

Early childhood care: working conditions, training and quality of services – A systematic review



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Contents

Executive summary	1
Introduction	5
1. Methods: mapping exercise and in-depth review	11
2. Mapping results: description of studies	17
3. Results: impact studies	35
4. Results: views studies	43
5. Conclusions and implications	57
References	63
Annex 1: Tables relating to Chapter 3	73

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Executive summary

Introduction

The focus of this report is on the impact of the working conditions and continuous professional development (CPD) of the workforce in the field of early childhood education and care (ECEC) on the quality of the services provided and, in particular, on the outcomes for children. The report reviews research evidence from all 28 EU Member States, including both English and non-English language studies. The aim is to identify how the training and development of ECEC workers who operate in a range of settings might be tailored to most effectively improve the quality of the care and education services available for children below primary-school age in EU Member States.

This report adopted the systematic review methodology elaborated by the EPPI-Centre at the Institute of Education, University of London, for informing evidence-based policies. The review establishes what are known to be, on the basis of available research evidence, the links between CPD interventions, working conditions and outcomes for children. In so doing, it aims to inform policymakers' decisions on effective strategies for sustaining the quality of ECEC through investment in its workforce.

Policy context

In the quest for high-quality services, recent EU and OECD policy documents highlight that improving the working conditions and enhancing the professional development of the ECEC workforce are critical in meeting the dual challenge of providing equitable access to services while also improving the quality of provision.

The European Council conclusions on early childhood education and care from May 2011 notes that provision can be improved by 'supporting the professionalisation of ECEC staff, with an emphasis on the development of their competences, qualifications and working conditions, and enhancing the prestige of the profession'. The 2006 European Commission communication on efficiency and equity in European education and training systems points out the long-term returns of early childhood education and states that 'the supply of specially trained pre-primary teachers will need to be improved in many countries'. The European Quality Framework on ECEC includes two statements focusing on the role played by the ECEC workforce in raising the educational quality of services for young children and improving children's outcomes. Similarly, the OECD Quality Toolbox focuses on working conditions and in-service training and reviews the evidence available linking these two elements with outcomes for children.

Key findings

Evidence on the benefits of CPD

In general it can be concluded that CPD interventions that are integrated into the ECEC centre's practice with a focus on reflection that leads to changes in practice and curricula (feedback component) are effective. For short-term training, intensive intervention with a video feedback component has been found effective in fostering practitioners' competences in care-giving and language stimulation; regarding children's short-term outcomes, there were significant gains in terms of language acquisition and cognitive development.

Long-term CPD interventions integrated into practice, such as pedagogical guidance and coaching in reflection groups, have been proved effective in very different contexts – in countries with a well-established system of ECEC provisions and a high level of qualification requirements for the practitioners, but also as in countries with poorly subsidised ECEC systems and low qualification requirements. Thus, independent of the kind of ECEC system, long-term pedagogical support to staff by specialised coaches or counsellors in reflection groups was found effective in enhancing the quality of ECEC services, as well as in improving children's cognitive and social development.

The impact of CPD interventions on staff–child interactions and outcomes for children might be explained – to a certain extent – by the positive effects that training and its follow-up activities have on practitioners’ knowledge, practice and understanding. In particular, long-term CPD initiatives that build upon practitioners’ needs and participation are found to be successful in increasing the pedagogical awareness and professional understanding of ECEC staff. By enhancing practitioners’ reflectivity both at individual and at team level, CPD activities allow ECEC professionals to strengthen their capacities and address areas for improvement in everyday practices. CPD interventions can redirect the practitioners’ role towards active listening, and can develop a learning orientation towards play discovery and an appreciation of the learning gains for children’s spontaneity, curiosity and inventiveness.

Participation in CPD initiatives sustains practitioners’ competence in developing, implementing and evaluating ECEC curricula or pedagogical frameworks starting from the needs of the children they are working with. This, in turn, might nurture children’s learning more effectively.

In addition, engaging in participatory CPD activities within highly socioculturally diverse ECEC contexts can lead practitioners to reconceptualise their role in parental involvement and to develop more responsive educational strategies. These include, for example, a more welcoming approach that enables parents to engage in a reciprocal dialogue with practitioners and to participate in educational decision-making processes in early childhood settings.

Evidence on the impact of working conditions

Only five studies rated as reliable found that, broadly speaking, staff–child ratio and class size have positive effects on the quality of practitioners’ practices and on staff–child interaction. However, the studies adopted different measurements of staff–child ratio and class size and different tools to evaluate their effects on practitioners’ practice or their impact on staff–child interactions and children’s outcomes. There must, therefore, be concerns about comparability of outcome measures across countries.

Policy pointers

The evidence points to critical factors in CPD intervention.

- CPD is best embedded in a coherent pedagogical framework or curriculum that builds upon research and addresses local needs.
- Practitioners should be actively involved in the process of improving educational practice within ECEC settings.
- CPD needs to be focused on practitioners learning in practice, in dialogue with colleagues and parents, which in turn implies that a mentor or coach should be available during staff’s non-contact hours.
- CPD interventions also require changes in working conditions, especially the availability of non-contact time.

Interventions based on research-based enquiry or action research can help staff reflect on their pedagogical practice and so improve it. Those based on documentation or action research can provide the structure to help focus more on children’s actual needs. Meanwhile, practice-based research can contribute to raising the quality of ECEC services through the dissemination and exchange of good practice, which in turn might help increase the status of ECEC in the eyes of the public and policymakers.

Intensive CPD programmes with a video feedback component proved to be effective for achieving short-term outcomes in fostering practitioners’ competences in care-giving and language stimulation, and regarding outcomes for children there were significant gains in terms of language acquisition and cognitive development. Long-term CPD initiatives

accompanied by pedagogical guidance and coaching in reflection groups proved to be effective for enhancing and sustaining the quality of ECEC services over long periods of time; evidence of impact on children's cognitive and social outcomes was also found. Different combinations of CPD delivery modes can be seen not in opposition but rather as complementary, serving different goals in different contexts.

Research on working conditions in Europe is mostly carried out within research designs that – albeit rigorous – might not necessary comply with the highest standards of systematic reviews: this is a concern that could be brought to the attention of policymakers and researchers when conducting future systematic reviews.

The further elaboration of systematic review procedures that address challenges and the feasibility of reviewing literature in multiple languages might be considered: the richness of research and pedagogical traditions displayed across European Member States definitely calls for increased attention to studies published in languages other than English.

Introduction

The focus of this report is research evidence from across Europe on the impact, on the quality of the services provided, of continuous professional development and working conditions of workers in early childhood education and care (ECEC). Two aspects of quality of service are of particular concern: the impact on staff–child interaction and the cognitive and social outcomes for children availing of services.

The report was commissioned as part of a larger project by the European Foundation for the Improvement of Living and Working Conditions (Eurofound). It sought to identify how the training and working conditions of ECEC workers might be tailored to most effectively improve the quality of services available for children below primary school age.

This report adopted the systematic review methodology elaborated by the EPPI-Centre for informing evidence-based policies and was carried out in the 28 EU Member States. The review establishes what are known to be, on the basis of available research evidence, the links between staff training and working conditions and outcomes for children. In so doing, it aims to inform policymakers' decisions on effective strategies for sustaining the quality of ECEC by investing in the workforce.

Improving ECEC services and outcomes for children

In response to recent demographic, economic and social challenges, ECEC has risen up the European policy agenda. Research has shown the beneficial effects of ECEC services for children, families and society at large. At the same time, ECEC quality and accessibility are crucial for laying the foundation of children's successful learning and for fostering social inclusion in contexts of increasing diversity (Bennett, 2012). However, despite the EU being a world leader in providing ECEC services, international reports have identified that more effort is needed to increase quality and accessibility of provision across Member States (NESSE, 2009). For example, the Third European Quality of Life Survey (Eurofound, 2012), found that for just over a quarter (27%) of European citizens interviewed, local childcare services are of low quality, making their use problematic.

Nevertheless, the advantages of investing in high quality and accessible ECEC provision are being emphasised by international policies at EU level and beyond. In May 2011, the EU Council concluded that while considerable attention had been given to the quantity of ECEC places, high-quality ECEC was equally important (Council of the European Union, 2011). The European Commission's DG Education and Culture responded to these Council conclusions by setting up a Thematic Working Group on Early Childhood Education and Care. This initiative is set up within the context of the 'Strategic framework for European cooperation in education and training' (ET2020). The Thematic Working Group (a group of representatives of 26 EU Member States) developed a European Quality Framework on ECEC. They met eight times and the results of this Thematic Working Group were discussed by a group of ECEC stakeholders that aimed to create, support and facilitate the implementation of this European Quality Framework (EQF) throughout the Member States. The research evidence on the European Quality Framework on ECEC was presented at the EU Presidency conference in Athens in June 2014. The EQF consists of eight statements, two of which focus specifically on the role played by ECEC workforce in contributing to enhance pedagogical quality of services for young children and to improve children's outcomes. EQF's statements 3 and 4 on ECEC workforce encourage EU Member States to: a) develop comprehensive training programmes for all staff employed in these services (such as pre-school teachers, assistants, educators, family day carers); and b) provide supportive conditions that create opportunities for observation, reflection, planning, teamwork and cooperation with parents.

Beyond the EU context, professional development and working conditions in ECEC have increasingly been recognised as important determinants of quality by international policy organisations such as the OECD. Research briefs recently produced within the OECD quality project 'Encouraging Quality in Early Childhood Education and Care' highlight that staff working conditions and professional development are fundamental components of structural and process quality

that are linked to children's cognitive and non-cognitive attainment (OECD, 2012b, 2012c). Research findings on staff qualifications and professional development point out that better-educated staff are more likely to provide high-quality pedagogy and stimulating learning environments, which, in turn, foster children's development and lead to better learning outcomes (OECD, 2012b); however, inferences about causal links should be made with caution. In fact, results from the reviewed primary research studies show that there is no simple direct relationship between staff training and children's outcomes but rather that positive effects are the results of multiple factors, such as the design, content and delivery of the training (OECD, 2012b).

Similarly, international research on the impact of staff working conditions shows a clear link between the staff-to-child ratio, group size, wages and the quality of ECEC environment, which produces positive effects on children's outcomes (OECD, 2012c). At the same time, however, research findings stress the complex interplay between multiple aspects of working conditions and this makes it difficult to disentangle the effects of each particular characteristic (OECD, 2012c). In this sense, findings from the studies reviewed in the OECD research brief seem to point in different directions, highlighting that no single component of structural quality associated with working conditions has, on its own, a clear impact on children's outcomes.

