A SYSTEMATIC REVIEW OF THE EVIDENCE-BASE FOR PROFESSIONAL LEARNING IN EARLY YEARS EDUCATION (THE PLEYE REVIEW)

Principal Investigator: Professor Sue Rogers, UCL Institute of Education.

Co-Investigator: Professor Chris Brown, University of Portsmouth.

Project researcher: Ximena Poblete, UCL Institute of Education.

Final report to the Nuffield Foundation

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We are also immensely grateful for the contributions from members of our review advisory group:

Dr Lynn Ang, Reader in Early Childhood Education, UCL Institute of Education

Bernadette Duffy OBE, Former Head of Thomas Coram Children's Centre, Camden, London

Beatrice Merrick, Chief Executive of Early Education

Susanna Kalitowski, Senior Policy Adviser PACEY

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LIST OF ABBREVIATIONS

CPD: Continuous Professional Development

DMI Dialogic Model of Impact

EPPI: Evidence for Policy and Practice

EYE: Early Years Education

EYT: Early Years Teachers

PD: Professional Development

PDL: Professional Development and Learning

PLEYE: Professional Learning in Early Years Education

QTS: Qualified Teacher Status

ToA: Theory of Action

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Report to the Nuffield Foundation

Sue Rogers, Chris Brown and Ximena Poblete

EXECUTIVE SUMMARY

This systematic review brings together international evidence on professional development and learning (PDL) approaches in Early Years Education (EYE) that demonstrate positive impact on children's outcomes. The review is pertinent and topical and has a strong and direct connection with the current policy drive to a) improve the skills and knowledge of the early years workforce in order to improve outcomes for children, particularly those most at risk of disadvantage and b) develop system-led self-improvement through evidence-based approaches to PDL. Our intention in conducting this review is to stimulate and contribute to sector-led and sector-wide debate about how best to improve the knowledge and skills of the EYE workforce, particularly in the UK. The review will help the user community i.e. policy-makers, setting leaders and EYE professionals, to make informed decisions about the types of PDL approaches that are most effective, and to feel confident that those approaches are underpinned by robust and rigorous research evidence. We propose that the EYE sector seeks to develop a framework for professional learning and development opportunities that take into account quality, impact on children's outcomes, access and affordability.

WHAT IS THIS PROJECT ABOUT?

The early years phase (defined here the period from birth to six), has been at the forefront of educational policy for successive governments in the UK, and is widely viewed as *the* optimum time in which to establish the key dispositions and skills for achievement and success in school (Allen, 2011). Agreement across all political parties in the UK for continued expansion of provision to meet the increasing demand for childcare places from working parents, recent policy intervention in the education of disadvantaged two-year-olds, and an increasing focus on raising quality and a curriculum and pedagogy that supports 'school readiness' in England (DfE, 2012a), indicate unprecedented interest in early years education and presuppose a workforce that is knowledgeable about child development, early learning and the types of interactions with children that support the development of language, early literacy, and executive functioning skills. In this context the EYE sector faces a significant challenge if it is to increase the number of suitably skilled and qualified staff in order to meet increased demand *and* raise attainment through high quality early education.

One policy response to this challenge in England has been to increase numbers of graduates and qualified teachers in EYE settings (DfE, 2012b; 2017). Research tells us that improvement in quality of provision and attainment is linked to the qualifications level of staff working with young children (DfE 2012; 2017; Mathers and Smees, 2014), prompting a range of initiatives to increase the number of graduates in EYE settings (DfE, 2017) and to develop a suite of qualifications and requirements for new entrants to the profession and for those who wish to progress their qualifications. Improving the qualifications and leadership capacity in the sector is one important way to tackle the skills gap challenge. But this approach will take time to feed through the sector and is

unlikely to keep pace with current plans for expansion of EYE and childcare. Furthermore, there are many reasons that prevent early years workers from accessing further study. In a largely female workforce, these may include caring and family commitments, a lack of access to funds, lack of proximity to colleges and universities, and low self-confidence following extended periods away from education. Others may choose to remain in a supporting role with individual children and small groups. Although the strategic direction of government is broadly welcomed by the sector, there continue to be concerns raised by employers who face difficulties in recruitment and retention of graduates, particularly Early Years Teachers (EYT) (DfE, 2017: p.15), in part at least due to the lower pay levels than those graduates who have taken the Qualified Teacher Status (QTS) route (Kalitowski, 2016: p.10).

It is also recognised that professional development and training can play an important part in raising quality in EYE provision (DfE, 2017; Kalitowski, 2016; Mathers and Smees, 2014; Yoshikawa, 2013; OECD, 2012). However, less well understood is precisely what types of professional development have positive and lasting impact for practitioners and, critically for children. It is in recognition of this 'gap' in the literature that we undertook the current systematic review.

HOW DID WE FIND OUT?

Our starting point in developing this project was to undertake a high-level 'gap' analysis of the broad literature on PDL in EYE from which we developed an overarching question:

What approaches to professional development and learning are most effective for improving the knowledge and skills of the EYE workforce and so improve outcomes for young children?

Following on from this broad question, we identified three focused research questions:

1. What evidence is there of impact of professional learning approaches for improving outcomes for children in EYE? Which approaches are more and less impactful?
2. What are the features of and the theory of action underpinning effective professional learning approaches in EYE?
3. What types of professional learning opportunities are available to EYE practitioners and who provides them? How do these relate to 1) and 2), above?

Our approach was to carry out a systematic review following the process set out by the internationally recognised EPPI (Evidence for Policy and Practice) guidelines, using the EPPI Reviewer 4 software to ensure quality, rigour and optimal impact. Our aim was to undertake a systematic criteria-led search of the literature, evaluate the quality of and synthesise the evidence. not identify any systematic or otherwise, that looked specifically at the impact of PDL on outcomes for children in EYE. Professional learning and professional development are used interchangeably in the literature, but we prefer the concept of 'professional learning' since we associate 'learning' specifically with long lasting changes in professional thinking and practice rather than a broader conception of development through a range of experiences and activities (Knapp, 2003). In this report, however, we will use the term 'professional development and learning' abbreviated to PDL.

REVIEW ADVISORY GROUP

Drawing on guidance from the EPPI-Centre and best practice in systematic reviews we established a review advisory group at an early stage in the research. The group comprised representation from key user groups: the Head of a widely regarded Children's Centre in London, CEO of Early Years, a senior member of PACEY (Professional Association of Childcare and Early Years), representing preschool settings and child-minders, and a senior early years academic with experience of systematic reviews. We met with the group on three occasions to present and discuss our findings as they developed. In addition, we consulted the group throughout the analysis and preparation of this report.

WHY UNDERTAKE A SYSTEMATIC REVIEW

Most reviews of research take the form of traditional literature reviews, which usually examine the results of only a small part of the research evidence, and take the claims of report authors at face value. When relevant to policy, systematic reviews can be an important tool for knowledge transfer to inform policy decisions. The key features of a systematic review or systematic research synthesis are that:

- Explicit and transparent methods are used;
- It forms a piece of research in its own right that follows a stage process of retrieving, screening and reviewing literature items;
- It is accountable, replicable and updateable;
- There is a requirement for user involvement to ensure reports are relevant and useful (with user engagement occurring before, during and after the review process) (Gough et al., 2012)

Systematic reviews rely on schemes of carefully constructed criteria in order to establish a basis for the selection, inclusion and exclusion of research studies. Based on our initial mapping of the sector three main inclusion criteria were applied:

1. *Professional learning interventions must be conducted with practitioners who work with children in the age group birth to 6.*
   We acknowledge that some commentators argue for 0-8 conception of early childhood, but for the purposes of this review, we have limited the scope of the review to practitioners who work with children in the age range birth-6. Exceptions were made if studies are longitudinal and evaluate impact of professional learning for children in our specified age band but extending beyond the age of 6.

2. *The studies/reports are published after and including January 2000*.
   We have retrieved studies from 2000 to the present day. This period is a particularly significant time in the evolution of early years education policy and practice in the UK and also marks unprecedented national and global interest and investment in the education of children in the preschool years.

3. *The methods and analytic approach adopted in identified studies are sufficiently detailed to allow the research team to judge that the conclusions are robust and validity can be evaluated.*

SELECTION OF STUDIES FOR IN-DEPTH REVIEW

Stage 1. Single Screening by Title and Abstract (T & A)

In the first stage, the 1197 articles were divided in 3 groups. Each member of the research team screened 399 articles according to the following 5 criteria:

1. Study has a publication date after 1999
2. Focused on ECE settings, children in 0-6 age range
3. Subjects of the intervention must be in-service early years education workers
4. The methods or analytical approaches are described in detail
5. The topic of the study is related to the implementation of professional learning/development

This initial inclusion process led to the inclusion of 124 studies for full text screening.

Stage 2. Triple Full Text Screening

In this second stage the three members of the team did a full text screening of the 124 articles selected in the first stage. Of the 124 studies included here, 70 were excluded on the basis that they did not meet the quality criteria sufficiently.

This stage led to 54 studies included to be considered for in-depth review in Stage 3

Stage 3. In-depth review

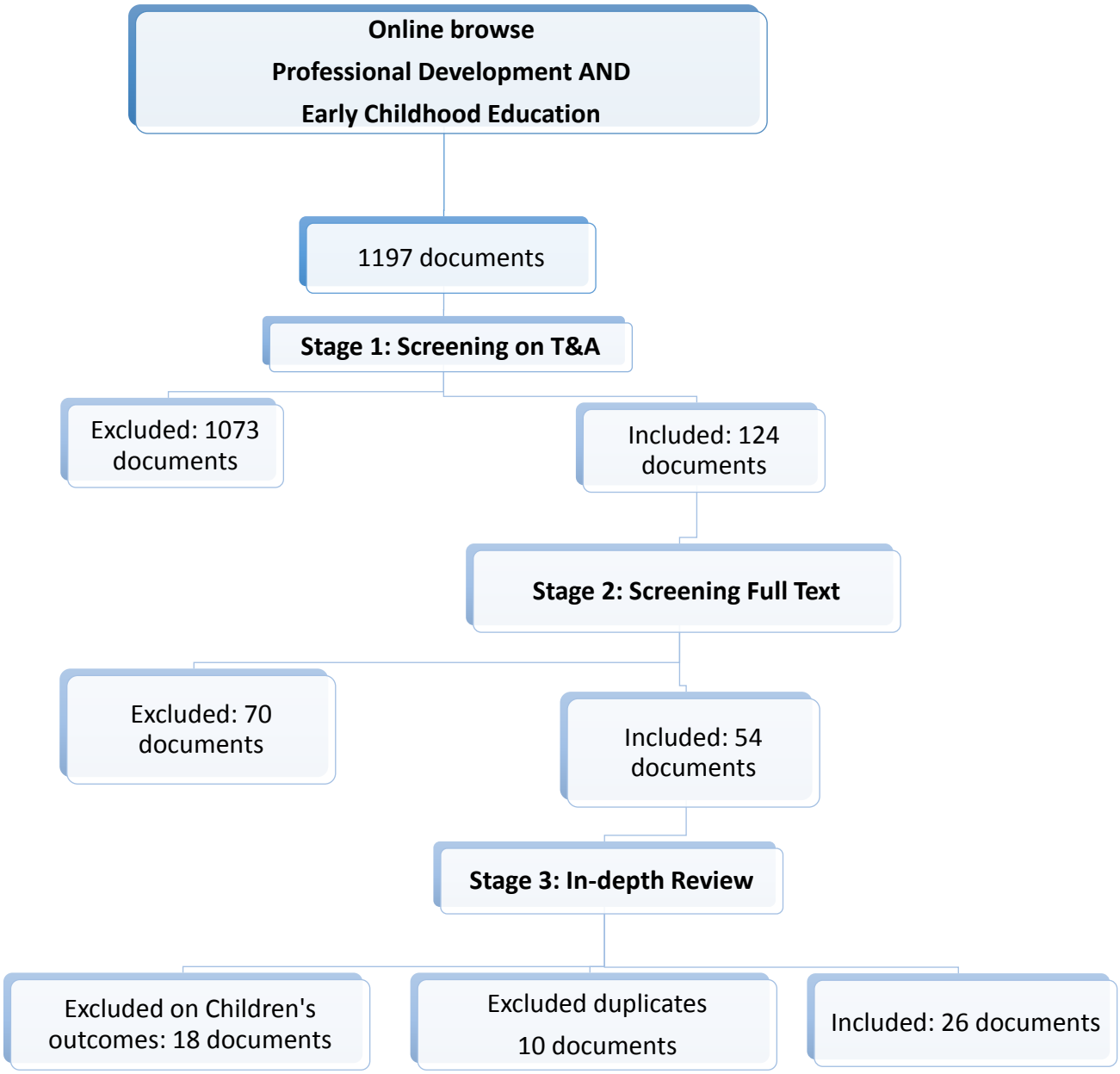
In addition to the 5 criteria described above, a further criterion was applied for the Stage 3 screening:

1. The study must report on children's outcomes

54 studies were subjected to in-depth review by pairs of researchers. 18 studies were excluded, as they did not report on children's outcomes. A further 10 documents were excluded as duplications. The final set of studies that met the criteria in full for this systematic review totalled 26.

