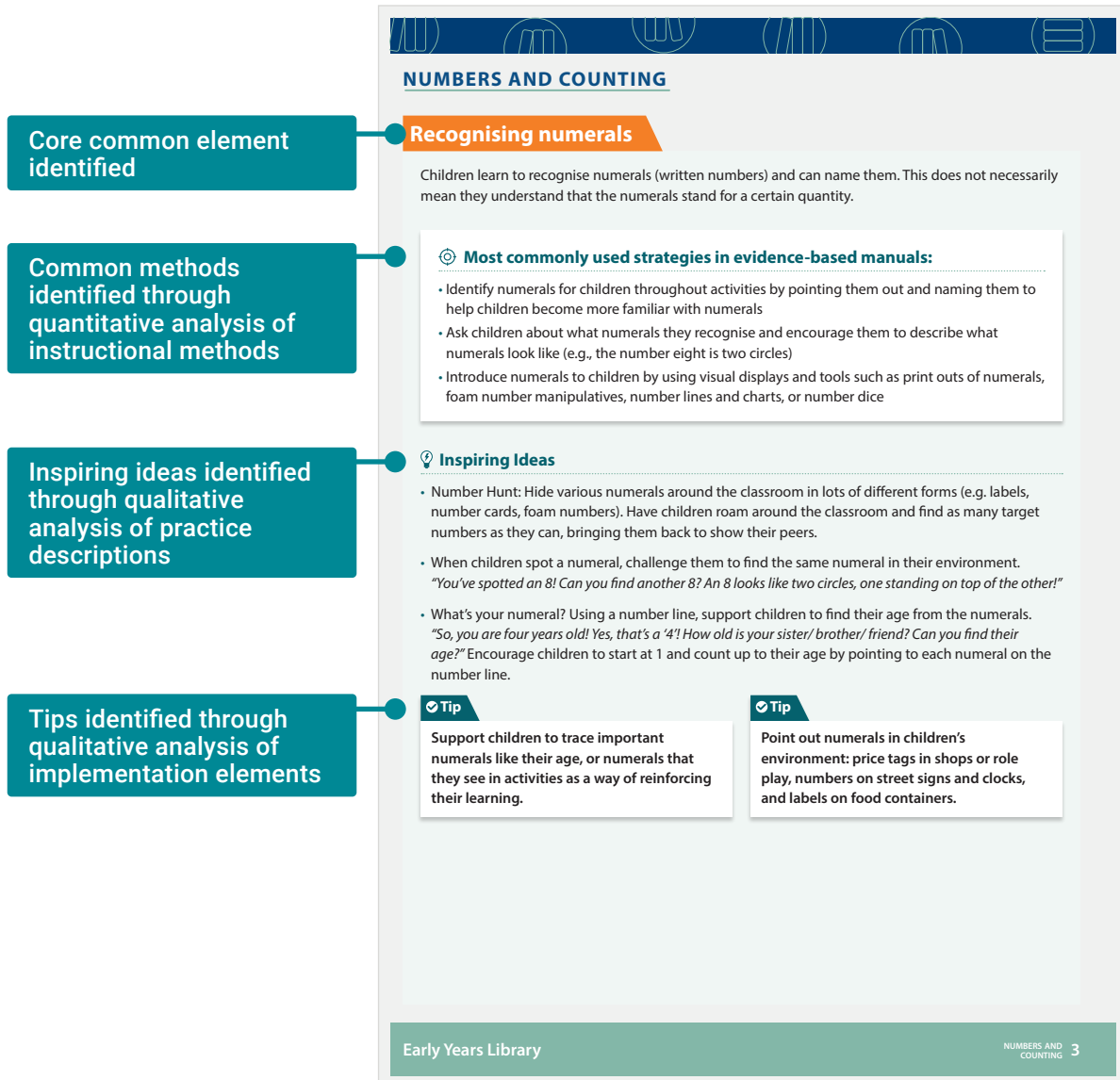


Practitioners are also provided with a set of inspiring ideas to support them in integrating the practices within their everyday interactions with children. These ideas are based on typical activities in evidence-based manuals which are low-burden and easy to implement into everyday practice, and which can be adapted for different ages. The inspiring ideas include individual, small-group and whole-group activities.

The booklets also provide tips on supporting high-quality implementation of these evidence-informed practices. Figure 2 provides an overview of the structure of an individual booklet.

## FIGURE 2: BOOKLET STRUCTURE

An overview of the structure and key components of a booklet



The booklets are designed to be used flexibly and for different purposes depending on the specific needs of a setting – for example:

- during new staff induction, to help new staff understand why they focus on certain skills and activities
- when planning activities for the children based on practitioners' understanding of their interests, needs and the curriculum in their setting
- throughout the day, to get inspiring ideas for extending activities, responding to children and planning in the moment.



## Feedback from practitioners

Members of the expert panel piloted the booklets in their setting and provided feedback on feasibility, usability and overall satisfaction. The feedback received was positive, and confirmed that the Early Years Library can be used flexibly to promote a better understanding of certain skills, plan activities in advance, and inspire practitioners throughout the day.

*“The booklets will be a great way for new staff members in the sector to reflect upon their practice and consider why and how they do what they do. We have also been thinking about creating a ‘library’ of resources for staff to refer to when thinking about children’s learning: these booklets will be included in this as a reference material.”*

– Expert panel member 1

*“The booklets are very clear, very concise, not too wordy, and go to the heart of matter. They will massively benefit staff – the front pages could be laminated and used as posters.”*

– Expert panel member 3

*“I love the booklets, they are well thought out, and are pitched really nicely. It is also useful to reinforce that some of the activities we use are worthwhile, we use them for a reason, and there is research behind them. It is good to realise that.”*

– Expert panel member 7



# Strengths and limitations of our research

Our research and the methodology we employed has a number of strengths, including the use of systematic review methods to identify evidence-based early childhood education programmes, and the detailed extraction of data from programme manuals, which enabled us to identify common practice, process and implementation elements.