It would appear that it is the combination of several components related to staff working conditions that, with a different balance in different contexts, improves the quality of ECEC services, and, in turn, leads to positive effects on children's attainments and well-being. Therefore, improvements in the quality of ECEC might require simultaneous actions across multiple structural characteristics, with an understanding of how each structural characteristic has an impact on quality within each system (European Commission Thematic Group on ECEC Quality, 2014).

Building on this body of research and on consultation with national stakeholders' representatives, the International Labour Organization published *Policy guidelines on the promotion of decent working conditions for early childhood education personnel* (ILO, 2014). By recognising the crucial role exercised by the early childhood workforce in achieving high-quality ECEC provision for all, the document underlines that a greater focus should be placed on improving the professional development, status and working conditions of these staff. As stressed in a recent research overview, the workforce is central to ECEC provision, as it accounts for the greater part of the total cost of early childhood services and is the major factor in determining children's experiences and their outcomes (Bennett and Moss, 2011). For this reason, how ECEC staff are recruited, trained and treated is critical for the quality of early childhood services and for the appropriate inclusion of all children.

To conclude, the EU and the OECD highlight that improving the working conditions and enhancing the professional development of the ECEC workforce are critical measures to meet the dual challenge of providing equitable access to services while also improving the quality of provision (Council of the European Union, 2011; OECD, 2012b, 2012c). However, while there is agreement about the need to improve working conditions for staff in the field and invest in their professional development, there is no consensus on how to achieve these goals.

Continuing professional development

There is strong evidence to suggest that better-educated staff are more likely to provide high-quality pedagogy and stimulating learning environments, which, in turn, foster children's development leading to better outcomes (Munton et al, 2002). However, the impact that the continuing professional development of staff has on the children in their care is less well understood. Ongoing professionalisation of staff is a key element in guaranteeing children's positive outcomes (Fukkink and Lont, 2007), but it seems clear from research evidence prior to this review that it is not professional development in itself that has an impact on children's outcomes.

Research gaps have been identified especially in relation to the design, content and delivery of professional development opportunities as well as their contribution in addressing the current challenges faced by ECEC services. For example, little is known about how various forms of professional development operate and interact to improve the quality of early childhood programmes and children's outcomes (Sheridan et al, 2009; Zaslow et al, 2010).

Working conditions

There is little international research on the impact of staff working conditions on children's learning outcomes. Furthermore, 'findings do not always point in the same directions' because the complex interplay of the features associated with working conditions makes it difficult to disentangle the effects of each particular characteristic (OECD, 2012c). Evidence from literature studies conducted prior to this review suggested that staff wages are an important factor in the quality of provision (Huntsman, 2008). Although findings are not totally consistent, it is also suggested that lowering child–adult ratios and reducing group size have a small but significant impact on the quality of interactions between staff and children (Munton et al, 2002; Huntsman, 2008) which in turn influence children's developmental outcomes (Love et al, 2003).

Other aspects of working conditions, such as non-financial benefits, teamwork, workload, manager's leadership and physical aspects of the setting/workplace, remain largely underexplored in the research literature (OECD, 2012c).

The role of research evidence

There is widespread agreement that efforts should be made to develop research evidence to inform policymaking in the educational field in Europe (Gough et al, 2011). The recommendations from the Evidence Informed Policy-making in Education in Europe (EIPEE) project suggest using more systematic research reviews to 'ensure complete, relevant, quality assured and accessible research evidence' (Gough et al, 2011, p. 10). Such evidence includes evaluation research about which interventions work, and which interventions might work, for whom and in which contexts: in complex social interventions, such as those acting on complex social systems, effectiveness of policy initiatives is crucially dependent on context and implementation (Pawson et al, 2005). It has also been argued that determining 'what works' by relying solely on the measurements of predefined outcomes might not necessarily provide the most valid form of evidence in the ECEC field (Vandenbroeck et al, 2012), where multiple stakeholders are involved in decision-making at several levels (policymakers, local administrators, practitioners, children, families and local communities).

Therefore, it is crucial that systematic literature reviews that aim to inform policy decision-making provide explanatory analysis indicating what works for whom, in what circumstances, in what respect and how (Pawson et al, 2005). For this reason, the domain of relevant research also includes qualitative studies of the opinions and experiences of practitioners themselves about their experience of CPD, or working conditions, and about policy initiatives and implementation programmes that attempt to address CPD and working conditions.

Existing systematic reviews

Whilst reviews have been conducted on research on the quality of ECEC and its relationship to child outcomes (Mitchell et al, 2008; Vandell and Wolfe, 2000), few have focused specifically on the impact of continuing professional development and staff working conditions (Huntsman, 2008; Munton et al 2002; Zaslow et al, 2010); fewer still have been systematic (Fukkink and Lont, 2007; Camilli et al, 2010).

Overall, the main limitations of the review evidence to date are that the evidence base in primary studies is limited and frequently not comparable.

First, most reviews to date rely on English-language sources only. This means that existing evidence in relation to the investigated topics is produced in contexts that are largely dominated by research agendas typical of English-speaking countries where ECEC provision is generally embedded in liberal welfare state systems (Esping-Andersen, 2002). The majority of existing reviews on the topics of staff training and working conditions in ECEC are from the US, Australia and New Zealand (Vandell and Wolfe, 2000; Huntsman, 2008; Mitchell et al, 2008; Zaslow et al, 2010; Camilli et al, 2010). Meanwhile, those from Europe (Fukkink and Lont, 2007; Munton et al, 2002) rely largely on research evidence produced in non-European countries. This means that the relevance of their findings for the European policy context might be very limited. This is mainly because EU Member States are characterised by well-established traditions in the provision of ECEC services which, in most cases, are embedded in publicly funded systems and build upon pedagogical approaches valuing children's rights and participation. Within such contexts, outcome-focused evaluations of ECEC programmes and targeted interventions, such as those typically found in English-speaking countries, are often considered inappropriate or undesirable (Penn, 2004). Furthermore, the fact that existing reviews have largely relied on searching English-language databases might imply that important findings from non-English language sources have been missed.

Second, the contexts within which primary research evidence are produced are historically marked by significant differences in the typology of ECEC settings and provision investigated, making comparison and generalisations problematic. Clear cross-country differences can be observed in, for example, staff training interventions and delivery and governmental regulations regarding staff working conditions (Munton et al, 2002).

This review: scope and methodology

This systematic review is explicitly European in orientation. It includes non-English language studies. It is comprehensive in scope, as it goes beyond 'childcare' to include both 'care' and 'education' in its conceptualisation. It identifies, as far as is possible from the evidence base, the mechanisms by which professional development, and working conditions, relate to children's outcomes (both cognitive and non-cognitive) as well as to children's learning and socialising experiences. Finally, the review covers all types of primary studies, whether quantitative or qualitative in methodology, as well those that employ mixed methods. The report is a systematic review of both of these types of evidence (quantitative and qualitative). It examines 'impact studies' which are designed to establish whether or not an intervention works, and 'views studies' which use qualitative and other types of methods to study the perspectives and experiences of the actors involved. By combining empirical evidence from both 'impact' and 'views' studies, the review aims to help decision-makers reach a deeper understanding of interventions linked to staff CPD and working conditions and how they can be made to work more effectively (Pawson et al, 2005).

A systematic review is a specialist review technique which employs standardised and explicit methods (Gough et al 2012; Petticrew and Roberts, 2008). These methods are employed to minimise the risk of drawing the wrong or misleading conclusion from a body of evidence and include searching exhaustively to find all relevant research, assessing the quality of the research and using rigorous techniques to synthesise findings.

When study findings are numerical, statistical meta-analysis can be used to synthesise findings. In a review of effectiveness, a statistical meta-analysis aggregates the effect sizes from individual trials (Lipsey and Wilson, 2001; Sutton et al, 2000). Methods for the synthesis of non-numerical findings or qualitative research are emerging and include meta-ethnography (Campbell et al, 2003), meta-study (Paterson and Canam, 2001) and thematic analysis (Thomas and Harden, 2008). These types of syntheses aim to understand the phenomenon under review from the perspectives of the people being studied and they produce new descriptions, theories or interpretations rather than aggregated effect sizes. Nevertheless it is possible to bring together the findings across a range of data through 'third-level synthesis' that juxtaposes results from controlled trials and qualitative studies by combining them in a matrix (Thomas et al, 2004).

European research traditions

As documented elsewhere (Urban et al, 2011b), ECEC research carried out within EU Member States in relation to the issues explored in this review refers predominantly to staff professionalisation and ongoing improvement of ECEC services by focusing on pedagogical approaches, educational processes and conceptual critiques. Research studies explicitly evaluating the impact of staff training and working conditions on children's outcomes are rarer in EU Member States.

Moreover, it is acknowledged that understandings of childhood, learning and development are deeply embedded within specific historical, cultural, geographic, economic and political contexts, and this also applies to the place of ECEC services within society, as well as the image and the status of those who work with young children (Moss, 2000; Oberhuemer, 2010). This is also reflected in the structure of the ECEC workforce, which takes different forms across EU Member States, depending on the ECEC systems within which services are embedded. Despite the considerable variations in terminology, which reflect the diversity of workforce profiles and ECEC systems across Europe, efforts were made, when establishing inclusion and exclusion criteria for the studies to be reviewed, to allow for the maximum representation of the different situations that are present in EU Member States.

Aims and research questions

The overarching aim of the review was to explore links between continuing professional development, working conditions, staff-child interactions (process quality) and children's outcomes and experiences.

The specific objective of the research was to achieve the following:

- document what constitutes more effective ECEC services and how investing in the ECEC workforce contributes towards improving quality;
- provide evidence about which features of staff working conditions and CPD have a positive impact on pedagogical quality, with a specific focus on children's outcomes and learning/socialising experiences.

The review addressed the following questions:

- Which features of CPD affect children (their outcomes/well-being) and staff-child interactions? Which forms are the most effective?
- Which features of working conditions affect children (their outcomes/well-being) and staff-child interactions? Which forms are the most effective?

The review conducted the following syntheses:

- of quantitative data concerning the impact of CPD and working conditions in ECEC on outcomes for children;
- of qualitative data describing ECEC workers' views and experiences of CPD and working conditions;
- of the above quantitative and qualitative data to assess the findings of the reviews in relation to one another.

As outlined above, the combined synthesis of evidence drawn from quantitative and qualitative research findings is appropriate to provide decision-makers with information that allows them to discern which interventions might work for whom and in which circumstances, in respect to complex social interventions such as those in focus in this review (Pawson et al, 2005).

Methods: mapping exercise and in-depth review 1

This chapter presents a brief summary of the methods of the review. Further details can be found in the annexes of this report, available on the Eurofound website.