Figure 1 shows the process of the systematic review

Figure 1. PLEYE Systematic Review Stages:



Disagreement, when it arose, was adjudicated by the project lead in discussion with our academic adviser, Dr Lynn Ang. In Stage 3 In-depth review, 5 papers were subject

to discussion following disagreement. We focused our analysis on this final set because the papers met our criterion to include data on impact on children's outcomes.

RESULTS

What does the systematic review show?

We found two overarching contrasting perspectives on EYE PDL in the broad literature. The first perspective views PDL as an enriching entitlement for EYE educators, underpinned by a commitment to practitioners' personal and professional growth. The majority of these studies were conducted in the UK and European context and were not included in our final set since they did not consider children's outcomes. The vast majority of papers from our initial set of 1,197 items focused on impact on outcomes for EY educators rather than for children. While it is likely that change in educator's practice will have positive benefits for children, the aim of the current review is to seek evidence of the impact of PDL on children's learning and development. The second perspective discernible in the literature (and mainly reported in studies from the USA), views PDL as a means by which to achieve specific outcomes in teaching quality, particularly in relation to improving children's basic skills in literacy, language and mathematics. This approach appears to be underpinned by accountability to school, district (in the USA) and national agendas for driving up educational standards. With our focus on outcomes for children most of the studies in our final set after full text screening, fall into this category, although that is not to say that they do not also show a deep commitment to improving teachers' development and practice. Our evidence suggests that it is possible for effective PDL to achieve positive impact on children's outcomes and at the same time be a rich and professionally rewarding experience for EYE workers. In the next section we summarise our key findings.

1. Reflection, feedback and follow-up matter

PDL programmes that provide opportunities for reflection, peer group discussion and regular feedback on learning and performance are effective at changing practice and improving outcomes for children. From our evidence some element of coaching appears to be an effective way in which to achieve this. However, important to note that the focus of the coaching i.e. implementation of a curricular programme or pedagogical approach is equally important. This finding further supports research which suggests that programmes that are overly directive and lack follow up have little lasting impact on participant learning and it follows on children's outcomes. Such passive learning approaches may have a place in delivering essential operational and regulatory procedures to staff, but it seems important to distinguish between professional development for this purpose, and deeper level learning programmes that are aimed at changing professional practice and improving outcomes for children.

2. Research-based interventions related to real world contexts are linked to improving practice and outcomes for children.

Research-based interventions introducing new learning about children's development and learning, or content and pedagogical knowledge appear to be linked to positive outcomes for children particularly when they are linked to practitioners' professional contexts. Research findings that are presented in ways that are accessible and encourage participants to try out new pedagogical approaches or new content in their settings appear to be effective and engender long-lasting

change to practice. Using research evidence in this way requires that PDL programmes are presented incrementally, at relatively frequent intervals, over time to allow for revisiting concepts and learning new pedagogical strategies, knowledge and skills.

3. Combining research-based knowledge with knowledge of setting contexts supported by a coaching model of PDL appear to impact most positively on children's learning outcomes

Programmes that combine new knowledge and content (from research) with knowledge gained from the participants' own specific setting context appear to be most effective at achieving change to practice and positive impact on children's learning. The consistent message from the studies we reviewed is that PDL programmes works best when they start with the current understanding of EYE professionals and combine this with new knowledge. When combined with frequent coaching styles of support and peer-to-peer feedback there appears to be greater impact on children's outcomes. This is perhaps not surprising as coaching is, by definition, an effective way of tailoring learning to individual needs. Moreover, this may be of particular relevance to the EYE workforce, which includes a diverse workforce with wide ranging skills and qualification levels. The diverse nature of the EYE workforce, attrition and staff turnover rates, suggests the need for a more bespoke and responsive approach to PDL.

4. Duration, frequency and intensity of PDL are important factors in achieving impact on outcomes for children

We have already noted that the type of one-off workshops common to much PDL is widely regarded as ineffective at impacting on deep level learning and impact on practice and outcomes. Duration (how long is the intervention?), frequency (how often does the PDL occur?) and intensity (how long are individual sessions and what do they consist of?) of PDL are, then, clearly important factors in determining which approaches are most effective but there is little agreement in the literature and it has emerged as a key area for further research. More complex still is frequency and intensity of PDL and again, we found wide variation in our final set of studies. More work is needed to understand this aspect and how best to achieve impact from PDL programmes, particularly when the EYE sector is constrained in terms of financial resource and time.

RECOMMENDATIONS FOR POLICY AND PRACTICE: ADDRESSING THE EYE SKILLS GAP

It was always our intention that in conducting this review we would be able to provide guidance, which was of use to policy-makers and EYE professionals in making informed decisions about the types of PDL they could support. With that in mind, drawing on the evidence from our review, we conclude this report by making some recommendations for policy and practice.

1. Key stakeholders in the EYE sector should work together to develop a set of agreed guidelines or minimum standards for the quality assurance of PDL programmes

The review process, including our engagement with our advisory group, has led us to the general conclusion that:

A desirable and responsible approach to the funding of EYE professional development and learning is that it should first and foremost benefit children, by enhancing individual

educators' skills and knowledge in ways that are long lasting, sustainable, and which help to build the learning capital of an organisation and community of practice.

Members of our review advisory group report that in a climate of limited resources, priority is increasingly given to operational and regulatory training around first aid, health and safety and child protection procedures. It highlights for us a concern that we simply do not have reliable data on the types of PDL already on offer to the sector, the modes of delivery, what impact if any it is having on improving outcomes for children and whether or not it is evidence-informed and of acceptable quality. Significant improvements in quality of provision have been reported in recent years, particularly in the maintained sector, though according to research, that appears to be the result of an increase in graduate-led provision (Mathers and Smees, 2014). In the absence of reliable information, there is currently no reliable way to quality assure PDL in the EYE sector against evidence-based benchmark of what works. Our evidence accords with a study of PDL in the 5-18 school sector conducted by Cordingley et al., (2015) and on that basis we recommend that EYE settings and schools make use of facilitators of PDL who can:

- translate the best available research evidence into actions for practice/pedagogy;
- engage participants in critical reflection and group work with peers;
- draw on individual and setting contextual information and the current level of understanding of the participants;
- consider providing coaching to enhance the application of new learning;
- support participants to think about how the PDL relates to the children in their setting; and
- build in time for planning and feedback back in participant settings.

The present review has identified intensive coaching models as a potentially important approach to improving children's outcomes as long as it is coupled with a clear content focus and linked to practitioners' setting contexts and experience. Coaching from more expert peers provides a responsive approach for a diverse workforce with wide variation in skills, knowledge and qualification. Further work is needed on identifying the optimum duration, frequency and intensity to maximise limited resources available to support PDL. In the longer term, we recommend that the EYE sector (including schools), might work with Local Authorities, Teaching School Alliances and/or government to develop a set of agreed guidelines or minimum standards for the quality assurance of PDL, its pedagogy and the mode of delivery appropriate to the type of learning and content delivery required.

2. Develop a strategy for investment in evidence-informed professional development and learning in EYE

The recent government EYE workforce strategy (DfE, 2017) has been a welcome addition to the debate about how best to support skills development but we do not think it goes far enough. What is needed now is a strategy for professional learning and development as a complementary route to improving quality to the qualifications route. Our evidence suggests that it is possible to produce tangible gains in children's learning through PDL, which can also meet the diverse needs of the EYE workforce. A government strategy for EYE PDL would facilitate debate and clear direction for developing PDL programmes that are based on sound evidence of high quality PDL with the best possible chance of improving outcomes for children. None of the interventions we considered offered an economic evaluation. This might be one

possible avenue to pursue in future research to ensure cost effectiveness. But we would argue that it is highly likely that schools and EYE settings are already investing funds in PDL opportunities that do not have demonstrable gains for children.

On the basis of our findings, we concur with the report by Kalitowski, (2015) (also a member of the advisory group), who proposes that there is a need for a workforce strategy that sets out a clear plan to reward and motivate existing practitioners to stay in the profession and progress their careers. Scotland and Wales are already doing this, as are other countries and professions. In this new, more professional era of childcare and early education, more attention is required on the part of setting and school leaders and policy-makers, to help overcome the barriers to high quality PDL described earlier in this report by improving access to evidence-informed PDL programmes. Furthermore, three core components are necessary to provide the highest quality care and education possible for children and their families:

- the commitment of childcare professionals to continuously improve (both to benefit the children in their care and to progress their careers)
- access to the affordable, flexible PDL that childcare professionals need to do so; and
- this commitment being recognised, with PDL and higher qualifications leading to better pay and opportunities within the sector and beyond.

3. Develop and evaluate sector-wide EYE PDL intervention

The evidence from our review is clear that PDL programmes that are based on the best available research evidence, include curricular content as well as pedagogical and procedural knowledge, embedded in real contexts, and that provide opportunities for reflection, feedback through coaching and peer group discussion are highly effective at improving educator skills at all levels of qualification, *and* are most effective at improving outcomes for children. Many of the studies we reviewed from the USA were in the form of randomised controlled trials and evaluations of state-funded programmes. In the UK there have been few recent examples of evidence-informed PDL interventions, which might be taken to scale and evaluated with the intention of developing an effective programme for the sector. Building on the findings from this review, our intention is to work with our advisory group members to develop a research proposal for an EYE PDL intervention and evaluation project, which takes into account the types of professional learning that seem to be most effective at improving outcomes for children.

Finally, we strongly recommend that investment in developing high quality PDL opportunities in EYE should be a priority, alongside the qualifications route. Although we recognise that further work is needed to fully understand which types of PDL have the greatest impact and are cost effective, the review provides useful evidence to show that certain types of PDL can help to improve the quality of pedagogical interactions between adults and young children and enhance subject knowledge, which in turn can significantly benefit, children's developmental and learning outcomes. The potential benefits of this to children's school readiness and social-emotional development seem clear. We suggest also that the EYE sector and schools might seek ways to bring together professionals from different settings to allow greater sharing of expertise and practice, to find ways to redeploy and hence grow the learning capital acquired by

educators through PDL programmes, across organisations and clusters of settings. However, arguably the most important factor in ensuring that the positive benefits of PDL programmes have long lasting and sustainable impact is the full commitment and on-going support of school and setting leaders, and ultimately that of policy-makers and government.

MAIN REPORT

1. BACKGROUND

AIMS AND RATIONALE

This systematic review focuses on professional learning and development (PDL) in early years education (EYE). In particular, the review aims to:

- Identify the most effective types of PDL approaches for improving outcomes for children in EYE;
- Inform and have impact on policy and practice in the EYE sector as a necessary first step to developing PDL programmes that are effective in improving outcomes for children.

The review brings together the best available evidence for PDL approaches with impact on children's outcomes. In so doing it will contribute to growing interest in the benefits of evidence-informed teaching practice and the professional learning approaches that might help EY practitioners to become research informed. We have undertaken a systematic review of evidence following the guidelines of the EPPI Centre, to ensure rigour, transparency and optimal impact, and importantly, to engage key user groups at each stage of the review process. The scope of the review is international to ensure maximum coverage of the literature and to take into account shared global concerns about how best to improve outcomes for children. However, due to resource constraints we have limited our review to items published in English.