Furthermore, while the field of common elements research has grown in recent years and there have been several publications identifying common elements across various research fields, relatively few programmes of research have progressed beyond the knowledge synthesis phase to develop a resource designed to improve practice. Through this research, we have worked with early childhood practitioners on the development of a freely available Library of evidence-informed, low-burden practices which address children's cognitive and social-emotional skills. This Library addresses several challenges related to structured manualised programmes including costs, lack of practitioner autonomy, insufficient flexibility and poor integration into everyday practice.

In addition to working with practitioners, we have also consulted with experts from universities and interested organisations to ensure that that content within our Library was aligned with the latest evidence on what works to enhance children's early literacy and numeracy skills.

Despite these strengths, there are a number of limitations to this research which deserve recognition.

- First, despite every effort, we were unable to obtain 18 manuals that fulfilled our inclusion criteria. The omission of these evidence-based programmes could have affected what we identified as common across the programme manuals.
- We found many more manuals focused on language and early literacy, early numeracy and social-emotional skills than executive functions and meta-cognition skills. This made it difficult to apply the common elements approach to the latter. Therefore, the guidance produced on this topic is focused only on a set of self-regulated learning skills which have been identified based on manuals' recommendations and activities. It does not include common elements identified through the methodology we used for language and early literacy, early numeracy and social-emotional skills.
- The process of identifying common elements was based on the frequency of such practice elements occurring across multiple programmes, which does not tell us about the *effectiveness* of any such practice element. Further research is required to determine the effectiveness of these common elements when integrated into practice, as described below.
- Our research did not examine the degree to which these common elements appear in *ineffective* early childhood education programmes. We did not examine this as part of this research given the lack of information provided in published articles regarding why programmes are ineffective (for example, due to programme content or poor fidelity).
- Our analysis examined the frequency of individual elements and not *combinations* of practice elements. Further research is required to understand what combinations and interactions of element across core skills (that is, between numeracy and executive

functions and meta-cognition, literacy or social-emotional skills) are important in supporting skill development.

- Another limitation is related to the methodology of coding programme manuals. In this case, the outputs are limited by the inputs. As such, many known aspects of effective early years practice (such as scaffolding) are not included in the Early Years Library because they were not identifiable as frequently recurring elements within the programme manuals.
- Finally, it is important to recognise the potential challenges with implementing our Early Years Library in practice, including the fact that it is not itself a manualised approach, and so without sufficient training and support it may be difficult to integrate into practice. We intend to focus on this challenge during the next phase of research.

# Implications for future research and practice

This research sought to identify the common elements associated with effective ECE programmes. The results add to existing common elements methodology research by providing a taxonomy of common elements (practice, instructional and implementation elements) across evidence-based ECE programmes. The research has several implications for future practice and research.

## 1. Enhancing the quality of practitioner interactions with children

National surveys and longitudinal research demonstrate the enduring benefits that high-quality ECE provides into adolescence and beyond (Campbell et al., 2012; Taggart et al., 2015; Schweinhart et al., 2005). The Early Years Library is an important step forward in supporting a focus on practitioners' daily practice approaches outside of or alongside full-scale intervention programmes. The integration of these practices through everyday practitioner–child interactions has the potential to produce meaningful changes in the quality of those interactions.

## 2. Informing the development of training and continuing professional development for ECE practitioners

A skilled ECE workforce has been consistently identified as one of key moderators of high-quality ECE provision. ECE in the UK is characterised by huge variation in practitioner qualifications and the level of training provided across a diverse range of settings (maintained/private nurseries, childminders, nannies). There is no mandated CPD for ECE practice. Surveys show that most ECE practitioners access training within their setting, since there is usually little budget for external providers or for cover to allow time away for training (Ceeda 2019). Hence, there is a strong need for high-quality on-the-job training.

Results from this research can be used to inform the development of new in-house training programmes. By providing guidance on the common strategies and instructional methods used across evidence-based programmes, alongside inspirational practices which can be used in daily practice, the Early Years Library can meet stakeholders' needs in a flexible, sustainable manner. Initial feedback from practitioners confirmed that the content of the Early Years Library can be used to support a better understanding of children's cognitive and social-emotional skills, and that the information can also be used to address gaps in practitioners' knowledge, confidence and skills.

## 3. Generating an evidence-informed resource for testing

The primary implication from the present work concerns the development of an evidence-informed resource that is now ready to be tested in order to understand *how* it can be used in practice and its potential for impact. Testing the implementation and feasibility of the Early Years Library will ensure that these resources are feasible, desirable, viable and ready for full-scale trial. Testing the feasibility and impact of Early Years Library has the potential to support the Department for Education's policy to transform the quality of ECE, especially in the wake of the pandemic's impact on practitioners and children. If rigorously evaluated, the Library could complement the Early Years Foundation Stage framework and be effectively rolled out nationally.

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# Appendix: List of coded manuals

- Building Blocks
- Curiosity Corner
- Early Learning in Mathematics
- Early Literacy and Learning Model
- FUN FRIENDS
- Head Start REDI
- I Can Problem Solve
- Incredible Years Child Training (Dinosaur School)
- Kindness Curriculum
- Language Focussed Curriculum
- Nuffield Early Language Intervention (NELI)
- Number Sense
- PAVed for Success
- Positive Action
- Pre-K Mathematics Curriculum
- Preschool PATHS
- Red Light, Purple Light
- Read It Again!
- Roots, now distributed as Whole Number Foundations – Level K
- Second Step
- Systematic and engaging early Literacy
- Tools of the Mind