Inclusion and exclusion criteria

To be considered for inclusion in this review, studies were required to meet pre-specified eligibility criteria. Studies were included if they were undertaken on formal ECEC provision in the 28 EU Member States and published after 1991, following the publication of *Quality in services for young children: A discussion paper* (Balaguer et al, 1992). The focus also had to be on ECEC professionals and children aged 0–7 years and studies were required to focus on at least one of the two key areas of the review:

- CPD and ECEC quality or children’s learning outcomes and experiences, including staff–child interactions;
- staff working conditions and ECEC quality or children’s learning outcomes and experiences, including staff–child interactions.

The eligibility criteria also specified that only primary empirical research, both quantitative and qualitative, would be included, such as evaluation studies that measured impact or views studies reporting perceptions of participants through interview, where views are presented as data – for example, in the form of direct quotes from participants or description of findings.

Quality of ECEC was not included in the criteria initially set out in the protocol. The senior researchers who knew the literature on CPD and working conditions in Europe feared that there were not enough studies in Europe published on the relation between CPD, working conditions and child outcomes or staff–child interaction. Whereas evaluation studies examining the impact of ECEC interventions on child outcomes and staff–child interaction might be more common in English-speaking countries outside the EU (such as the United States and Australia), European literature tends to investigate the effects of CPD and working conditions within a broader perspective. Such a perspective would focus on the effects of CPD and working conditions on ECEC quality and its associated features, among which practitioners’ competence (knowledge, practices and understandings) would be an important component. As the relation between ECEC quality and child outcomes is acknowledged and widely accepted in international research in this field, the core team decided to add quality as a reported outcome.

Identifying English-language studies

Searches were conducted using a two-pronged approach, with the core team conducting searches for English-only studies and the national experts searching for non-English studies. The core team identified relevant key terms and organised searches using comprehensive search strings on nine international electronic bibliographic databases. The results were uploaded into the software EPPI-Reviewer for screening (Thomas et al, 2010).

The second approach was a more focused search conducted by national experts in all 28 EU Member States in their respective native languages using relevant translated key terms; more details on this process are described below. Relevant databases and specialist websites were also searched to capture as many potentially relevant studies as possible. Non-indexed publications or grey literature were also sourced by the core team on European Commission websites (DG Education and Culture, DG Employment and DG Justice), on the Eurydice Database and on the website of the OECD/Directorate for Education and Skills (with particular reference to the materials produced by the Network on Early

Childhood Education and Care). Reference lists were also scanned for relevant studies. Full details of the search strategy and sources can be found in Annex 2.¹

Table 1: *Databases searched by core team*

International databases
ASSIA (Applied Social Science Index and Abstracts)
British Educational Index
Child Data
ERIC
IBSS (International Bibliography of the Social Sciences)
PsycInfo
SCOPUS
SSCI/Web of Knowledge
Sociological Abstracts
Specialist libraries
European Commission
EURYDICE
OECD

Identifying non-English language studies

Searches for the studies published in languages other than English were conducted by national experts in all 28 EU Member States, in collaboration with the members of the core team. The core team prepared detailed guidelines for the national experts outlining the search strategy, search terms and the main objective of the current review. National experts were asked to translate the search terms into their native languages by producing a glossary of key terms. Where necessary, the core team followed up with emails and Skype calls to ensure that all involved understood the search process. National experts conducted searches in national databases, including national libraries and university catalogues, and institutional websites searching for grey literature. National experts also conducted manual searches of journals or scientific reports where database searches returned no results, or where no relevant databases were identified. Each national expert was required to deliver to the core team a country report including four sections:

1. the glossary of key terms used for combined searches;
2. a detailed list of search sources;²
3. a list that accurately reported the output of searches;³

¹ Annexes 2–9 are published separately as *Early childhood care: working conditions, training and quality of services – A systematic review – Annexes 2–9*.

² More specifically, national experts were required to compile a list of the search sources under three sub-sections: national databases, institutional websites publishing research reports and grey literature, and academic journals.

³ National experts were required to provide for each source reported in the output section the full reference of the article/report and the translation of title and abstract into English.

4. a final section reporting experts' remarks in relation to the state of the art in their country concerning the topic of the systematic review and its place in the national policy debate.⁴

National experts applied the same eligibility criteria to screen non-English studies using Excel sheets provided by core team researchers and all the titles and abstracts of potentially relevant studies translated into English were uploaded into EPPI-Reviewer. Members of the core team then double-screened these to verify their inclusion. In both approaches, where two researchers could not agree on the inclusion or exclusion of a study, the matter was referred to the wider team for discussion and a consensus reached.

From mapping to in-depth review

All studies meeting the eligibility criteria were mapped to capture descriptive details such as study population, aims, study design, outcomes reported and themes arising from the qualitative studies. This process enabled the team to familiarise themselves with the included studies and further refine the inclusion criteria for the in-depth review. The mapping exercise identified a number of quantitative studies that did not measure the impact of CPD and working conditions and these were subsequently excluded from the review at this point. To be included in the in-depth review, views studies had to examine professionals' views on CPD and/or working conditions and elicit views about their impact on quality and child outcomes.

Data extraction

Data extraction of studies meeting the eligibility criteria was carried out using a framework specifically developed for this review. The framework was used to extract information from each study including descriptive details of the working conditions or CPD studied, study aims and rationale, population studied, methods of sampling, recruitment, data collection and analysis. For qualitative studies, participants' quotes were also extracted, followed by, and distinguished from, authors' descriptions and analyses of participants' views. The framework was applied to English-language studies by the core team using the software EPPI-Reviewer 4, while the national experts conducted data extraction on non-English studies using the same framework, but in Excel.

National experts carefully reviewed the full documents and compiled the Excel tables to resemble as closely as possible the structure of the data extraction framework used by the core team in EPPI-Reviewer 4. All the relevant information for each code available in the study was summarised by national experts and translated into English. In addition, up to two rounds of clarifications (by telephone, Skype and email) took place before the data extraction templates in Excel were finalised.

A summary of data extracted for the individual views studies is presented in Annexes 4–7. A summary of the characteristics and methodology of the impact studies is presented in Chapter 3.

Quality assessment

The procedures and criteria used for assessing methodological quality were adapted from existing tools used in other systematic reviews (Shepherd et al, 2010; Harden et al, 2004 and 2009) and can be found in Annexes 2 and 3. Methodological quality assessments were conducted as part of the overall data extraction process. Quantitative studies

⁴ These materials for each of the 28 EU Member States are available on request from Eurofound. It was not possible to include them in annexes due to their length. However, national experts' remarks in relation to the state of the art have been used for contextualising the findings of mapping results.

were independently assessed for risk of bias using a tool adapted from Shepherd et al (2010). Criteria included the assessment of:

- selection bias (refers to systematic differences between baseline characteristics of the groups that are compared);
- detection bias (refers to systematic differences between groups in how outcomes are determined);
- attrition bias (refers to systematic differences between groups in withdrawals from a study);
- selective reporting bias (refers to systematic differences between reported and unreported findings).

The quality and methodological rigour of views studies was assessed using a tool developed at the EPPI-Centre (Harden et al, 2009), which considers whether the findings are grounded in the data and reflect study participants' views. Studies were assessed according to six criteria.

- Were steps taken to increase rigour in the sampling?
- Were steps taken to increase rigour in the data collected?
- Were steps taken to increase the rigour in the analysis of the data?
- Were the findings of the study grounded in or supported by the data?
- How would you rate the study's findings in terms of their breadth and depth?
- To what extent does the study privilege the perspectives and experiences of participants/ECEC professionals?

Studies were then rated in terms of usefulness and reliability. To be judged as high in the 'reliability' category, studies needed to answer at least 'several' or 'fairly' on all criteria.⁵ Studies judged high in terms of their 'usefulness' needed to be coded 'well-grounded' in criterion 4, 'good/ fair breadth and depth' or 'little depth' in criterion 5 and 'a lot' or 'somewhat' in criterion 6 (see description of quality assessment in Annexes 3 and 4 for more details).

Data synthesis

Quantitative synthesis

The core team decided that, considering the limited duration of the project and given the challenges in retrieving detailed data from the impact studies written in languages other than English, a meta-analysis was not possible. Therefore, the research team conducted a thematic summary of the impact studies' findings.

In addition, the findings of impact studies were synthesised by systematically relating the components of CPD interventions and working conditions studied to the outcome reported (ECEC quality, staff-child interactions and children's outcomes). This allowed identification of patterns in the components of CPD and working conditions that are most frequently associated with certain outcomes studied (quality of ECEC, staff-child interaction, or children's outcomes) and highlighted research gaps.

⁵ A. Yes, a (fairly) thorough attempt was made (specify) or B. Yes, several steps were taken (specify).

Qualitative synthesis

Methods for synthesis of views built on those developed by the EPPI-Centre (Harden et al, 2004; Thomas and Harden, 2008). Studies of participants' views were synthesised using framework synthesis (Barnett-Page and Thomas, 2009; Oliver et al, 2008) based on methods from primary qualitative research (Ritchie and Spencer, 2002).⁶ Verbatim quotes from study participants and author descriptions of findings were extracted from the 'Results' sections of included studies and organised into broad themes to capture the meanings of the data. Themes were grouped and condensed, where possible, to produce higher-order themes containing a set of more specific sub-themes (Thomas and Harden, 2008). Themes were used to address review questions and develop hypotheses about factors related to ECEC staff working conditions and professional development and the impact on quality, and outcomes for children.

⁵ Qualitative research produces large amounts of textual data in the form of transcripts, observational field notes, and so on. This poses a challenge for rigorous analysis. Framework synthesis offers a highly structured approach to organising and analysing data. It utilises an a priori framework – informed by background material and team discussions – to extract and synthesise findings (Barnett-Page and Thomas, 2009).

Mapping results: description of studies 2

Contextualisation of mapping results

The framing of the research question on effectiveness and impact had consequences for the inclusion of studies across all European research traditions. As noted, most non-English language studies in the field of ECEC institutions and workforces have their origins in paradigms of local pedagogical traditions and cultures of childhood rather than within an evidence-based paradigm assuming effectiveness of interventions at its core. While a rich body of scholarly research and grey literature exists in relation to the theoretical conceptualisation of CPD approaches, as well as in relation to the description of locally developed practices (Urban et al, 2011b), empirical studies aimed at systematically evaluating the effectiveness of CPD interventions are extremely rare in EU Member States. A six-country study carried out within the framework of the German WiFF initiative highlighted the lack of nationwide research and evaluation as a weakness of the CPD systems across countries (Oberhuemer, 2012).⁷ On the other hand, studies on the effectiveness of different structural quality components linked to staff working conditions might be more common in large-scale cross-national comparative evaluations rather than in within-country research, unless the implementation of specific policy interventions is to be evaluated.