A NOTE ABOUT AUTHORS, FUNDERS AND USERS OF THE REVIEW

The review was conducted by a team of researchers at the UCL Institute of Education and is funded by the Nuffield Foundation. In keeping with the aims of the funder and the underlying principle of EPPI systematic reviews, we have conducted a user-focused review, which has:

- engaged with EYE professionals and setting leaders before, during and after the review as part of our scoping exercise for the review and in earlier PDL interventions conducted by the two lead authors of this report,
- produced a report that is accessible and useable to a non-academic audience and
- offered a set of recommendations to inform policy and practice.

These recommendations are intended to help the EYE user community (i.e. setting and school leaders, early years professionals and policy makers), to make informed decisions about the types of professional learning opportunities that are most effective and to feel confident that those approaches are underpinned by robust and rigorous research evidence. Our primary intention in conducting this review is to inform and have impact on policy and practice in the early years sector. We see it as a necessary first step to developing PDL programmes that are effective in improving outcomes for children.

PROFESSIONAL DEVELOPMENT OR PROFESSIONAL LEARNING?

We started from a broad definition of professional development proposed by Snyder

et al. (2012), as 'facilitated teaching and learning experiences designed to enhance practitioners' knowledge, skills, and dispositions as well as their capacity to provide high-quality early learning experiences for young children' (p.188). The terms professional development and professional learning are used interchangeably in the literature, but we prefer the term *professional learning* since we associate 'learning' specifically with tangible and sustainable changes in professional thinking and practice, rather than a broader conception of development through a range of experiences and activities (Knapp, 2003). For ease of reading, however, we use the term 'professional development and learning', abbreviated to PDL in this report.

EARLY YEARS PROVISION TERMINOLOGY

Definitions used to describe early years provision and associated terminology are complex, due to the varied history and tradition on which the education of young children is founded both here in the UK and in other countries. In part, this review has been conducted in response to that diversity and the challenges it poses for a coherent approach to PDL. To describe the sector, we use the term early years education (EYE) the period from birth to age 6, which is applicable to the UK context. In the USA, Canada and Australia, early childhood education (ECE) is the common term used, and in Europe, Early Childhood Education and Care (ECEC) is widely employed.

POLICY AND PRACTICE CONTEXT

In the UK, there is agreement across all political parties for continued expansion of provision to meet the increasing demand for childcare places from working parents, presenting the sector with the challenge of meeting that demand with suitably qualified and knowledgeable educators. Other recent policy developments in England, which reinforce the urgent need for the sector to provide a highly skilled workforce, include educational intervention in the lives of disadvantaged children from the age of two, many of whom have been placed in primary schools, arguably to ensure quality of provision, but also highlighting the lack of available places in nurseries and childcare settings. This has placed further pressure on the sector to increase the number of suitably skilled staff. Furthermore, an increasing focus on an early years curriculum and pedagogy that supports 'school readiness' in England (DfE, 2014), presupposes a workforce that is knowledgeable about child development, curriculum, early learning and the types of interactions with children that support the development of language, early literacy, and executive functioning skills such as resilience, self-regulation and planning (Sylva, 2014). School readiness is a complex and contested term. Perspectives on children's development from research have shifted in recent years from a maturational to a more socially constructed concept of development, to include the child's interactions with the environmental and cultural experiences (Murphy and Burns, 2002) leading critics to argue against educational policies which place undue emphasis on the early years as a preparation for school learning, and in particular on the basic skills literacy and mathematics. In this review we have adopted the definition proposed by Rao et al. (2014) since it takes a holistic view of children's development appropriate to the ways in which young children learn:

School readiness refers to children's attainment of a certain set of psychosocial, behavioural and cognitive skills needed to learn and function successfully in school. The term includes physical wellbeing and motor development, social and emotional development, language development, cognitive development and general knowledge and learning-related skill (p.5).

School readiness, then, can be viewed as covering the full range of developmental needs required for young children to make a successful entry into school, become confident and motivated learners, and to lead fulfilling and worthwhile lives. The review sought research on this wide spectrum of outcomes for children.

Governments across the world agree that a highly skilled and knowledgeable workforce is required to ensure the best education and care for young children. One policy response to concerns over the shortage of suitably skilled staff in the UK, has been to increase numbers of graduates and qualified teachers in early years settings (DfE, 2012; 2017). The link between higher qualifications and high quality provision is now well understood and well documented. Research undertaken by Mathers and Smees (2014) for example, provides evidence of the positive link between graduate-led provision and improved outcomes for the most disadvantaged children. The study noted that 'disadvantaged children have the most to gain from good quality provision'. However the study also notes that 'non-graduate settings are not well-equipped to maintain quality standards' (2014, p.5). By 'non-graduate settings' the authors are referring mainly to provision in the private, voluntary and independent (PVI) sector. Clearly, improving the qualifications profile and increasing pedagogical leadership capacity in the sector is one important way to tackle the skills challenge in the early years sector in the long term. But it takes time to build a workforce in this way and, moreover, there are many well-documented reasons that prevent early years educators from accessing further study and higher qualifications. In a largely female workforce these may include caring and family commitments (Osgood, 2012), lack of access to and support with funding (Kalitowski, 2012; DfE 2017), lack of proximity to colleges and universities, and low self-confidence following extended periods away from education (Barkham, 2008). In addition, some educators may prefer to remain in a supporting role, valuing the opportunity this affords to work with individual children and small groups (Barkham, 2008). Moreover, the Department for Education *Early Years Workforce Strategy* (2017) reports that some employers in the sector 'find it difficult to attract and/or retain specialist graduates and would like more opportunities to develop the staff already in their workforce to become pedagogical specialists' thus raising the question of how best to access high quality PDL (2017, p.9). Taking all of this into account, a key question underpinning this review is: how can we ensure that *all* those who work with young children have fair access to the most effective professional learning opportunities? Or put another way, how can we ensure that *all* children have access to the most knowledgeable and skilled educators?

2. METHODS OF THE REVIEW

In this section we present detail on the methods used to undertake a systematic review of the extant literature relevant to our topic, aims and research questions.

REVIEW ADVISORY GROUP

Drawing on best practice in systematic reviews we established a stakeholder review advisory group with representative key users (listed in the acknowledgements section). We met with the group on three occasions to present and discuss the review process and our findings as they developed. In addition, we consulted the group throughout the analysis and preparation of this report. Working with the group gave us invaluable information about grass-root issues and challenges facing the sector, anecdotal information on current types of PDL on offer and the practicalities of developing more comprehensive programmes. Our academic adviser specifically provided input on the review process, management of data and synthesis of findings. The group continues to meet to consider dissemination and application of findings and potential next steps for research projects to address areas requiring further investigation.

WHY UNDERTAKE A SYSTEMATIC REVIEW?

Although systematic reviews share common principles they inevitably vary according to the aims and research questions underpinning the review, the extent of the 'work done' and the approach taken (Gough and Thomas, 2012). Most reviews of research take the form of traditional literature reviews, which usually examine the results of only a small part of the research evidence, and take the claims of report authors at face value. By contrast, the key features of a systematic review or systematic research synthesis, such as the approach developed by the EPPI-centre are that:

1) Explicit and transparent methods are used;
2) It forms a piece of research in its own right that follows a stage process of retrieving, screening and reviewing literature items;
3) It is accountable, replicable and updateable;
4) There is a requirement for user involvement to ensure reports are relevant and useful (with user engagement occurring before, during and after the review process).

In general terms, systematic reviews aim to find as much as possible of the research relevant to the particular research questions, and use explicit methods to identify what can reliably be said on the basis of these studies. Methods should not only be explicit but systematic with the aim of producing valid and reliable results. With these principles in mind, our approach with this project has been to: establish selection criteria; conduct searches; assess study quality and bias; extract data and conduct data analysis and synthesis; write the report and disseminate findings. These activities have been managed and organised via the EPPI Reviewer version 4 software. This ensures the review is an updateable resource as the EYE sector invests in and develops approaches to PDL at this critical time of expansion.

REVIEW QUESTIONS

Following an initial scoping exercise, we identified three research questions:

1) What evidence is there of impact of professional learning approaches for improving outcomes for children in EYE? Which approaches are more and less impactful?

2) What are the features of and the theory of action underpinning effective professional learning approaches in EYE?
3) What types of professional learning opportunities are available to EY practitioners and who provides them? How do these relate to 1) and 2), above?

APPROACH ADOPTED

An important distinction is made in the literature between two overarching approaches to systematic review dependent on whether they aggregate (add up) or configure (organise) information (Gough et al., 2012). In practice, given the range of work in the social sciences, reviews are likely to adopt a mixed method design combining both approaches to varying degrees. Since our aim is to address, in particular, knowledge gaps about professional learning interventions that might impact upon outcomes for children in settings where there is a diverse range of staff characteristic of the early years sector, our approach has aimed to take this diversity and complexity into account where possible in order to discover the conditions that make a particular programme or intervention effective and, moreover, enable us to understand the factors that work in a particular situation and under certain circumstances. Gough et al., (2012) describe this approach as a *realist* synthesis.

PROCESS FOR CHECKING OUR APPROACH IS FIT FOR PURPOSE

To ensure that we have developed a robust and appropriate approach to the review we undertook the following preparatory work prior to commencing the project:

1) Prior to submitting a full proposal to the Nuffield Foundation, the PI discussed the project with the Assistant Head of an Early Years Training Centre to ascertain the likely usefulness of the review and potential contextual challenges that might arise. This consultation emphasised in particular the importance of addressing the complexity of the EYE workforce in the review and led to a refinement of our key concern to understand how professional learning approaches meet the needs of such diverse levels of expertise and skills of staff working in preschools, children's centres and nursery classes?
2) To establish a viable approach to the review we consulted two published systematic reviews aimed specifically at user groups, each seeking to instigate change in practices (a Canadian review of mental health interventions in preschool, by Carrey et al., 2014, and an EPPI-Centre international review of early childhood education by Rao, et al., 2012).
3) We consulted with colleagues in the EPPI-Centre, and the proposal was peer reviewed by two specialists (an early years expert and an EPPI education review expert).

SEARCH STRATEGY

Following the procedure outlined in the EPPI systematic review guidelines (Gough et al., 2012), we developed a comprehensive search strategy to reduce the likelihood of bias, to maximise the range and quality of the literature we can engage with, and ensure the production of a review that is rigorous, trustworthy and transparent. EPPI guidelines recommend four main search approaches: a) electronic-database searches b) hand searches of journals c) specialist website searches and d) personal contacts, authors, experts in the field. The sources we employed during the review process were as follows:

1. Electronic databases**:** Academic Search Elite/EBSCOhost; Campbell; Child Care and Early Education Research Connections (CCERC); Dragon (The University of Hong Kong Libraries Catalogue); Danish Education Clearinghouse; Educational Resources Information Center (ERIC); Google Scholar; JSTOR; National Child Care Information Center (NCCIC); Psychology and Behavioral Sciences Collection; PsycInfo; Social Sciences Abstracts; Sociological Collection; Web of Science; What Works Clearing House (WWC) USA

2. Hand/online searches of journals: International Journal of Early Years Education; Early Years; Contemporary Issues in Early Childhood Education; Journal of Early Childhood Teacher Education; Journal of Educational Psychology; Professional Development; Child Development

3. Specialist website searches: OECD (The Organisation for Economic Cooperation and Development); BERA/TACTYC (British Educational Research Association); NAEYC (National Association of Education for Young Children, USA); NIEER (National Institute for Early Education Research, USA); EPPI-centre reviews.

4. Personal contacts/authors and experts in the field: the authors of this report are all active members of national and international research networks in their respective fields. These include membership of research special interest groups in BERA (British Educational Research Association) and AERA (American Educational Research Association), editorial work on key journals such as the *International Journal of Early Years Education* and the *Journal of Educational Change*. These networks provide access to a wide range of academic producers and users of systematic reviews and of the review topic.