Furthermore, the governance structure within which ECEC is provided might have an indirect effect on the available research. National experts who provided data from non-English speaking Member States also provided contextual material on the state of the art of research in their own country. From this material it emerges that in contexts where ECEC is provided within a split system (OECD, 2006) research on workforce issues tends to be carried out within an integrated framework for pre-primary and primary professionals, while the same issues are often neglected in relation to services for children under three years of age. There were consequences for the inclusion of certain studies in this review. For example, studies where the effects of training interventions could not be disentangled for each category of educational professional (pre- and primary teachers) had to be excluded from the mapping and in-depth review as they did not provide evidence about the targeted group of professionals (this aspect was particularly salient in the case of Spain and Italy). In addition, few studies focused on professionals working with children aged 0–3 years. In other cases, the lack of national frameworks orienting ECEC policies and research might have hindered the development of scholarly literature in this field, which tends to be limited and highly fragmented (as reported for example by the Austrian national expert).

More specifically, the analysis of country research reports revealed three main patterns.

Existing body of research: In some countries there is a copious body of literature on issues regarding ECEC staff professionalisation; however, empirical research is mostly designed within a pedagogical value-oriented framework and reported in the form of thick description of process rather than evaluating outcomes. France is the most striking example, followed by Denmark and Italy. This pattern is frequently associated with a scarce body of literature on staff working conditions, which might be due to the fact that in such systems ECEC provision is embedded in long-established public policies that tightly regulate working conditions and characteristics of structural quality. For example, the Slovenian national contribution states that research examining the effect of structural indicators on children's outcomes might be scarce, since public ECEC provision has to conform to binding legal requirements. And the Finnish national contribution highlights that research investigating the influence of staff working conditions on children's outcomes tends to be rare, as children's development is evaluated mostly in terms of well-being; in addition, a participatory/democratic approach to quality improvement, which engages staff, parents and children, is seen as more appropriate.

⁷ The nationwide initiative *Weiterbildungsinitiative Frühpädagogische Fachkräfte (WiFF)*, funded by the German Federal Ministry of Education and Research and the European Social Fund, examined the structures, content and quality of CPD in the early childhood sector across EU Member States. The findings draw on the cross-national analysis of six country case studies of CPD systems: Denmark, England, Hungary, Italy, Slovenia and Sweden.

Emerging body of research: There is a group of countries in which a growing body of research on ECEC quality, encompassing impact evaluations of staff professionalisation and working conditions, is gradually emerging as a consequence of recent policy focus and educational reforms. The Portuguese national contribution, for example, stresses that scholarly literature in the educational field has developed enormously in recent years as a result of investment in research, resulting in an increase in the number of doctorates and funded projects. In the case of Germany, major research initiatives focusing on issues of staff professionalisation and working conditions have been triggered by the current policy debate. After putting a great deal of effort into the quantitative expansion of ECEC provision, federal policies are now focusing on the issue of quality. Regional differences (for instance, with regard to staff–child ratios or ECEC management) present a major concern and have triggered debates and initiatives to advance nationwide quality standards and regulations.

Scarcity of research: In a number of countries, research on ECEC in general, and on CPD and working conditions in particular, is scarce due to a lack of public investment in the early childhood sector. National expert reports from Greece, Cyprus and Hungary all document this scarcity. Lack of research on these issues may also be motivated by the fact that countries are still facing a transition phase in establishing ECEC systems at national level (for instance, Latvia and Poland). Finally, in some countries scholarly literature grounded in empirical research is rare within the ECEC field in general and even more so in relation to staff professionalisation issues (Lithuania, the Czech Republic and Estonia).

These features of ECEC services and the variable level of ECEC research across EU Member States establish that findings from a review of the effectiveness of CPD and working conditions in relation to children’s outcomes are likely to be weighted toward countries with certain research and practice traditions. Moreover, in most countries research on services for very young children is underrepresented, and studies of family daycare from the perspective of CPD and working conditions are virtually non-existent.

Identification of relevant studies

Identification of relevant studies was carried out using two parallel processes: one for English-language sources and one for non-English sources. The search strategy for English sources identified a total of 24,961 records. Figure 1 describes the flow of these records through the two-stage screening process – Stage one based on information contained in the title and abstract and Stage two on the full text of the study. After removing 5,587 duplicate records, 19,452 records remained for screening.

Concerning English-language sources, screening at title and abstract was carried out on 13,670 sources (or 70% of the total) within the time scale of the review. Although not all records were screened, using an innovative functionality in the EPPI-Reviewer system called ‘priority screening’ (Miwa et al, 2014), which ‘pulls’ the relevant studies towards the beginning of the screening process and ‘pushes’ the irrelevant ones towards the end, the authors are confident that the majority of relevant records were identified and screened accordingly. Priority screening works through an iterative process, whereby the accuracy of the predictions made by the database is improved as screening progresses. When used in a review, it involves the reviewer screening a small number of studies manually; the machine then ‘learns’ from these decisions and generates a list of citations for the reviewer to look at next. This cycle continues, with the number of reviewer decisions growing, until a given stopping criterion is reached and the process ends.

The majority of studies were excluded at the title and abstract stage because they did not meet the focus of the study. That is, they were either not from an EU Member State or were not about CPD or working conditions and their impact on ECEC quality, staff–child interactions or children’s learning outcomes and experiences (n=7,920, 60%). A further 4,927 (36%) studies were excluded because the population studied were not ECEC professionals and/or children aged 0–7 years. At this stage, 294 studies were included for retrieval and full-text screening. Full reports were retrieved and

screened for 281 (96%) of the 294 citations identified at the title and abstract screening stage. Only 13 citations were unavailable and out of the 281 full texts screened 86% were excluded, of which nearly half were excluded because they did not meet the focus of the study. A total of 39 study reports were thus deemed relevant and included in the next stage of the review, the mapping exercise.

The search strategy among non-English sources available in the EU28 identified 1,551 records (Figure 1). No articles satisfying key search terms were identified in Luxembourg and Malta. Based on screening on the title and abstract (for which the same criteria were used as for the English-language sources), 173 studies (out of 1,551) were identified as potentially relevant for the review. At the title and abstract stage, no articles from Cyprus, Greece, the Czech Republic, Latvia or Estonia were further included into the screening process. A further 146 studies were excluded at the full-text screening stage because they did not satisfy inclusion criteria. In Austria, Bulgaria, France, Hungary, Lithuania, the Netherlands, Romania and Slovakia, no relevant articles were found at the full-text screening stage.⁸ As a result, 27 non-English articles from Belgium, Croatia, Denmark, Finland, Germany, Italy, Poland, Slovenia, Portugal, Spain and Sweden were included in the next stage of the review, the mapping exercise.

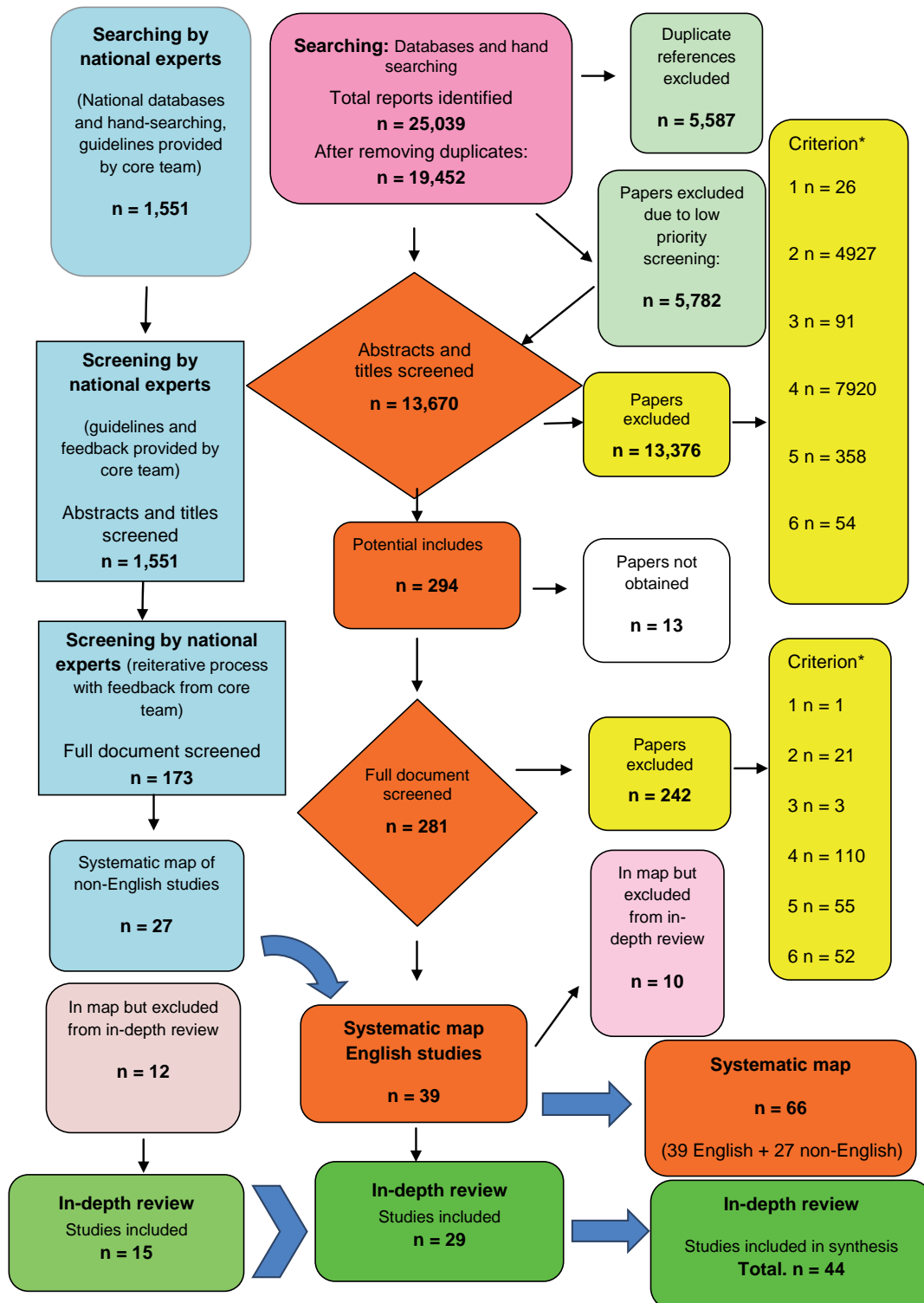
Quality appraisal was carried out by two reviewers on each study included in the map for both English language and non-English sources. Quantitative studies and qualitative studies were assessed according to different criteria in relation to their study design. Mixed-methods studies were split into quantitative and qualitative elements and each was assessed according to pertinent criteria. The quantitative part of mixed-methods studies was assessed against the criteria set for impact studies while the qualitative part was assessed against the criteria set for views studies. The quantitative studies were included if they were of the ‘controlled before-and-after study design’ type; this is ‘a study in which observations are made before and after the implementation of an intervention, both in a group that receives the intervention and in a control group that does not’ (Reeves et al, 2008, p. 13.2). Quantitative studies were also included if they were a randomised controlled trial (RCT); this is ‘a study in which people are allocated at random (by chance alone) to receive one of two or more interventions. One of these interventions is the standard of comparison or control’ (Oliver et al, 2010, p. vii). Randomisation is a technique that reduces the variation in effect size and is recommended for evaluating policy interventions (Oliver et al, 2010).