Our preliminary work identified two main overarching variables for our search strategy: *early years/early childhood* and *professional learning/development*. Since we have undertaken an international search and review, our searches took into account the variation in terminology used to describe the education for children prior to statutory school age. In England, for example, *early years education* and *childcare* or *early years* is the standard terminology used. Internationally, *early childhood* or *early childhood education and care* (ECEC) are more commonplace. These broad terms also capture other potentially important terms, which may also be suggestive of the range of setting types; for example 'kindergarten', preschool and day care.

Similarly, though we have opted for the term 'professional learning' in our project title, *professional development* (PD) and *continuing professional development* (CPD) are used in some contexts to describe the same activity. Specific approaches to professional learning such as *enquiry learning*, *lesson study*, *joint practice development* and *action research* may also be relevant. Exemplar search terms, based on an initial trawl of studies including Powell et al., (2009), Wasik and Hindman (2011), Urban (2012) and Waters and Payler (2015) demonstrate the range and diversity of terms used in this area.

SEARCH TERMS USED:

Early years/early childhood early years, early childhood, kindergarten, childcare, day care, early education, preschool, reception class, nursery, Head Start, language development, literacy development, vocabulary development, early intervention, low-

income families, teaching strategies, teacher-child interactions, support staff, teaching assistants, child-care assistants, nursery nurses.

Professional learning/professional development professional learning, teacher development, teacher preparation, continuing professional development, CPDL, action research, teacher change, professionalism, competence, joint practice enquiry, lesson study, reflective practice.

INCLUSION AND EXCLUSION CRITERIA

Systematic reviews rely on schemes of carefully constructed criteria to in order to establish a basis for the selection, inclusion and exclusion of research studies. Based on our initial mapping of the sector three main inclusion criteria were applied:

1) *Professional learning interventions must be conducted with practitioners who work with children in the age group birth to 6.*

   We have deliberately capped the age at 6 when most children in developing countries are in school. We acknowledge that many argue for a 0-8 conception of early childhood, but for the purposes of this review, we have limited the scope of the review to practitioners who work with children in the age range birth-6. Exceptions were made if studies are longitudinal and evaluated the impact of professional learning for children in our specified age band but extending beyond the age of 6.

2) *The studies/reports are published after and including January 2000*.

   Systematic reviews typically consider research over a 10-year period for reasons of an efficient use of time and resource and at the same time ensure up-to-date, relevant evidence is considered. In this review we have opted to retrieve studies from a slightly longer period from 2000 to the present day. This period is a particularly significant time in the evolution of early years education policy and practice in the UK. For example, the Foundation stage for children aged 3-5 was established in England and Wales in 2000, including for the first time, statutory curriculum guidance for children with the introduction of the *Curriculum Guidance for the Foundation Stage* (CGFS). In 2008 the *Early Years Foundation Stage* (EYFS) extended to children aged from birth to 5 (revised in 2012 and 2014) was introduced. This period also marks unprecedented national and global interest and investment in the education of children in the preschool years placing particular demands on an emergent and rapidly developing workforce (see for example, a report of global priorities in early childhood education published by OECD, 2012).

3) *The methods and analytic approach adopted in identified studies are sufficiently detailed to allow the research team to judge that the conclusions are robust and validity can be evaluated.*

SCREENING PROCESS

Screening refers to the process by which members of the research team assess whether the data found actually meet the inclusion criteria and the overall aims of the study. Screening ensures that relevant material is identified and utilised in the review (Gough et al., 2012). Search results and abstracts were divided between members of the research team who worked in pairs (double screening) to independently assess titles and abstracts against the agreed inclusion criteria. Disagreement, when it arose, was adjudicated by the project lead in discussion with our academic expert. In a

second round of screening the three members of the research team independently examined the full text (triple screening) to assess its relevance and potential inclusion. Again, when disagreement arose it was moderated by the project lead after a team discussion on the criteria used in the screening process and consultation with our academic expert. This process enabled triangulation of screening of relevant research, and ensured that all team members were fully involved in the review process.

SELECTION OF STUDIES FOR IN-DEPTH REVIEW

The initial search provided 1197 articles/documents/reports for screening. These were uploaded on to the EPPI software. The selection of the studies for final inclusion and in-depth review involved a three-step process:

STAGE 1. SINGLE SCREENING BY TITLE AND ABSTRACT (T & A)

In the first stage, the 1197 articles were divided in 3 groups. Each member of the research team screened 399 articles according to the following 5 criteria:

1) Study has a publication date including and after 2000
2) Focused on EYE/ECE settings, children in 0-6 age range
3) Subjects of the intervention must be in-service EYE workers
4) The methods and/or analytical approaches are described in detail
5) The topic of the study is related to the implementation of professional learning/development

Stage 1 process led to the inclusion of 124 studies for full text screening.

STAGE 2. TRIPLE FULL TEXT SCREENING

In Stage 2 the three members of the team did a full text screening of the 124 articles selected in the first stage to assess quality of method and topic relevance. Of the 124 studies included here, 70 were excluded on the basis that they did not meet the quality and topic criteria sufficiently.

This stage led to 54 studies included for in-depth review in Stage 3

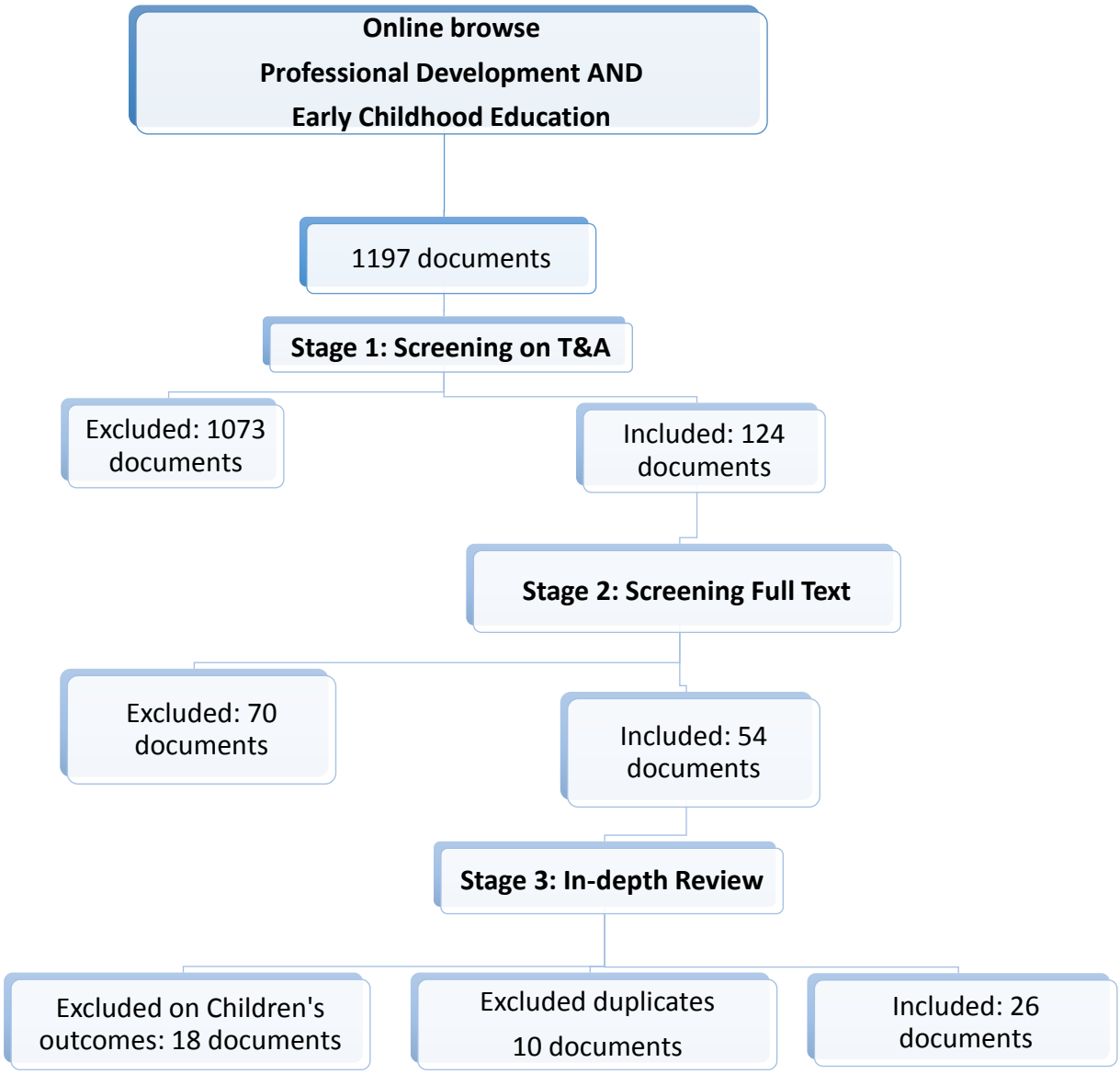
STAGE 3. IN-DEPTH REVIEW

To address the aims of the review and in addition to the 5 criteria described above, a further criterion was applied for the Stage 3 screening:

1) The study must clearly report on children's outcomes in a rigorous and robust way.

The 54 studies remaining in this stage were subjected to in-depth review by pairs of researchers. After the in-depth review stage, 18 studies were excluded, as they did not report on children's outcomes adequately. Finally, we screened for and excluded duplications, which resulted in the exclusion of a further 10 documents. The final set of studies that met the criteria in full for this systematic review totalled 26. 25 are peer-reviewed articles, 1 is a chapter of a book. 24 of the outputs are from United States; 1 from Canada; and 1 from New Zealand. We did not find any studies that looked specifically at the impact of professional learning on outcomes for children in the UK context. We will return to this point more fully in the discussion of findings section. Figure 1 shows the process of the systematic review:

Figure 1: PLEYE Systematic Review Process.


Online browse
Professional Development AND
Early Childhood Education
1197 documents
Stage 1: Screening on T&A
Excluded: 1073 documents
Included: 124 documents
Stage 2: Screening Full Text
Excluded: 70 documents
Included: 54 documents
Stage 3: In-depth Review
Excluded on Children's outcomes: 18 documents
Excluded duplicates
10 documents
Included: 26 documents

CRITERIA FOR ASSESSING QUALITY

To assess quality of included papers, we adopted the model of research quality suggested by Oancea and Furlong (2007), which considers a number of assessment criteria, including: methodological and theoretical robustness, use value and timeliness, the reaction to the research by policy-makers and practitioners, and the cost effectiveness of the study. Following EPPI guidelines and refining this further, four specific criteria were used for assessing the quality of evidence reported in the studies for inclusion in the review: rigour of research design, soundness/trustworthiness of study, topic relevance to the study itself and topic relevance to the review questions. Each paper in the final set was assessed against these criteria by each of the researchers, discussed and agreed before application to the inclusion and exclusion process.

3. SYNTHESIS

This stage directly addressed our research questions by bringing together the findings of all relevant and trustworthy studies considered in the review. The review synthesis represents a thorough integration of our findings and leads to a synthesis of studies with a result that is 'greater than the sum of the individual studies' (Gough et al., 2012, p.283). The initial search resulting in 1197 papers at Stage 1 comprised a diverse mix of theoretical or conceptual studies and those that provided findings (which could be either qualitative or quantitative in nature). However, the final 26 studies, which met our criteria were all interventions that used experimental or randomised control trial methodologies. In synthesising these findings, we attempted to do three things:

1) Build a theory of action that outlines why and how professional development is effective, and for whom;

2) Understand the ways in which the empirical findings relate to this conceptual frame and the extent to which they augment or challenge it. Does it show observed effects or even, does it provide conflicting evidence on proposed drivers for action;

3) Understand where further empirical evidence is required because it is either absent or lacking in type (qualitative or quantitative), amount, or robustness.

A CONCEPTUAL MODEL FOR ASSESSING IMPACT

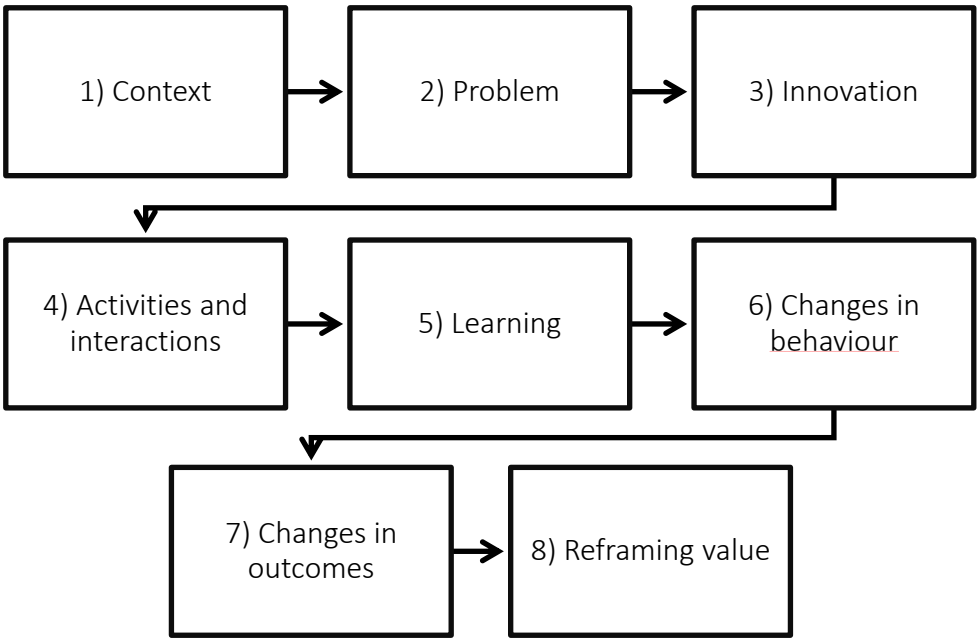
To meet the first of these aims, the project team employed the Dialogic Model of Impact (DMI) developed by Brown and Graydon (2017) as the basis of a theory of action (ToA) to examine why and how professional development is effective, and for whom. Theories of action are described by Earl and Timperley (2015: 19) as the reasoning organisations use to describe how they will make change in the world; with the 'theory' aspect of a ToA providing an explanation of why certain things happen. Theories of action are thus perhaps best thought of as the journey guide for impact, that steers educators towards their intended long term outcomes, or the difference an innovation is designed to make for a given group or set of stakeholders. To help educators reach this long-term vision ToAs provide the steps that need to occur along the way.

DMI developed from an examination of existing impact measurement models. As part of this examination it became clear that common amongst these models is the idea that impact occurs through a process of change that stretches across a number of different 'levels'. Correspondingly, these levels can be used to assess the *extent* of

positive change achieved by a given innovation or intervention for a particular group. More specifically, DMI comprises the following eight domains of impact as illustrated in Figure 2:

1. The **context** in which the school or setting is situated
2. The **problem or driver** for innovation
3. Detail on **the innovation** and how it was intended to result in change
4. **Activities and interactions** related to the introduction and roll-out of the approach
5. **Learning** that results from engaging in these activities/results from interactions
6. **Changes in behaviour** (and the extent to which something is being used):
7. What **difference** have behavioural changes made?
8. **Reframing value**: reassessing what is possible in relation to the innovation

Figure 2: Domains of Dialogic Model of Impact (DMI)



As a consequence, by looking at impact and how this impact was achieved we have been able to examine commonalities in the professional learning interventions according to the type of impact and the approaches undertaken to secure improved outcomes in early years settings. In applying this conceptual frame to our synthesis and analysis we aim to better understand the relationship between:

1) the aims of a professional learning intervention,
2) what did it intend to achieve, how and why?
3) how it was put into practice and
4) what if any impact it achieved and how do we know?

In the next section we move towards our findings, first by characterising the literature, which in itself can give indications of how professional learning is viewed by early years policy makers and 'budget holders' and in so doing highlight challenges in delivering professional learning that is effective in achieving its intentions for impact.

4. FINDINGS

Applying our conceptual model outlined above, as well as assessing the extent of positive change achieved by a given intervention (and whether this occurs in terms of

knowledge, practice and/or children's outcomes), the domains identified in the DMI can also be employed to think about why an intervention should cause such change. We used domains 3 to 7 of the DMI model to deconstruct the interventions specified in our 26 papers, interrogating each study with the following questions:

- What type of professional learning intervention was used? (Domain 4)
- What were the aims of the professional learning intervention? For example, quality of setting, content knowledge; (Domain 3)
- How were the interventions delivered? (Domain 4)
- What changed as a result – teacher's knowledge and practice? (Domain 5, 6)
- What changed as a result – children's outcomes? (Domain 5, 7)

WHAT TYPES OF PROFESSIONAL LEARNING INTERVENTIONS WERE USED?

Table 1 below provides detail on the type of PDL intervention. Of these, 15 of the 26 interventions considered involved some form of coaching or mentoring. How these were understood and the differences between them was not always clearly explained in papers (e.g. Podhajski and Nathan, 2005), though all made reference to generic support strategies such as modelling, feedback, support and guidance. Powell et al. (2010) compared on-site and remote online coaching but found no differential effects between these. In most cases where impact on children's outcomes, was reported, coaching and mentoring were used in combination with other aspects (such as provision of instructional tools for teachers to employ: e.g. Chen and McCray, 2012), with varying degrees of content, input and duration. By comparison, one study offered a two-hour workshop on literacy and found no evidence of impact on teaching practice or child outcomes, measured eight weeks later (McLachlan and Arrow; 2014) highlighting a potential need for more intensive PDL over a longer period. After coaching and mentoring, the next most common feature (evident in six interventions) was the use of classroom implementation activities (e.g. the provision of lesson plans for developmentally appropriate activities that teachers could implement) or the provision of other instructional approaches such as the prescription of intervention strategies to build strengths. Likewise tasks and group work to help educators understand concepts also featured in five studies. Four of the interventions involved approaches to develop teacher content knowledge, while two provided scholarships to attend community college courses.

There was, then, a preponderance of coaching in our final set of studies as an approach to PDL, for providing greater flexibility to build on practitioners' existing knowledge and skills than other approaches such as workshops alone or on-line tutoring. Coaching and mentoring can operate on the lines of an apprenticeship model which research has consistently shown to be an effective and responsive learning approach (ref).

Table 1. ***Type of PDL Interventions***

Studies	Coaching and mentoring	Learning labs	Classroom implementation	Tasks and group work	Scholarships	On-line PDL
1. Brendefur et al. (2013)			X			
2. Cain et al. (2007)	X					
3. Campbell and Milbourne (2005)				X		
4. Chen and McCray (2012)	X	X	X			
5. Collins and Dennis (2009)	X		X		X	
6. Conroy et al. (2013)	X					
7. Downer et al. (2011)						X
8. Gallagher et al. (2011)	X					
9. Gettinger and Stoiber (2008)	X		X			
10. Hindman and Wasik (2012)	X		X			
11. Jackson et al. (2006)	X	X				
12. Kermani and Aldemir (2015)						
13. Landry et al. (2009)	X					X
14. Landry et al. (2011)	X					X
15. Lane et al. (2014)	X					
16. Lonigan et al. (2011)	X					
17. Marcon et al. (2012)					X	
18. Martin et al. (2007)					X	
19. McLachlan and Arrow (2014)		X				
20. Milburn et al. (2015)	X					
21. Piasta et al. (2015)						
22. Podhajski and Nathan (2005)	X	X				
23. Porche et al. (2012)			X			
24. Powell et al. (2010)	X			X		X
25. Sarama et al. (2008)	X		X			
26. Swaminathan et al. (2014)		X				

WHAT WERE THE AIMS OF PDL INTERVENTIONS USED?

Table 2 below shows the aims underpinning the different interventions. Nineteen interventions focused on developing teachers' pedagogical or instructional knowledge whilst 15 focused on enhancing teachers' content knowledge. Ten interventions focused on both. Pedagogical knowledge is specialised teacher knowledge for creating effective teaching and learning environments for all children, and knowledge of the techniques and strategies used for supporting children's learning of a new skill, concept or information, such as 'scaffolding' or open-ended questions. On the other hand, content knowledge is knowledge of a particular subject such as mathematics or language development. However, in practice these are inextricably linked, and most interventions reported multiple aims to ensure the improvement of children's learning/development outcomes. One study included also a focus on teacher's attitudes and beliefs about content knowledge (Chen and McCray, 2012). Looking more broadly, three studies included objectives regarding the maintenance and sustainability of the PDL learning within the organisation. Those studies focused on developing organisational support, such as promoting clarity of these goals, of leadership, and of all participants' responsibilities and accountability; on beginning to create (and eventually institutionalise) a support infrastructure; on developing the necessary support to scale up interventions and build expectation and camaraderie to support a consensus around adaptation (e.g. Porche, Pallante and Snow, 2012; Sarama et al., 2008). Finally, two studies focused on developing strategies for classroom management, for instance helping teachers to reduce children's challenging behaviours (e.g. Conroy et al., 2014; Lonigan et al., 2011).

Table 2. ***Aims of PDL Interventions***

Studies	Enhance teachers' content knowledge	Improve teachers' attitudes	Develop instructional strategies	Improve quality of settings	Classroom management	Promote children's learning outcomes	Develop organisational support
1. Brendefur et al. (2013)	X		X			X	
2. Cain, Rudd and Saxon (2007)	X						
3. Campbell and Milbourne (2005)				X			
4. Chen and McCray (2012)	X	X	X				
5. Collins and Dennis (2009)	X		X			X	
6. Conroy et al. (2013)			X		X		
7. Downer et al. (2011)			X			X	

Studies	Enhance teachers' content knowledge	Improve teachers' attitudes	Develop instructional strategies	Improve quality of settings	Classroom management	Promote children's learning outcomes	Develop organisational support
8. Gallagher et al. (2011)			X			X	X
9. Gettinger and Stoiber (2008)			X			X	
10. Hindman and Wasik (2012)	X			X		X	
11. Jackson et al. (2006)			X			X	
12. Kermani and Aldemir (2015)	X					X	
13. Landry et al. (2009)			X			X	
14. Landry et al. (2011)			X			X	
15. Lane et al. (2014)	X		X			X	
16. Lonigan et al. (2011)	X		X		X		
17. Marcon et al. (2012)	X		X				
18. Martin et al. (2007)			X				
19. McLachlan and Arrow (2014)	X						
20. Milburn et al. (2015)			X				
21. Piasta et al. (2015)			X			X	
22. Podhajski and Nathan (2005)	X		X				
23. Porche, Pallante and Snow (2012)	X		X				X
24. Powell et al. (2010)	X		X	X		X	
25. Sarama et al. (2008)	X		X				X
26. Swaminathan et al. (2014)	X						

HOW WERE THE PDL INTERVENTIONS DELIVERED?

Table 3 below summarises the different types of the PDL interventions identified in the included studies. As described in Table 1 above, coaching and to a lesser extent mentoring featured most prominently in our final set of included studies. However, little information was given in the papers to distinguish between them. Each of these approaches imply close and specialised support for practitioners to model best practices and the provision of feedback from either more experienced peers or experts. Along with these elements, 12 studies included a workshop; these were held at the beginning of the intervention or at intervals across the duration of the PDL interventions (e.g. Campbell and Milbourne, 2005; Lonigan et al., 2011; Milburn et al., 2015, Powell et al. 2010). 14 studies used research-based interventions about children's development and learning, or content and pedagogical knowledge (e.g. Cain, Rudd, and Saxon, 2007; Jackson et al., 2006; Kermani and Aldemir, 2015; Podhajski and Nathan, 2005 and Powell et al. 2010). The teaching methods were varied across the interventions, ranging from attending college-courses and interactive lectures to more participatory strategies including hands-on activities such as constructing material or role-plays (e.g. Lonigan et al., 2011; Collins and Dennis, 2009; Sarama et al., 2008; Cain, Rudd, and Saxon, 2007; and Powell et al., 2010). Videotaping teachers' practices were used in some interventions to illustrate key strategies (e.g. Downer et al., 2011; Sarama, et al., 2008). Five studies used technology to support practitioners. For instance Lane et al. (2014) tested a distance-mentoring model in which participants received the lessons by email. Likewise, Porche, Pallante and Snow (2012) supplemented the on-site coaching with teacher-initiated phone and e-mail check-ins. Landry et al. (2009) evaluated an online professional development course and Downer et al. (2011) used a web-based PDL. Another relevant element to consider regarding the operationalisation of PDL interventions was the frequency and intensity of programmes. This implies on-going on-site support for practitioners throughout the duration of the intervention. Collaboration among key participants and peers features as an important consideration when implementing effective PDL. Five of the included studies offered a collaborative element promoting group work among practitioners during workshop and providing group staff development (Sarama et al., 2008). At an institutional level, three interventions considered the need to promote organisational support to intensify teachers learning and engagement and ensure the sustainability of the PDL programme (e.g. Porche et al. 2012; Sarama et al., 2008). Sarama et al. (2008), Collins and Dennis (2009); Gettinger and Stoiber (2008) provided supportive roles and materials for parents.