However, due to the low number of studies of working conditions, three studies were included that did not meet this threshold (they contained no control group) but were the most robust studies available and rated as sound despite discrepancies in terms of the quality criteria. These were studies that had large numbers of participants or were longitudinal in design. Studies not meeting these criteria were excluded from the in-depth synthesis, along with those judged ‘not sound’ according to the quality criteria discussed in the section on ‘Quality assessment’, above. Qualitative studies were each allocated a ‘weight of evidence’ with two dimensions rating the reliability and usefulness of reported findings. Views studies that were rated ‘low’ on both dimensions were excluded from in-depth review. More details about the quality appraisal can be found in the section on ‘Quality assessment’, above, and in Annexes 3 and 4.

Qualitative studies were each allocated a ‘weight of evidence’ with two dimensions rating the reliability and usefulness of reported findings. Views studies that were rated ‘low’ on both dimensions were excluded from in-depth review.

⁸ The screening process – both at title and abstract stage and at full-text stage – was carried out by country experts supervised by core team researchers. As this process was not carried out in EPPI-Reviewer4, Figure 1 reports only the outcome of this process (see left-hand column in the graph), without detailing the number of non-English language sources that were excluded for each criteria.

Figure 1: Flow diagram showing stages of selection of relevant sources for English and non-English language studies



Note: Criterion 1: Date (published after 1991);
 Criterion 2: Age group (0-7 years);
 Criterion 3: Intervention (ECEC);
 Criterion 4: Focus/aim of study (CPD and/or working conditions);
 Criterion 5: Types of studies;
 Criterion 6: Geographical coverage (EU).

Characteristics of included studies

Full reports of relevant studies published in English were retrieved and coded in EPPI-R4 based on and adapted from a standardised tool in turn based on a key wording system developed by the EPPI-Centre (Peersman and Oliver, 1997). In a similar way, full reports of relevant studies published in languages other than English were retrieved by country experts and coded in English by compiling Excel tables provided by the core team and using the same codes as those used for mapping in EPPI. In total, 66 studies were included in the systematic map: 39 (59%) were published in English and 27 (41%) were published in languages other than English.

Based on information contained in the full text of the study reports, studies were classified according to the following: study type and design; country in which the study was conducted; the focus of the intervention (CPD or working conditions, research participants, the early years provision setting). Impact studies were also classified according to the type of training intervention and working conditions investigated in relation to the outcomes measured. Views studies were classified according to the type of CPD or working conditions studied in relation to the perceived effects on practitioners' knowledge, practices, understandings and on staff–child interactions as well as on observed children's learning and socialising experiences. This mapping of relevant studies enabled a rich description of the research literature based on the description of study characteristics presented below. Table 2 outlines the studies included in the mapping phase of the review.

Table 2: Overview of studies by country, author, focus and study design

Country	Study ID	Intervention studied	Study design
Portugal	Almeida (2012)	Working conditions	Quantitative
	Cardoso (2012)	CPD	Qualitative
	Craveiro (2007)	CPD	Mixed-method
	Leal (2011)	CPD	Qualitative
	Lino (2005)	CPD	Mixed-method
	Peixoto (2007)	CPD	Qualitative
	Quaresma et al (2011)	CPD	Qualitative
	Oliveira-Formosinho and Araújo (2004)	CPD	Quantitative
	Oliveira-Formosinho and Araújo (2011)	CPD	Qualitative
United Kingdom	Ahsam et al (2006)	CPD	Mixed-method
	Ang (2012)	CPD	Qualitative
	Aubrey et al (2012)	CPD	Qualitative
	Blatchford et al (2001/2002)	WC	Mixed-method
	Blenkin and Hutchin (1998)	CPD	Qualitative
	Jopling et al (2013)	CPD	Qualitative
	Menmuir and Christie (1999)	CPD	Qualitative
	Potter and Hodgson (2007)	CPD	Qualitative
	Wood and Bennett (2000)	CPD	Qualitative
Ireland	Bleach (2013)	CPD	Qualitative
	Duffy (2007)	CPD	Mixed-method
	Hayes et al (2013)	CPD and working conditions	Mixed-method
	McMillan et al (2012)	CPD	Qualitative
	O'Kane (2005)	Working conditions	Quantitative
	Rhodes and Hennessy (2001)	CPD	Quantitative
	Share et al (2011)	CPD	Qualitative
	SQW (2012)	CPD	Qualitative

Country	Study ID	Intervention studied	Study design
Sweden	Asplund Carlsson et al (2008)	CPD	Qualitative
	Johansson et al (2007)	CPD	Qualitative
	Palmerus (1996)	Working conditions	Quantitative
	Rönnerman (2003)	CPD	Qualitative
	Rönnerman (2008)	CPD	Qualitative
	Sheridan (2001)	CPD	Quantitative
	Sheridan et al (2013)	CPD	Qualitative
	Sundell (2000)	Working conditions	Quantitative
Germany	Beller et al (2007/2009)	CPD	Quantitative
	Buschmann and Joos (2011)	CPD	Quantitative
	Evanschitzky et al (2008)	CPD	Quantitative
	Richter (2012)	CPD	Mixed-method
	Simon and Sächse (2011)	CPD	Quantitative
	Tietze et al (2013)	Working conditions	Quantitative
	Wächter and Laubenstein (2013)	CPD	Qualitative
Spain	Franco Justo (2008)	CPD	Quantitative
	Lera (1996)	Working conditions	Quantitative
	Ruiz de Miguel and García (2004)	Working conditions	Quantitative
	Pineda et al (2011)	CPD	Mixed-method
	Sandstrom (2012)	Working conditions	Mixed-method
	Alsina i Pastells and Palacios (2010)	CPD	Qualitative
Netherlands	De Roos et al (2010)	CPD	Qualitative
	Fukink and Tavecchio (2010)	CPD	Quantitative
	Van Keulen (2010)	CPD	Qualitative
Belgium	Peeters (1993)	CPD	Qualitative
	Peeters and Vandenbroeck (2011)	CPD	Qualitative
	Vandenbroeck et al (2008; 2013)	CPD	Quantitative
Finland	Happo et al (2012/2013)	CPD and working conditions	Qualitative
	Venninen (2007)	CPD	Mixed-method
Italy	Picchio et al (2012)	CPD	Qualitative
	Pugnaghi (2014)	Working conditions	Quantitative
Slovenia	Pačnik (2009)	CPD	Quantitative
	Vonta et al (2007)	CPD	Qualitative
Croatia	Glavina and Sindik (2012)	CPD	Quantitative
	Vujičić (2008)	CPD	Qualitative
Denmark	Jensen et al (2013)	CPD	Quantitative
Poland	Andrzejewska (2011)	Working conditions	Quantitative
Greece	Rentzou and Sakellariou (2011)	Working conditions	Quantitative
Cross-national	Cryer et al (1999)	Working conditions	Quantitative
	Montie et al (2006)		

Note: n = 66

Of the 66 reports describing studies relevant to exploring the effects of CPD and working conditions, 25 (38%) were classified as quantitative studies, 31 (47%) were classified as qualitative ones and 10 (15%) as mixed-method studies, offering both quantitative and qualitative data. For the purpose of mapping the characteristics of existing literature in the field, the characteristics of quantitative studies and qualitative studies are described separately in the sections below. Information from mixed-methods studies is reported in each of the two sections, since it has been split into quantitative and qualitative parts.

Overall, out of 66 studies included in mapping, 50 (76%) focus on continuing professional development, 14 (21%) focus on working conditions and two (3%) studies relate to both CPD and working conditions. All mapped studies were carried out in EU Member States. Two cross-national comparative studies were included (3%). Both comparative studies report findings on structural quality components that are related to working conditions: Cryer et al (1999) involves the US along with three EU countries (Germany, Portugal, Spain), while Montie et al (2006) illustrates the results of the IEA Pre-Primary project that was carried out in 10 countries (Finland, Greece, Hong Kong, Indonesia, Ireland, Italy, Poland, Spain, Thailand and the US). In addition, nine (14%) studies were conducted in Portugal and in the UK respectively, eight (12%) in Ireland and Sweden, seven (11%) in Germany, six (9%) in Spain, three (5%) in the Netherlands and Belgium, two (3%) each in Croatia, Finland, Italy, Slovenia and while only one included study was carried out in Denmark, Greece and Poland.

Quantitative studies

The section below describes the characteristics of 35 studies reporting quantitative findings derived from quantitative and mixed-methods research. Two studies from the UK (Blatchford et al, 2001 and Blatchford et al, 2002) as well as two studies from Germany (Beller et al, 2007 and 2009) and from Belgium (Vandenbroeck et al, 2008 and Vandenbroeck et al, 2013) have been counted as one study each in the report as they evaluate the same intervention. Of the 35 studies described, only 14 (40%) were included in the in-depth review. Over half of the studies (n=21, 60%) reporting quantitative findings were excluded from the in-depth synthesis either on the basis of research design (not ‘controlled trial’ or controlled before-and-after study) or on the basis of methodological rigour (the ‘soundness of the study’) assessed at the quality appraisal stage.

Country

Table 3 shows that Germany was the leading country in terms of the number of studies evaluating the effects of CPD interventions and working conditions on quality, staff-child interactions or children’s outcomes (with six studies, or 17%). Five were from Spain (14%); four from Portugal and Ireland (11%); three from Sweden (9%); and two from the UK (6%). Belgium, Croatia, Denmark, Finland, Greece, Italy, Netherlands, Poland, Slovenia and two comparative studies equally accounted for 32% of the studies, with one study in each country.

Table 3: Country in which studies were conducted (n=35)

Country	N	Of which n were mixed-method studies
Germany	6	1
Spain	5	2
Portugal	4	2
Ireland	4	2
Sweden	3	0
United Kingdom	2	2
Belgium	1	0
Croatia	1	0
Denmark	1	0
Finland	1	1
Greece	1	0
Italy	1	0
The Netherlands	1	0
Poland	1	0
Slovenia	1	0
Cross-national comparative	2	0

Note: n = 35

Publication date

Although only studies published after 1991 were sought for inclusion in this review, the majority of studies included (n=31; 89%) were not published until at least 10 years after the publication of *Quality in services for young children* (Balaguer et al, 1992) (which was used as the starting point), with 63% published between 2007 and 2014 (Table 4).

Table 4: Studies by publication date

Date	N	Of which n were mixed-method studies
1991–1993	0	0
1994–2000	4	0
2001–2006	9	3
2007–2014	22	7

Note: n = 35

Study design

The quality of reporting in terms of methodology varied greatly across the studies, rendering classification by study design problematic. While originally a total of 34 studies claimed to evaluate the impact of working conditions or CPD on either quality, staff–child interactions or child outcomes, upon closer inspection of the full text it became apparent that many were not ‘intervention studies’ and did not adopt an evaluation design method.

European studies using experimental research design involving randomisation of intervention and control/comparison group(s) to evaluate interventions are rare in this field of study (Table 5). Only two studies out of 35 (6%) reported using a randomised control trial design. One of these was conducted in Denmark and one in Ireland. The first study evaluated a training intervention only, while the latter evaluated an intervention including both staff training and working conditions.

Thirteen studies of 35 (37%) adopted a controlled before-and-after research design, using measures at baseline and a period after the intervention to evaluate change over time. Of the 13 controlled before-and-after studies, five evaluated training interventions carried out in Germany while three studies in Sweden focused on training (n=2) and working conditions (n=1). Of the five remaining controlled before-and-after studies, one was a linked study conducted in the UK with a focus on staff working conditions, one was a linked study from Belgium evaluating the impact of CPD, and three were studies carried out in Ireland, the Netherlands and Spain evaluating CPD interventions.

More than half of the studies (n=20, 57%) either did not specify the evaluation design or described other designs (such as cross-sectional surveys, comparative designs) which did not necessarily evaluate impact (Table 5). This suggests that there is a lack of reliable evidence about the effects of CPD and working conditions on the quality of ECEC, on staff-child interactions and on outcomes for children.

Table 5: *Studies by design*

Study design	N	Of which n were mixed-method studies
Randomised controlled trials	2	1
Controlled before-and-after evaluations	13	2
Other study designs	20	7

Note: n = 35

Interventions studied and outcomes reported

Quantitative studies predominantly evaluated CPD interventions only (n=20), with one study carried out as an RCT; 10 quantitative studies were controlled before-and-after studies. Only one study focused simultaneously on CPD and working conditions and this was an RCT. The remaining studies (n=14) focused on working conditions, of which three adopted a controlled before-and-after evaluation design.

Table 6: *Type of interventions studied*

Intervention	N	Of which n were mixed-method studies
Only CPD	20	7
Only working conditions	14	2
CPD and working conditions	1	1

Note: n = 35

In relation to both interventions (CPD and working conditions), the studies included in the review measured outcomes relating to ECEC quality, staff-child interactions and children’s cognitive/non-cognitive outcomes.

Type of CPD interventions studied and outcomes reported

Studies claimed to evaluate a range of CPD interventions/training, some of which involved multiple components. CPD, as described in the studies, was categorised according to characteristics of instructional training broadly referring to its delivery, scope and duration (Table 7).

More than two-thirds of the quantitative studies evaluating CPD interventions (n=15, out of 21) investigated the effects of training programmes that were integrated into practices in ECEC settings. Such programmes were carried out either in the form of on-site training (such as in-house professional development) or in the form of off-site training with follow-up activities in the centre (for instance, a combination of lectures and workshops followed by sessions in which practitioners reflect on practice). More than half of the studies evaluating CPD interventions (n=12, out of 21)

encompassed follow-up activities in the ECEC settings, such as coaching or supervision (including feedback and reflection on practices).

Most CPD interventions evaluated in quantitative studies (n=13, of 21) focused broadly on various topics related to ECEC practices (taking a broad scope) rather than on specific subject areas (a narrow scope); in one case, the scope of CPD intervention was not clearly defined in the study.

There was variation in terms of the duration of the CPD interventions studied. They ranged from four-day intensive sessions to programmes lasting two years. However, it is notable that in one-third of the studies evaluating CPD interventions (n=7, of 21), the duration of training in terms of length of the programme and/or number of sessions delivered is not clearly specified.

Table 7: *Type of CPD studied: instructional characteristics*

CPD		N	Of which n were mixed-method studies	
Delivery	Training integrated into ECEC centres' practices (on-site training or combination of off-site training and follow-up activities)	With coaching / supervision (feedback)	12	3
		Without coaching / supervision	3	2
	Training not integrated into ECEC centres' practices		3	1
	Not stated / unclear which type		3	2
Scope	Broad scope	Courses covering various topics	13	5
	Narrow scope	Courses with specific focus	7	2
	Not stated / unclear which type		1	1
Duration	Less than six months		4	1
	Six months to one year		5	1
	More than one year		5	0
	Not clearly specified		7	6

Note: n = 21

The effects of CPD interventions on children's cognitive and non-cognitive outcomes were examined in nearly half the studies (10 of 21), with findings related to cognitive outcomes (language abilities in particular) reported in nine of these 21 studies. The effects of CPD interventions on the quality of ECEC (including accessibility for low-income and ethnic minority families) were investigated in six studies. Five of these six studies used internationally validated rating scales, such as ECERS (Harms et al, 1998), PIP (HighScope, 1995) and PQA (HighScope, 2003), for measuring the effects of CPD interventions on the quality of ECEC settings. Only one study looked at the effects of CPD on the accessibility of ECEC services; in this case, the impact of training was measured by relating enrolment rates of children from low-income and ethnic minority families to the places available before and after the intervention was carried out. The effects of CPD on staff-child interactions were examined in six studies (of 21), which used as measurement tools such rating scales as CIS (Arnett, 1989) or Child Involvement and Adult Engagement Scales (Laevers, 1994), and structured observation protocols recording verbal and/or non-verbal interactions between staff and children. Finally, in two of eight mixed-methods studies investigating the effects of CPD, outcomes were not clearly stated in relation to quantitative findings.

Table 8: *Outcomes reported in relation to CPD interventions*

Outcomes measured	Tool used for measurements	N	Of which n were mixed-method studies
ECEC quality (accessibility)	ECERS	2	1
	PIP rating scale	2	2
	HighScope PQA tool	1	1
	Availability/enrolment rates	1	0
Staff–child interaction	CIS	3	1
	Structured observation protocols	2	1
	Child Involvement and Adult Engagement Scale	1	1
Children’s outcomes	Cognitive and social abilities standardised assessment	3	1
	Cognitive abilities test only	6	1
	Social abilities test only	1	0
Outcomes and measurement tools not clearly stated		2	2

Note: n=21; studies could measure more than one outcome.

Working conditions studied and outcomes reported

Quantitative studies on working conditions were predominantly ‘non-intervention’ studies, which sought to evaluate the influence of structural factors, such as staff–child ratio, group size, in-service training, working hours allocation and wages, on process quality and children’s outcomes.

Most studies investigating working conditions (10 of 15) examined more than one structural variable at a time, with staff–child ratio and group size being the most studied variables, featuring in over half the studies. Of the 15 quantitative studies evaluating the effects of working conditions, the allocation of working hours (including the amount of non-contact time) was investigated in five studies, the provision and/or attendance of in-service training was examined in four studies and staff wages in three studies. The least studied variables were turnover and career progression, which were investigated in one study each.

Table 9: *Type of working conditions studied*

Working conditions	N	Of which n were mixed-method studies
Staff–child ratio	11	3
Group size	9	2
Working hours allocation	5	1
In-service training	4	1
Wages	3	0
Turnover	1	0
Career progression	1	0

Note: n=15; studies could investigate more than one structural variable.

Eight studies (of 15) investigated the effects of working conditions on the quality of ECEC as measured through rating scales, such as ECERS (Harms et al, 1998), CLASS (Pianta et al, 2008), or through structured observation tools, such as MOT (Management of Time), CA (Child Activities), or AB (Adult Behaviour), developed within the IEA Pre-Primary Project. Equally, the effects of working conditions on staff–child interactions were examined in eight studies, which used as measurement tools either rating scales (CIS) or structured observation protocols recording verbal interactions between

staff and children. Notably, only six out of 15 studies investigated the effects of working conditions on children’s cognitive and non-cognitive outcomes. This suggests that evaluation studies on working conditions carried out in EU Member States are more likely to report findings on process quality (such as environmental quality and staff–child interactions) than on outcomes for children (cognitive and social abilities).

Table 10: *Outcomes reported*

Outcomes measured	Tool used for measurements	N	Of which n were mixed-method studies
Quality of ECEC	ECERS	5	2
	CLASS	2	1
	Structured observation tools (MOT/CA/AB)	1	0
Staff–child interaction	CIS	4	1
	Structured observation protocols	2	0
	Not clearly stated	2	0
Outcomes for children	Cognitive and social abilities standardised assessment	3	1
	Cognitive abilities tests only	3	1
	Social abilities tests only	0	0

Note: n=15; Studies could measure more than one outcome

Qualitative studies

The section below describes the characteristics of 41 studies reporting qualitative findings derived from qualitative and mixed-methods research studies. Two linked studies from the UK (Blatchford et al, 2001 and Blatchford et al, 2002) as well as two linked studies from Finland (Happo et al, 2012 and Happo et al, 2013) were counted as one study each in mapping as they reported on the same research project. Of the 41 views studies mapped, 32 studies (78%) were included in the qualitative in-depth synthesis. Nine of 41 studies (22%) reporting qualitative findings in relation to the effects of CPD or working conditions were excluded from the in-depth synthesis on the basis of study design or methodological rigour criteria (low ‘usefulness’ and ‘reliability’ of reported findings).

Country

Table 11 shows that the UK was the country in which the greatest number of studies were conducted (n=9, 22%) evaluating the effects of CPD initiatives and working conditions on practitioners (knowledge, practices, understandings), staff–child interactions or children’s learning and socialising experiences. Eight were from Portugal (20%); six from Ireland (15%); five from Sweden (12%); three from Spain (7%); two each from Belgium, Finland and Germany (5%) with Croatia, Italy and Slovenia together accounting for 9% of the studies.

Table 11: *Country in which studies were conducted (n=41)*

Country	N	Of which n were mixed-method studies
United Kingdom	9	2
Portugal	7	2
Ireland	6	2
Sweden	5	0
Spain	3	2
Belgium	2	0
Finland	2	1
Germany	2	1
The Netherlands	2	0
Croatia	1	0
Italy	1	0
Slovenia	1	0

Note: n=41

Publication date

Table 12 shows that very few studies relevant to the research questions were published before 2001. The majority of studies (34 of 41) were published between 2007 and 2014. The fact that scholarly research published on the effects of CPD and working conditions has developed exponentially in the last seven years may indicate that the topics investigated in this review have only recently gained international research attention, probably in conjunction with an increased focus on the quality of ECEC in international policy debates (European Commission Thematic Group on ECEC Quality, 2014; OECD, 2012a). In fact, it is worth noting that over half of the views studies mapped (23 out of 41) were published after 2010.