Table 3. How was the PDL delivered?

Studies	Coaching	Mentoring	Workshop	Research based intervention	Collaboration	Organisational support	Frequency and intensity of PDL	Use of technology	Work with the family	Video tape lessons	College lectures
1. Brendefur et al. (2013)			X	X							
2. Cain, Rudd and Saxon (2007)	X			X							
3. Campbell and Milbourne (2005)			X				X				X
4. Chen and McCray (2012)	X						X				
5. Collins and Dennis (2009)	X	X	X	X			X		X		X
6. Conroy et al. (2013)	X										
7. Downer et al. (2011)	X			X			X	X		X	
8. Gallagher et al. (2011)		X	X	X	X						
9. Gettinger and Stoiber (2008)	X			X	X		X		X		
10. Hindman and Wasik (2012)	X						X				

Studies	Coaching	Mentoring	Workshop	Research based intervention	Collaboration	Organisational support	Frequency and intensity of PDL	Use of technology	Work with the family	Video tape lessons	College lectures
11. Jackson et al. (2006)		X		X							X
12. Kermani and Aldemir (2015)				X			X				
13. Landry et al. (2009)		X	X	X			X	X			
14. Landry et al. (2011)		X	X	X				X			
15. Lane et al. (2014)		X						X			
16. Lonigan et al. (2011)		X	X								
17. Marcon et al. (2012)											X
18. Martin et al. (2007)											X
19. McLachlan and Arrow (2014)			X								
20. Milburn et al. (2015)	X		X								
21. Piasta et al. (2015)			X							X	
22. Podhajski and Nathan (2005)		X		X							

Studies	Coaching	Mentoring	Workshop	Research based intervention	Collaboration	Organisational support	Frequency and intensity of PDL	Use of technology	Work with the family	Video tape lessons	College lectures
23. Porche, Pallante and Snow (2012)	X			X		X		X			
24. Powell et al. (2010)	X		X	X			X	X			
25. Sarama et al. (2008)	X			X	X	X			X	X	
26. Swaminathan et al. (2014)			X								

WHAT CHANGED AS A RESULT? – TEACHERS' KNOWLEDGE AND PRACTICE.

The studies we reviewed showed five key areas of change: 1) changes in teachers' content knowledge; 2) changes to teachers' procedural knowledge; 3) improvements to the organisation of the classroom environment; 4) changes in teacher-child interactions; and 5) changes in joint attention with children under 3. Nine studies reported changes to teachers' content knowledge, reporting impact on teachers' vocabulary (as well as that of their children); increased awareness of the way in which they engaged with children; and knowledge of their practices and environment. For example Jackson et al. (2006) and Collins and Dennis (2009) both combined mentoring and research approaches, and in the case of Collins and Dennis (2009), workshops and college lectures, to achieve change, suggesting that models of PDL that give both new knowledge and 'scaffolded' support are effective at instigating change in practice. In addition, both studies met high levels of frequency and duration in delivery. By comparison McLachlan and Arrow (2014) reported no changes in teacher understanding of phonological awareness and little impact on children's outcomes following an 8-week programme consisting of a 2-hour workshop prior to implementation. They conclude that 'teachers need greater involvement or time for changes in beliefs and practices to occur' (2014, p.835), highlighting also the importance of subject knowledge with ongoing PDL such as coaching and feedback to ensure impact on children's learning. Nine studies showed changes in procedural knowledge with impact on improved lesson planning; improvement of ECE settings ability to deliver high-quality, pre-literacy skills development instruction and enhanced practice such as: being more conscious of emphasising sounds in words; pointing out the alphabet to children; emphasising names and writing of names on artwork; encouraging writing of stories; and so on. The majority of the final 26 studies focused on children of preschool age (3-6). Only one study (Cain et al., 2007) focused on children from 18-24 months. In that study the change in teacher knowledge was in developing joint attention in developmentally appropriate ways. This finding highlights the lack of research on the impact of professional learning on those who work with the youngest children in EYE.

Table 4. ***Changes in teachers' knowledge and practices***

Studies	Teachers' content knowledge	Teachers' procedural knowledge	Organisation of classroom environment	Joint attention	Teacher-child interaction
1. Brendefur et al. (2013)					
2. Cain, Rudd and Saxon (2007)				X	
3. Campbell and Milbourne (2005)			X		
4. Chen and McCray (2012)					
5. Collins and Dennis (2009)	X	X			
6. Conroy et al. (2013)					X
7. Downer et al. (2011)		X			X
8. Gallagher et al. (2011)		X			
9. Gettinger and Stoiber (2008)					
10. Hindman and Wasik (2012)	X		X		
11. Jackson et al. (2006)	X	X	X		
12. Kermani and Aldemir (2015)	X				
13. Landry et al. (2009)	X	X			
14. Landry et al. (2011)	X	X			
15. Lane et al. (2014)		X			
16. Lonigan et al. (2011)					X
17. Marcon et al. (2012)	X				

Studies	Teachers' content knowledge	Teachers' procedural knowledge	Organisation of classroom environment	Joint attention	Teacher-child interaction
18. Martin et al. (2007)					
19. McLachlan and Arrow (2014)		X			
20. Milburn et al. (2015)	X				
21. Piasta et al. (2015)					
22. Podhajski and Nathan (2005)					
23. Porche, Pallante and Snow (2012)					
24. Powell et al. (2010)	X	X			
25. Sarama et al. (2008)					
26. Swaminathan et al. (2014)					

WHAT CHANGED AS A RESULT? – CHILDREN'S OUTCOMES.

The studies included in this review reported on four types of children's outcomes:
1. Joint attention engagement (1);
2. Literacy knowledge and skills (16)
3. Mathematical and science knowledge and skills (5) and
4. Socio-emotional/behavioural development (2).

Three of the included studies did not report positive gains in children's outcomes (Cain, Rudd and Saxon, 2007; Piasta et al., 2015; Porche, Pallante, and Snow, 2012). Lonigan et al. (2011) reported positive gains as a result of curriculum change but reported that the impact of professional development was insignificant. Furthermore, in the study by Jackson et al. (2006) gains in child outcomes were mixed so that there were positive gains in children's print recognition and letter knowledge, but there were no measurable changes in phonological awareness or oral language nor any effect on children's socio-emotional development. The prevalence of coaching, mentoring and feedback often in combination with other approaches, which presented new knowledge and best research evidence appears to be the most effective approach in impacting positively on child outcomes. One such programme is the *Exceptional Coaching for Language and Literacy* (ExCELL) intervention (Hindman and Wasik, 2012), implemented in Head Start preschool settings. In particular, the authors

examined whether 2 years of ExCELL coaching are linked to greater gains for teachers and children, than 1 year of coaching. This study is important because it reports positive gains in children's language and literacy knowledge during the course of the intervention and addresses the issue of duration i.e. how long professional learning programmes should last in order to achieve measurable impact. It also supports a coaching model alongside introduction of new knowledge as an effective PDL approach.

Table 5. Children's outcomes

Studies	Joint attention engagement	Literacy skills and knowledge	Mathematical abilities	Socio-emotional development
1. Brendefur et al. (2013)			X	
2. Cain, Rudd and Saxon (2007)	X			
3. Campbell and Milbourne (2005)				
4. Chen and McCray (2012)			X	
5. Collins and Dennis (2009)		X		
6. Conroy et al. (2013)				
7. Downer et al. (2011)		X		X
8. Gallagher et al. (2011)		X		
9. Gettinger and Stoiber (2008)		X		
10. Hindman and Wasik (2012)		X		
11. Jackson et al. (2006)		X		
12. Kermani and Aldemir (2015)			X	
13. Landry et al. (2009)		X		
14. Landry et al. (2011)		X		
15. Lane et al. (2014)		X		
16. Lonigan et al. (2011)				
17. Marcon et al. (2012)		X		
18. Martin et al. (2007)		X		
19. McLachlan and Arrow (2014)		X		

Studies	Joint attention engagement	Literacy skills and knowledge	Mathematical abilities	Socio-emotional development
20. Milburn et al. (2015)		X		
21. Piasta et al. (2015)			X	
22. Podhajski and Nathan (2005)		X		
23. Porche, Pallante and Snow (2012)				
24. Powell et al. (2010)		X		
25. Sarama et al. (2008)			X	
26. Swaminathan et al. (2014)				X

CHARACTERISTICS OF THE INCLUDED STUDIES

Table 6 below facilitates cross-referencing between the characteristics of study design, the type of intervention, focus of PDL, duration and composition of participants. We found no studies conducted in the UK, which reported impact of PDL on child outcomes (24 USA, 1 Canada, 1 New Zealand). Each of the included studies reported on interventions that were funded by state or federal government. Most interventions (17) focused on literacy and language and to a lesser extent on other basic subjects such as mathematics and science. Most studies (21) gave detailed information on the participants, the majority of which were diverse groups of practitioners, with mixed qualifications and experience reflecting the type of EYE workforce also found here in the UK. The prevalence of coaching seen in the included interventions (most of which reported gains in child outcomes), highlights again the potential of this responsive approach for a diverse and sometimes hard-to-reach workforce i.e. home-based providers and low qualified practitioners. Absent from this set of interventions, however, is any kind of economic evaluation, so it is difficult to judge the cost effectiveness of this approach, particularly in relation to duration, frequency and intensity. A further factor discussed in many of the papers is the critical part played by the fidelity of implementation of PDL by participants, to achieving impact. Coaching and regular opportunities for intervention participants to keep in touch and catch up may support higher levels of fidelity and ensure best possible confidence in study findings. Some studies provided information on the level of attrition in study samples. High turnover of staff in EY settings in some cases impacted on the interventions, as did withdrawal from the study. However, regular coaching support can help high rates of attrition in the workforce and hence ensure greater stability in settings.