Table 12: *Studies by publication date (n=41)*

Date	N	Of which n were mixed-method studies
1991–1993	1	0
1994–2000	3	0
2001–2006	4	3
2007–2014	33	7

Note: n=41

Methodological characteristics of views studies

The methodological characteristics of the qualitative studies included in the mapping varied greatly both in terms of research design and in terms of methods used for data collection and analysis. In the data extraction framework elaborated by the team for mapping qualitative studies, four broad categories were identified in order to classify studies in relation to their methodological characteristics.

Studies adopting a participatory approach: These studies took a participatory approach to evaluating CPD initiatives or investigating working conditions. In such studies, data are usually collected through open-ended questionnaires, semi-structured or in-depth interviews, focus groups, reflective diaries, participant observations in ECEC settings and audio-visual recording of pedagogical practice.

Studies adopting an action research approach: An action research approach involves practitioners in the process of data collection and analysis. In this case, the most frequently reported data sources were action plans, written accounts of practitioners’ and children’s experiences in ECEC settings, reporting of group meetings and audio-visual documentation.

Case studies adopting a descriptive approach: These case studies took a descriptive approach to the investigation of CPD programmes or working conditions by drawing on data such as narrative accounts of practitioners’ experiences (in-depth interviews, focus groups, participant observations in ECEC settings and so on).

Studies adopting an exploratory approach: This category of studies investigated (either CPD or working conditions) without making specific reference to any initiative; data are collected through open-ended questionnaires or narrative accounts of practitioners’ professional stories.

As shown in Table 13, the majority of views studies included adopted either a participatory evaluation design (19 of 41 – 46%) or an action research design (16 of 41 – 39%) while descriptive cases and exploratory studies accounted for just 15% of the total (6 of 41 studies).

Interestingly, more than half of the views studies adopting an evaluation design were carried out in the UK and Ireland (11 out of 19) while action research designs were more commonly found in studies carried out in Sweden and continental Europe.

Table 13: *Studies by design (n=41)*

Study design	N	Of which n were mixed-method studies
Participatory evaluation (including multi-methods evaluation studies)	19	8
Action research (including praxiological and practitioner-oriented research)	16	0
Descriptive case study	4	2
Other (exploratory study/qualitative survey)	2	0

Note: n=41

Topics in focus and reported views

Views studies focused overwhelmingly on CPD initiatives. These were investigated in 38 out of 41 studies. Qualitative findings related to practitioners’ perspectives on working conditions were reported in only three studies, of which one focused simultaneously on CPD and working conditions.

Table 14: *Focus of views studies (n=41)*

Intervention	N	Of which n were mixed-method studies
Only CPD	38	7
Only working conditions	2	2
CPD and working conditions	1	1

Note: n=41

The qualitative studies investigated practitioners’ views on the effects of CPD and working conditions on their knowledge, practices and understanding, on their everyday interactions with children and on children’s learning and socialising experiences within ECEC settings.

Type of CPD initiatives and reported views of participants

The views studies included in the mapping described and evaluated a wide range of CPD initiatives that differ in terms of delivery modes, scope and duration (Table 15). Some 32 of 39 studies (82%) reporting qualitative findings on the effects of CPD analysed programmes integrated into ECEC practices through a combination of training sessions and follow-up activities in the settings. In particular, 24 of these 32 studies investigated integrated programmes in which training sessions were accompanied by coaching or supervision activities providing practitioners with the opportunity of exchanging reflections and receiving feedback on practice, whereas eight studies examined integrated programmes without follow-up activities. Of the remaining five studies, two were exploratory surveys and three did not provide sufficient information for the categorisation of the CPD initiative investigated.

The high number of views studies exploring CPD programmes that included follow-up activities such as coaching, supervision and collective reflection is partly due to the fact that – in action research designs – revision and transformation of practices are integral parts of the research process, which is carried out as a joint activity involving practitioners and researchers together. In this research design, the boundaries between the processes of CPD implementation and research investigation are less marked than in impact studies.

In a similar way to the quantitative studies, most qualitative studies (n=28 of 39) focused broadly on various topics related to ECEC practices (broad scope) rather than on specific subject areas (narrow scope). Narrow-scope CPD initiatives focused on speech and language development (n=2), on early maths and science teaching (n=2) or on creative learning (n=1). In three cases, the scope of CPD intervention was not stated or clearly defined within the study.

In more than one-third of views studies on CPD (n=14 of 39 – 36%), the effects of long-term professional development initiatives (carried out for over one year) are described or evaluated. The equivalent figure for quantitative studies is 24%. Notably, nearly one-third of views studies reporting the effects of CPD initiatives (n=12 of 39) do not clearly specify the duration of training in terms of length of the programme and/or number of sessions delivered.

Table 15: *Type of CPD studied: instructional characteristics*

CPD		N	Of which n were mixed-method studies	
Delivery	Training integrated into ECEC centres' practices (on-site training or combination of off-site training and follow-up activities)	With coaching / supervision (feedback)	24	4
		Without coaching / supervision	8	1
	Training not integrated into ECEC centres' practices		2	1
	Not stated / unclear which type		5	2
Scope	Broad scope	Courses covering various topics	28	4
	Narrow scope	Courses with specific focus	8	2
	Not stated / unclear which type		3	2
Duration	Less than six months		1	1
	Six months to one year		12	1
	More than one year		14	3
	Not clearly specified		12	3

Note: n=39

As illustrated in Table 16, the majority of views studies investigated the effects of CPD initiatives on practitioners' knowledge, practice and understandings as reported by participants themselves or as observed by the researcher. The changes produced by training activities on the interactions between adults and children were studied in 11 studies (of 39), whereas the effects of training on the observed experiences of children in ECEC setting was investigated in only four studies.

Table 16: *Practitioners' views reported in relation to CPD initiatives*

Reported views		N	Of which n were mixed-method studies
Effects on practitioners	Professional knowledge and understanding	29	5
	Professional practices	26	5
Effects on interactions between practitioners and children		11	3
Effects on children's learning and socialising experiences		4	2

Note: Studies could report participants' views on more than one effect; n=39.

Working conditions studied and reported views of participants

Of the 41 views studies that were mapped, only three explored practitioners' perceptions in relation to staff working conditions. Interestingly, two of the three are mixed-methods studies, which might indicate that the issues related to staff working conditions in ECEC settings are underinvestigated in qualitative research.

Table 17: *Working conditions studied (n=3)*

Working conditions	N	Of which n were mixed-method studies
Staff-child ratio	1	1
Group size	2	2
Working environment	1	0
In-service training opportunities	1	1
Facilities and resources	1	1

Note: Studies could simultaneously investigate more than one component; n=3.

In a similar way to the quantitative counterpart, most studies explored the influence of staff-child ratio, group size and in-service training opportunities on practitioners' professional practices, whereas the effects of working conditions on children's learning experiences were reported in only one study.

Table 18: *Practitioners' views in relation to working conditions*

Reported views		N	Of which n were mixed-method studies
Effects on practitioners	Professional knowledge and understanding	0	0
	Professional practices	2	2
Effects on interactions between practitioners and children		2	2
Effects on children's learning and socialising experiences		1	1

Note: Studies could report participants' views on more than one effect; n=3.

Moving from mapping to in-depth review: quality assurance results

For the in-depth review, additional criteria in relation to the methodological rigour of the studies were applied by two reviewers independently.

To be included in the quantitative synthesis, impact studies had to be carried out as controlled trials or as controlled before-and-after evaluations to capture impact over time. Additionally, impact studies had to be assessed as ‘sound’ or ‘sound despite discrepancy with quality criteria’ at the quality appraisal stage. Only those studies that avoided all three types of bias stated in the QA tool (selection bias, bias due to loss of follow-up and selective reporting bias) were assessed as ‘sound’. Those studies avoiding at least one bias with two biases partially avoided were judged ‘sound despite quality criteria’ and therefore could still be included in the in-depth review, whereas those studies that did not avoid any of the three biases in full were excluded from quantitative synthesis as they were judged ‘not sound’ by the reviewers. Of the 35 studies reporting quantitative findings described in the mapping phase, 14 (40%) were included in the in-depth review. Some 21 studies were excluded from synthesis on the basis of either research design (n=20, or 57%) or ‘study soundness’ as assessed at the quality appraisal stage (n=1, or 3%).

To be included in the in-depth review, qualitative studies had to report: a) practitioners’ views with regard to the effects of CPD initiatives they had participated in; or b) practitioners’ perceptions with regard to working conditions in the ECEC settings where they were working. Therefore, exploratory studies and qualitative surveys were excluded at this stage. In addition, views studies were critically appraised against qualitative research criteria and each study was allocated ‘a weight of evidence’ with two dimensions. First, reliability of findings was rated in relation to the rigour of sampling, data collection, data analysis and reporting procedures. Second, the usefulness of findings was rated with regard to the extent to which richness and complexity of analysis was portrayed and perspectives of participants encouraged and valued. Studies that were rated ‘low’ on both the reliability and usefulness dimensions were excluded from qualitative synthesis. Out of the 41 studies reporting qualitative findings described in mapping, 32 studies (78%) were included in the in-depth review, while nine were excluded from synthesis either on the basis of study design or on the basis of QA criteria (low usefulness and reliability).

Table 19: *Studies included in mapping and in-depth review*

Type of study design		N studies included in mapping	Of which n were mixed-methods studies
Quantitative studies	RCT	2	2
	Controlled before-and-after evaluation	13	12
	Other designs (for instance, cross-sectional, comparative)	20	0
Qualitative studies	Participatory evaluation	19	14
	Action research	16	15
	Descriptive case study	4	3
	Other (exploratory study/ qualitative survey)	2	0

Note: The numbers reported in the table include quantitative and qualitative parts of mixed-methods studies; therefore mixed-methods studies were counted twice.

Results: impact studies 3

This section describes the findings of the review of the research evidence. First, an overview is provided of the main characteristics of the studies included in the in-depth review. Second, we present the summary of main findings for each of the 14 studies in the in-depth review alongside the weight of evidence accorded each study by the review team and the review team's subsequent conclusions about the soundness of each study. Finally, we synthesise findings on the impact of CPD and working conditions on ECEC quality, staff-child interaction and children's outcomes.

Characteristics of studies for in-depth review

Fourteen studies were selected for in-depth review, using the inclusion criteria presented in Chapter 2. They were published between 1996 and 2014. Four of them were undertaken in Germany (Beller et al 2007 and 2009; Buschmann and Joos, 2011; Evanschitzky et al, 2008; Simon and Sächse, 2011), three in Sweden (Palmerus, 1996; Sheridan, 2001; Sundell, 2010), two in Ireland (Hayes et al, 2013; Rhodes and Hennessy, 2001), and one each in the United Kingdom (Blatchford et al, 2001 and 2002), Belgium (Vandenbroeck et al, 2008 and 2013), Denmark (Jensen et al, 2013), the Netherlands (Fukkink and Tavecchio, 2010) and Spain (Franco Justo, 2008).