Table 6 .Characteristic of studies included

Study (by author)	Study design	Elements of PDL	Topic of PDL	Duration PDL	Content group	Composition Workforce
1. **Brendefur et al. (2013)**	RCT	Workshop + classroom activities	Early maths.	6 months	24 teachers. 16T & 111C (intervention) 8T & 33C (control)	36% High-School 17% Associate 31% BA 14% master
2. **Cain, Rudd and Saxon (2007)**	RCT	Workshop + coaching	Joint attention engagement (Language)		48 childcare providers	16 High-School, 28 College 3 Associate 1 BA
3. **Campbell and Milbourne (2005)**	RCT	Workshop + consultation	Quality ECE	3 months training	180 caregivers, 114 ECE rooms,	1% No High-School diploma 78% High-School 3% some college, 10% Associate 7% BA 1% Post-bachelors' work
4. **Chen & McCray (2012)**	Quasi experimental with intervention and control group	Workshop, coaching and classroom implementation	Early maths.	2 years	No info	No Info
5. **Collins & Dennis (2009)**	Intervention	Workshop, mentoring and home support	Language, literacy	3 years	8 Head Start classrooms	8 BA 6 masters' degree. 4 assistants 60 hr college credit

6. **Conroy et al. (2013)**	Descriptive non experimental	Workshop + coaching	Children's behaviour	14 weeks	10 teachers and 19 children	10 BA degree and current teacher certification.
7. **Downer et al. (2011)**	RCT	Workshop and web-based support	Language, literacy	2 years	161 teachers, 1,338 children	62.1% BA 36% advanced degrees
8. Gallagher et al. (2011)	RCT	Workshop + mentoring	Language	1 school year	16 mentors	62.5% college degrees.
9. Gettinger & Stoiber (2008)	RTI (Response To Information)	Workshop + coaching	Early literacy	2 years	15 teachers and 15 assistants	15 Associate (ECE)
10. Hindman & Wasik (2012)	RCT	Workshop + coaching	Language and literacy	2 years	16T intervention and 10T control 626C interv. & 357C control	1 working toward Associate 3 Associate 12 BA 1 Master
11. Jackson et al. (2006)	Experimental	Workshop + mentoring	Literacy	15 weeks	22 teachers 17 control	No info
12. Kermani & Aldemir (2015)	Quasi experimental	Workshop and support from research team	Science, math	6 hrs of PDL	4 teachers	4 BA
13. Landry et al. (2009)	RCT	Online training + mentoring	Language, literacy	2 years	262 teachers	146 High School/CDA 73 Two-year college; 181 4+ years college
14. Landry et al. (2011)	RCT	Online training + mentoring	Language, literacy	2 years	209 teachers in intervention;	Different groups

					(+)1200 teachers control.	
15. Lane et al. (2014)	Experimental	Online PDL	Language	24 weeks	27 teachers	18 High-School 41 Associates 36 BA/BS 4 Ma/MEd
16. Lonigan et al. (2011)	Cluster-randomized	Workshop + mentoring	Language, literacy	1 year	739 children	No Info
17. Marcon et al. (2012)	RCT	Workshop + technical assistance	Language	7 months	181 teachers intervention and 20 control	No Info
18. Martin et al. (2007)	Experimental	Coaching + materials + parent's education	Language	2 years	Aprox. 100 children. 11 classrooms	No Info
19. McLachlan and Arrow (2014)	Quasi experimental	Workshop	Literacy	8 weeks	32 teachers 103 children	3 No Qual 5 BA 3 Diploma in teaching 2 Graduate Diploma in 3 in training
20. Milburn et al. (2015)	RCT	Workshop and coaching	Literacy	6 months	31 teachers and 121 children	No Info
21. Piasta et al. (2015)	Quasi experimental	Workshops and video	Maths and Science	18 months	Mixed Early Childhood Centres	31% Non-grad 55% Degree 13% Masters
22. Podhajski and Nathan (2005)	Experimental	Workshop and mentoring	Literacy	2-day workshop, 6 monthly 45 min	Mixed childcare providers incl home-based	45% non-teaching qual 55% Degree+teaching qual

				mentoring visits		
23. Porche, Pallante and Snow (2012)	Experimental	Workshop + coaching	Literacy (CLLIP)	1 year	124 kindergarten, 148 Grade 4	Kindergarten and Elementary teachers
24. Powell et al. (2010)	RCT	Literacy coaching	Early literacy	36 hours	749 children (experimental and control groups)	Teachers 2 and 4 year degree plus
25. Sarama et al. (2008)	RCT	Distance learning, in-class coaching	Maths. (TRIAD)	1 year	25 teachers 209 children	Pre-K Teachers
26. Swaminathan et al. (2014)	Evaluation; pre-post test	Workshops, reflective shared learning	School readiness, Language & Cogn. Develop.	10 months, 15 hours	No info	Mixed assoc. degree

Having made some general observations about the literature, and provided descriptive detail on the included studies we move on to address our research questions.

What evidence is there of impact of professional learning approaches for improving outcomes for children in EYE? Which approaches are more and less impactful?

The majority of studies considered which reported positive outcomes for children, used a combination of PDL approaches, which at a general level is best described as *input and follow up*. Input included face-to-face workshops and/or on-line tutoring. Follow up was predominantly coaching, mentoring (with little distinction made between these) and/or tutor feedback. The preponderance of coaching as an approach to PDL is perhaps not surprising. This finding corroborates evidence from the wider literature regarding the efficacy of coaching as a professional development tool. Coaching, defined as a 'process of equipping people with the tools, knowledge, and opportunities they need to develop themselves and become more effective' (Peterson and Hicks, 1996; as cited by Feldman and Lankau, 2005, p. 841), is now widely adopted in a number of countries (including England, USA, Canada and Australia) as a way of achieving and enhancing professional learning and building capacity for more effective goal attainment, change management and improved educational outcomes (van Nieuwerburgh, 2012). Coaching has been shown to be effective in helping educators enhance their skills and develop new habits, as well as apply theoretical learning to workplace practice (Creasy and Paterson, 2005; van Nieuwerburgh, 2012), and is considered to be effective because it supports professional development, practice sustainability and continuous improvement (Creasy and Paterson, 2005, p. 5). What's more, evidence from randomised controlled trials suggest that compared to other forms of practice support, such as one-off workshops, the active steps involved in coaching, such as goal-setting, action planning and ongoing assessment and support (e.g. Goff et al., 2014), appear to be more likely to help educators overcome challenges, stay motivated and stay on track as they pursue goals.

It is not, however, only the *type* of PDL that is important in contributing to positive impact on children's learning. How long (duration), how often (frequency) and how much support (intensity) appear also to be significant. From the studies we considered, it is not possible to say precisely how much or little is optimally effective as not all studies gave sufficient detail on this and there was much variation between studies in terms of these parameters (see table 6). Consulting the wider literature, there seems little agreement on this aspect. For example, in a study of coaching duration and its impact on outcomes, Shidler (2009) reported that more time is not always better. Rather it is the type and quality of interaction between coaches and practitioners that becomes a deciding factor in efficacy of coaching. A systematic review of PDL and student literacy outcomes conducted by Basma and Savage (2017) reported that less rather than more than 30 hours of PDL appeared to be effective at raising literacy standards. Similarly, however they note that the quality of the PDL is significant and longer PDL may take longer to impact on practices and outcomes.

However, one study included in the review provided some convincing evidence on duration. The *Exceptional Coaching for Language and Literacy* (ExCELL) intervention (reported in Hindman, and Wasik; 2012), implemented in Head Start preschool settings for disadvantaged children examined whether 2 years of the ExCELL coaching programme is linked to greater gains for teachers and children, than 1 year of coaching. The authors report that whilst 1 year of ExCELL coaching is linked to

gains in the quality of teachers' classroom environments and instructional interactions, which in turn promote gains in children's vocabulary, alphabet, and phonemic awareness skills, *a second year of coaching is uniquely predictive of additional growth in teachers' instructional interaction quality and in children's vocabulary gains* (2012; p.151). A second factor stemming from this study, especially pertinent to this review is the relationship between coaching and content or new knowledge. The authors note that coaching focused on the quality of the environment (e.g. availability and use of books, writing materials, and print) may be easily understood and quickly translated into new practices by teachers. On the other hand, changing instructional interactions around these tools (e.g. using rich vocabulary, asking open-ended questions, and providing precise feedback) may 'challenge teachers to alter culturally embedded and sometimes automatic patterns of communication and conversation, thus requiring more time for training and reflection' (2012: p.134). This reflects also findings from McLachlan and Arrow (2014) who reported that change in beliefs and practices takes longer, but additionally highlights the need for reflection and feedback during that time. For the purposes of the current review, it is valuable to understand who might benefit most from a longer period of coaching and why. Hindman and Wasik (2012) offer three possibilities:

- teachers who initially demonstrate lower-quality classroom literacy environments or instructional interactions might benefit more from a second year of coaching;
- teachers with higher initial skills might be better placed to take better advantage of coaching and thus widen the gap further with their less-skilled peers over 2 years i.e. the so-called Matthew effect;
- the individualised nature of coaching would allow mentors to start with the professional's specific knowledge and skill level. This might reduce initial individual differences (adapted 2012, p.134).

Although this study was conducted in the USA the workforce diversity and composition bear striking similarities with that of the UK. We can see how targeting coaching resources on the least well qualified and skilled would be most beneficial since it could be tailored to meet individual levels of knowledge and skill, rather as in the apprentice model i.e. experts modelling and scaffolding learning. Other papers return similar findings in support of coaching models, which include EY practitioners with a range of qualifications. Future research might focus on the role played by duration, frequency and intensity in achieving impact from professional learning approaches, particularly in a climate of both financial austerity and an urgent need to find solutions to the skills gap in the EYE workforce.

What are the features of and the theory of action underpinning effective professional learning approaches in EYE?

From examining the above it seems clear that the most effective approaches to PDL are those that marry knowledge with reflection and interaction. That is, they begin by providing new knowledge that can be used as the basis for potential improvements in EY educator's practice. Often such knowledge is research-based but in all cases must be accessible such that practitioners will be able to both understand it and relate it to their current practice and context. But in the most effective interventions practitioners are also supported to develop their practice in light of this knowledge and to gain hands on experience by trialling new approaches in context. Typically, a coach is able to

assist practitioners through the use of feedback and critical reflection to identify how to rectify shortcomings or to enhance how the approach may be further improved. But peer-to-peer support can act in similar ways to help practitioners understand how to refine and apply the approach in question. As such it would seem the most effective approaches appear to work because they cohere with social constructivist models of effective learning.

What types of professional learning opportunities are available to EYE practitioners and who provides them?

We have been unable to find reliable information about the types of PDL currently on offer to the EYE in the UK, and it is as a result difficult to comment on whether or not it might be currently benefiting children's learning. In the absence of research into this area, we consulted with members of our advisory group. Anecdotally at least, PDL in the UK is delivered by a wide range of providers and facilitators including academics from higher education institutions, Local Authorities, private consultants who may have previously been teachers and head-teachers, private companies who have developed a particular product or approach, colleagues in settings and schools and increasingly via social media. Moreover, PDL appears to be a very mixed offer of one-off workshops, conference days, lectures, staff meetings or bespoke university-led programmes, though evidence from our scoping work for this review suggests that the latter is much less common for non-graduate EYE workers with take up typically from graduates. Of all practitioner groups, it would seem that home-based child-minders are the least well served with PDL opportunities. Members of our advisory group report that in a climate of limited resources, priority is increasingly given to operational and regulatory training around first aid, health and safety and child protection procedures. It highlights for us a concern that we simply do not have reliable data on the types of PDL already on offer to the sector and the prevalent modes of delivery. This prompts some important questions:

- What impact if any is PDL having on improving outcomes for children?
- To what extent are PDL opportunities in the EYE informed by the best available research evidence?
- Is PDL in the EYE of acceptable quality?

There is currently no reliable way of answering these questions and of quality assuring PDL in the EYE sector in the UK, other than that which individual schools and settings undertake themselves. This is an area for future research and sector debate.

5. CONCLUSIONS AND IMPLICATIONS FOR POLICY AND PRACTICE

When we set out to undertake this review it was on the assumption that it would be a first step in understanding how PDL impacts on children in the early years sector. Our aim is to build on the findings presented here in order to pursue further research and work with the sector to develop evidence-based guidelines for best practice in PDL for setting leaders and policy makers. Our review has brought together evidence on the impact of PDL interventions on children's outcomes. Following a rigorous and systematic screening of over 1000 studies we found only 26 that met our criteria and the requirements of our quality assessment protocol. Of the 26 papers we considered in our final included set, we were surprised to find that none were conducted in the UK. There are a number of ways we can interpret this interesting finding. First, evidence-informed practice, although now firmly embedded in policy and practice in

the 5-18 school sector, is relatively new in relation to EYE in the UK. Several influential reports of PDL have been undertaken but none considered interventions in EYE or the specific challenges facing the EYE sector. Secondly, EYE has only relatively recently come into the centre of policy and received the attention it now benefits from. The research effort in EYE provision in the UK is increasingly achieved through dedicated funding calls from organisations such as the Education Endowment Foundation and indeed, the Nuffield Foundation who funded the review reported here. All this is to the good and will enable the EYE sector in the UK to be informed by a stronger evidence base. Of the 26 interventions we considered, all but two were conducted in the USA. All were funded by individual state or federal government funding calls, as part of the national strategy to address educational disadvantage. We are mindful about placing too much emphasis on findings gathered in a different national and/or cultural context. That said, although there is much variation in the ways in which early education is provided here in the four countries of the UK, we have much in common with the USA in regard to the current demand for expansion of provision, a skills shortage in the early childhood sector and a policy drive for children to be 'school ready' and the nature and shape of the EYE curriculum. Thus in the absence of studies conducted in the UK context, we have asked throughout the review process: what can we learn from interventions applied in the USA and elsewhere?

Our primary focus in this review is on the forms of PDL interventions that have impact on both educators and children. There are important links between the type of intervention programme on the one hand, and how the workforce is conceptualised by policy-makers, administrators/leaders and parents in terms of its standing, professional status and type of learner. The low status, pay and conditions of the EY workforce is noted in several reports including Kalitowski (2015) so it is important that work is undertaken to examine this, to challenge negative and misinformed perceptions about the nature of work with young children that supports the EYE workforce in its development as a profession. The *professionalisation* of the early years/early childhood workforce internationally in recent decades, to some extent marks a 'coming of age' of the profession, and provides an important context for this review. The significant descriptive and qualitative literature on the concepts of professionalism, professional development/learning, leadership, qualifications and competency, relating to the early years field, testifies also to the widespread and enduring interest in the topic and related challenges, within the field. Noteworthy is that relative to this large body of (mainly) qualitative and conceptual studies in the field, the number of studies we have identified, which met our criteria and evaluated the impact of PDL on outcomes for children is strikingly low at 26. A further general observation commented on in the broad literature and in anecdotal accounts from our review advisory group is that professional learning experiences for EY educators are frequently short term, delivered in one-day workshops with little if any follow up and that this likely to increase as resources are further constrained. Delivery methods tend to be in the form of 'expert' lectures, conference presentations, possibly with some group work but with limited opportunities to share with colleagues and relate to practice. Research on adult learning (Dunst et al., 2010), and studies of professional development conducted in the 5-18 school sector (Cordingley et al., 2014), note that passive instruction and one off lectures/workshops may be a useful and an efficient, cost-effective way to impart factual information about regulatory requirements such as health and safety, but that genuine changes in professional practice are unlikely to come about through such methods of delivery and require a different approach. When adult instruction is limited to passive learning methods, there appears to be poor

transfer of skills from professional development to classroom practice (Tillery et al., 2010).

The present review was developed in recognition of the fact that there had not been a systematic review of evidence to identify the types of PDL that were most effective in improving outcomes for children and was timely because it reflects the pressing need in a rapidly expanding sector to seek ways to improve the skills level of the EY workforce and support the move to raise quality in EYE provision. The focus of research in the field of PDL in EYE is overwhelmingly on the development of EY educators rather than on children. While it is likely that change in educator's practice is will have positive benefits for children, the aim of the current review is to seek evidence of the impact of PDL on children's learning and development. One outcome of this review is to argue strongly for a greater emphasis on the impact of PDL on children's learning and developmental outcomes. This shift in focus need not exclude the possibility of seeking ways to positively enhance the development of practitioners. Indeed in all of our included studies, practitioners' and children's development were inextricably linked. PDL as a means by which to achieve specific outcomes in teaching quality, particularly in relation to improving children's basic skills in literacy, language and mathematics may appear to be underpinned by accountability to school, district (in the USA) and national agendas for driving up educational standards following. However, we do not see these perspectives as mutually exclusive. Rather we have come to the view based on the review evidence that it is possible to achieve positive impact on children's outcomes and at the same time offer a rich and professionally rewarding experience for EYE workers. From the review evidence we summarise our findings:

1. ***Reflection, feedback and follow-up matter***

PDL programmes that provide opportunities for reflection, peer group discussion and regular feedback on learning and performance appear to be effective at changing practice and improving outcomes for children. From our evidence some element of coaching appears to be an effective way in which to achieve this. However, important to note that the focus of the coaching, i.e. implementation of a curricular programme or pedagogical approach, is equally important. This finding further supports research which suggests that programmes that are overly directive and lack follow-up have little lasting impact on participant learning and subsequently on children's outcomes. Such passive learning approaches may have a place in delivering essential operational and regulatory procedures to staff, but it seems important to distinguish between professional development for this purpose, and deeper level learning programmes that are aimed at changing professional practice and improving outcomes for children.

2. ***Research-based interventions related to real world contexts are linked to improving practice and outcomes for children.***

Research-based interventions introducing new learning about children's development and learning, or content and pedagogical knowledge appear to be linked to positive outcomes for children particularly when they are linked to practitioners' professional contexts. Research findings that are presented in ways that are accessible and encourage participants to try out new pedagogical approaches or new content in their settings appear to be effective and engender long-lasting change to practice. Using research evidence in this way requires that PDL

programmes are presented incrementally, at relatively frequent intervals, over time to allow for revisiting concepts and learning new pedagogical strategies, knowledge and skills.

3. ***Combining research-based knowledge with knowledge of setting contexts supported by a coaching model of PDL appear to impact most positively on children's learning outcomes***

Programmes that combine new knowledge and content (from research) with knowledge gained from the participants' own specific setting context appear to be most effective at achieving change to practice and positive impact on children's learning. The consistent message from the studies we reviewed is that PDL programmes works best when they start with the current understanding of EYE professionals and combine this with new knowledge. When combined with frequent coaching styles of support and peer-to-peer feedback there appears to be greater impact on children's outcomes. This is perhaps not surprising as coaching is, by definition, an effective way of tailoring learning to individual needs. Moreover, this may be of particular relevance to the EYE workforce, which includes a diverse workforce with wide ranging skills and qualification levels. Our review evidence on the diverse nature of the EYE workforce, attrition and staff turnover rates, suggests the need for a more bespoke and responsive approach to PDL.

4. ***Duration, frequency and intensity of PDL are important factors in achieving impact on outcomes for children***

We have already noted that the type of one-off workshops common to much PDL is widely regarded as ineffective at impacting on deep level learning and impact on practice and outcomes. Duration (how long is the intervention?), frequency (how often does the PDL occur?) and intensity (how long are individual sessions and what do they consist of?) of PDL are, then, clearly important factors in determining which approaches are most effective but there is little agreement in the literature and it has emerged as a key area for further research. More complex still is frequency and intensity of PDL and again, we found wide variation in our final set of studies. More work is needed to understand this aspect and how best to achieve impact from PDL programmes, particularly when the EYE sector is constrained in terms of financial resource and time.

5. ***Key stakeholders in the EYE sector should work together to develop a set of agreed guidelines or minimum standards for the quality assurance of PDL programmes***

The review process, including our engagement with our advisory group, has led us to the general conclusion that:

A desirable and responsible approach to the funding of EYE professional development and learning is that it should first and foremost benefit children, by enhancing individual educators' skills and knowledge in ways that are long lasting, sustainable, and which help to build the learning capital of an organisation and community of practice.

Members of our review advisory group report that in a climate of limited resources, priority is increasingly given to operational and regulatory training around first aid, health and safety and child protection procedures. It highlights for us a concern that we simply do not have reliable data on the types of PDL already on offer to the sector, the modes of delivery, what impact if any it is having on improving outcomes for children and whether or not it is evidence-informed and of acceptable quality.

Significant improvements in quality of provision have been reported in recent years, particularly in the maintained sector, though according to research, that appears to be the result of an increase in graduate-led provision (Mathers and Smees, 2014). In the absence of reliable information, there is currently no reliable way to quality assure PDL in the EYE sector against and evidence-based benchmark of what works. Our evidence accords with a study of PDL in the 5-18 school sector conducted by Cordingley et al., (2015) and on that basis we recommend that EYE settings and schools make use of facilitators of PDL who can:

- translate the best available research evidence into actions for practice/pedagogy;
- engage participants in critical reflection and group work with peers;
- draw on individual and setting contextual information and the current level of understanding of the participants;
- consider providing coaching to enhance the application of new learning;
- support participants to think about how the PDL relates to the children in their setting; and
- build in time for planning and feedback back in participant settings.

The present review has identified intensive coaching models as a potentially important approach to improving children's outcomes as long as it is coupled with a clear content focus and linked to practitioners' setting contexts and experience. Coaching from more expert peers provides a responsive approach for a diverse workforce with wide variation in skills, knowledge and qualification. Further work is needed on identifying the optimum duration, frequency and intensity to maximise limited resources available to support PDL. In the longer term, we recommend that the EYE sector (including schools), might work with Local Authorities, Teaching School Alliances and/or government to develop a set of agreed guidelines or minimum standards for the quality assurance of PDL, its pedagogy and the mode of delivery appropriate to the type of learning and content delivery required.

6. Develop a strategy for investment in evidence-informed professional development and learning in EYE

The recent government EYE workforce strategy (DfE, 2017) has been a welcome addition to the debate about how best to support skills development but we do not think it goes far enough. What is needed now is a strategy for professional learning and development as a complementary route to improving quality to the qualifications route. Our evidence suggests that it is possible to produce tangible gains in children's learning through PDL, which can also meet the diverse needs of the EYE workforce. A government strategy for EYE PDL would facilitate debate and clear direction for developing PDL programmes that are based on sound evidence of high quality PDL with the best possible chance of improving outcomes for children. None of the interventions we considered offered an economic evaluation. This might be one possible avenue to pursue in future research to ensure cost effectiveness. But we would argue that it is highly likely that schools and EYE settings are already investing funds in PDL opportunities that do not have demonstrable gains for children.

On the basis of our findings, we concur with the report by Kalitowski, (2015) (also a member of the advisory group), who proposes that there is a need for a workforce strategy that sets out a clear plan to reward and motivate existing practitioners to stay in the profession and progress their careers. Scotland and Wales are already doing

this, as are other countries and professions. In this new, more professional era of childcare and early education, more attention is required on the part of setting and school leaders and policy-makers, to help overcome the barriers to high quality PDL described earlier in this report by improving access to evidence-informed PDL programmes. Furthermore, three core components are necessary to provide the highest quality care and education possible for children and their families:

- the commitment of childcare professionals to continuously improve (both to benefit the children in their care and to progress their careers)
- access to the affordable, flexible PDL that childcare professionals need to do so; and
- this commitment being recognised, with PDL and higher qualifications leading to better pay and opportunities within the sector and beyond.

7. Develop and evaluate sector-wide EYE PDL intervention

The evidence from our review is clear that PDL programmes that are based on the best available research evidence, include curricular content as well as pedagogical and procedural knowledge, embedded in real contexts, and that provide opportunities for reflection, feedback through coaching and peer group discussion are highly effective at improving educator skills at all levels of qualification, *and* are most effective at improving outcomes for children. Many of the studies we reviewed from the USA were in the form of randomised controlled trials and evaluations of state-funded programmes. In the UK there have been few recent examples of evidence-informed PDL interventions, which might be taken to scale and evaluated with the intention of developing an effective programme for the sector. Building on the findings from this review, our intention is to work with our advisory group members to develop a research proposal for an EYE PDL intervention and evaluation project, which takes into account the types of professional learning that seem to be most effective at improving outcomes for children.

Finally, we strongly recommend that investment in developing high quality PDL opportunities in EYE should be a priority, alongside the qualifications route. Although we recognise that further work is need to fully understand which types of PDL have the greatest impact and are cost effective, the review provides useful evidence to show that certain types of PDL can help to improve the quality of pedagogical interactions between adults and young children and enhance subject knowledge, which in turn can significantly benefit, children's developmental and learning outcomes. The potential benefits of this to children's school readiness and social-emotional development seem clear. We suggest also that the EYE sector and schools might seek ways to bring together professionals from different settings to allow greater sharing of expertise and practice, to find ways to redeploy and hence grow the learning capital acquired by educators through PDL programmes, across organisations and clusters of settings. However, arguably the most important factor in ensuring that the positive benefits of PDL programmes have long lasting and sustainable impact is the full commitment and on-going support of school and setting leaders, and ultimately that of policy-makers and government.

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