Nine studies were selected while reviewing the articles written in English (Blatchford et al, 2001 and 2002; Fukkink and Tavecchio, 2010; Hayes et al, 2013; Jensen et al, 2013; Palmerus, 1996; Rhodes and Hennessy, 2001; Sheridan, 2001; Sundell, 2000; Vandenbroeck et al, 2008 and 2013) and the remaining five were selected from the studies in original language (Beller et al, 2007 and 2009; Buschmann and Joos, 2011; Evanschitzky et al, 2008; Franco Justo, 2008; Simon and Sächse, 2011).

Eleven of the 14 studies included in the in-depth review focused on the impact of continuing professional development interventions. Among these, only two were carried out as controlled trials and they were both randomised control trials (Hayes et al, 2013; Jensen et al, 2013). Most studies adopted an evaluation design with controlled before-and-after measurement involving an experimental and a control group to assess the effectiveness of CPD interventions (Beller et al 2007 and 2009; Buschmann and Joos, 2011; Evanschitzky et al, 2008; Franco Justo, 2008; Fukkink and Tavecchio, 2010; Rhodes and Hennessey, 2001; Sheridan, 2001; Simon and Sächse, 2011), whereas only one used a longitudinal design involving a controlled before-and-after measure to evaluate the impact of an intervention combining training and policy measures (Vandenbroeck et al, 2008 and 2013). The influence of working conditions was analysed in four studies (Blatchford et al, 2001 and 2002; Hayes et al, 2013; Palmerus, 1996; Sundell, 2010) in which the effects of class size, staff-child ratio and non-contact time were measured in terms of change of ECEC quality, staff-child interaction and outcomes for children over time.

As illustrated in Table A1 (see Annex 1), nine (of 11) studies on continuous professional development investigated the impact of training interventions that were integrated into ECEC practices through a combination of learning courses and follow-up activities such as supervision and coaching. In particular, four studies examined the impact of intensive short-term interventions (4 to 20 sessions, over a six-month period) adopting video supervision as a tool for enhancing practitioners' reflection on practice to improve their interactions with children and children's outcomes (Beller et al, 2007 and 2009; Buschmann and Joos, 2011; Fukkink and Tavecchio, 2010; Simon and Sächse, 2011). Also, five studies investigated the impact of long-term interventions (lasting from one to two years) combining lectures or workshops with ongoing pedagogical guidance supporting practitioners' collective reflection within ECEC settings to improve ECEC environmental and process quality and outcomes for children (Evanschitzky et al, 2008; Hayes et al, 2013; Jensen et al, 2013; Sheridan, 2001; Vandenbroeck et al, 2008 and 2013).

In addition, one study reported on the impact of a short-term intensive training intervention integrated into practice (involving children's observation and project work) but without any feedback component (Rhodes and Hennessy, 2001) and another evaluated a short-term intensive training programme that was not integrated into ECEC practices (Franco Justo, 2008).

With regard to the outcome measured, the majority of CPD studies included in the in-depth review reported findings concerning the impact of interventions on children's outcomes (Beller et al, 2007 and 2009; Buschmann and Joos, 2011; Evanschitzky et al, 2008; Franco Justo, 2008; Hayes et al, 2013; Jensen et al, 2013; Rhodes and Hennessy, 2001). The impact of CPD on staff-child interactions were reported in five studies (Beller et al, 2007 and 2009; Fukkink and Tavecchio, 2010; Hayes et al, 2013; Rhodes and Hennessy, 2001; Simon and Sächse, 2011), whereas the impact of CPD on ECEC quality was reported in just three studies (Hayes et al, 2013; Sheridan, 2001; Vandenbroeck et al, 2008 and 2013).

Only four studies included in the in-depth review evaluated the impact of working conditions. Such studies measured the effect of staff-child ratio (Palmerus, 1996; Sundell, 2010; Hayes et al, 2013) and class size (Blatchford et al, 2001 and 2002) on the outcomes for children (Blatchford et al, 2001 and 2002; Hayes et al, 2013; Sundell, 2000), staff-child interaction (Palmerus, 1996; Hayes et al, 2013) and ECEC quality (Hayes et al, 2013).

Further details on the impact studies included in the in-depth review are illustrated in Table A1 (see Annex 1), which reports the main characteristics of each of the 14 studies included in the synthesis.

Summary of evidence from impact studies

Table A2 (see Annex 1) presents the main findings for each of the 14 studies included in the in-depth review alongside the weight of evidence accorded to each study by the review team, and the review team's subsequent conclusions about the soundness of the each study. Fuller descriptions of these studies are provided below in alphabetical order.

Beller et al – effects of enhancing quality of language stimulation and of affirmative approach: The linked studies by Beller et al (2007 and 2009) evaluated a training intervention aimed at enhancing the quality of language stimulation in ECEC institutions as well supporting teachers in developing a democratic and affirmative educational approach considered to have a positive impact on the development of children's language and cognitive skills. A pre-test and post-test design involving an experimental group and a control group was used to assess the impact of the intervention on teacher performance and children's outcomes. The first study (Beller et al, 2009) involved 151 children between 4–5 years of age from 26 different groups in ECEC centres (n=73 for the intervention group, n=78 for the control group) and 38 ECEC teachers (n=18 for the intervention group, n= 20 for the control group). The second study (Beller et al, 2007) involved 31 ECEC teachers (n=18 for the intervention group, n=13 for the control group) and 155 children 1–3 years old (n=88 for the intervention group, n=67 for the control group). The main findings of both studies revealed that, as a result of the training, teachers scored higher in various areas associated with language stimulation (such as listening to children, responding to their verbal expressions, relating to children's experiences, asking for their opinion, engaging in dialogue with children, supporting and extending children's verbal expression and so on). In addition, Beller et al (2007) found that the intervention had a positive impact on the language and cognitive development of the children irrespective of their ethnic background or family language. The positive effect was found for all age groups involved. Beller et al (2009) found that the intervention had a positive impact on the language development of four-year-old children irrespective of their family language. With regard to five-year-old children, however, language skills did not develop significantly better than in the control group. In this case, no significant impact was found on the cognitive skills of children.

Blatchford et al – Relationship between class sizes and children's achievement: Blatchford et al (2001 and 2002) focused on the relationship between class size and achievement for children in their first years of schooling. Relying on a large-scale longitudinal study within English local education authorities, the study presented results for achievement of progress in literacy and mathematics during the reception year when children are aged four. The study involved 220 schools, with 368 classes and 9,330 children in eight local education authorities in Cohort 1, and Cohort 2 involved a

further five local education authorities (Blatchford et al, 2002, p. 7). Using a series of multilevel models, the researchers demonstrated a strong and significant effect of class size on children's academic attainment over the reception year, both before and after adjusting for possible confounding factors. In regard to literacy outcomes, a reduction in class size from 30 to 20 pupils resulted in an increase in attainment of approximately 0.35 standard deviations for the low attainers, 0.2 standard deviations for the middle attainers, and 0.15 standard deviations for the high attainers. The relationship between class size and children's progress in mathematics was also found to be highly statistically significant ($p < 0.001$). A reduction in class size from 30 to 20 pupils resulted in an increase in attainment of approximately 0.25 standard deviations. In general, the results support the use of small classes during the reception year. In particular, the study found evidence that small classes appear to work best in literacy for those children with lower school entry scores. This suggests that the children who benefit the most from small classes are those who are most in need academically and who have the most ground to make up (Blatchford et al, 2002, p. 14).

Buschmann and Joos – Effects of interaction training programme for teachers on children's language development: Buschmann and Joos (2011) reported on the effects of a speech-based interaction training programme ('Heidelberger Trainingsprogramm zur frühen Sprachförderung in Kitas') for educational professionals. The study involved 30 ECEC teachers ($n=17$ for the intervention group, $n=13$ for the control group) and 28 language-delayed children at 21 months of age ($n=15$ for the intervention group, $n=13$ for the control group). Research findings indicate that children whose teachers had participated in the interaction training showed a significantly increased vocabulary and significantly better results in the standardised language developmental test at the age of 30 months. With regard to vocabulary, children in the intervention group scored 197 words (standard deviation – SD – 43.7) compared to 138 words (SD 76.8) in the comparison group ($t=2.42$, $p=0.03$). In the standardised language developmental test, children from the intervention group had significantly better results with regard to the production of words and sentences, whereas no differences were found in the understanding of words and sentences. Over half (53.4%) of the children in the intervention group had caught up in language skills with their peers and scored in the normal range, whereas in the comparison group this was true for less than a quarter (23.1%) (Buschmann and Joos, 2011, p. 308).

Evanschitzky et al – Mathematics, science and technology in kindergartens: Evanschitzky et al (2008) used a pre-test and post-test design involving an experimental group and a control group (35 teachers and 217 children in total) to assess the effectiveness of a two-year training programme for kindergarten teachers in the field of mathematics, science and technology. Research findings reported that children in the intervention kindergartens showed faster and more advanced development of mathematical concepts than children in the control kindergartens. Children in the intervention group scored significantly higher in pre-mathematical skills tests after their teachers had participated in one year of training. In the intervention group, the percentage of children in the highest competence level rose from 38% to 82%, whereas in the control group, the rise was from 35% to 58% (Evanschitzky et al, 2008, p. 475). Furthermore, parents and kindergarten teachers reported in questionnaires that children in the intervention group showed an increased interest in numbers and other mathematical concepts, whereas these changes were not found in the control group.

Franco Justo – Effects of relaxation intervention on teachers: Franco Justo (2008) assessed the effect of training in relaxation and improvement of self-esteem on pre-school teachers and on children in their class (in relation to graphical creativity). It involved an experimental group of female teachers ($n=12$) who had undergone 40 training sessions over 20 weeks (1.5 hour each) and a control group of 12 teachers who did not attend the training, as well as their pupils ($n=136$ for the intervention group, 146 for control group). The findings of the evaluation study showed that the implementation of the programme had a significant impact on the levels of anxiety and self-esteem in participant teachers, but a limited impact on children's outcomes in relation to graphical creativity (Franco Justo, 2008, p. 8). In fact, the results of covariance analysis on pre- and post-test scores showed that significant differences between control and experimental group were found in relation to both teachers' anxiety ($t=4.93$; $p < 0.01$) and self-esteem ($t=4.25$; $p < 0.01$). Concerning children's outcomes, the results of covariance analysis on pre- and post-test scores showed that significant differences between control and experimental group were found only in relation to graphical flexibility ($t=3.27$; $p < 0.01$),

and no significant differences could be found between control and experimental group in regard to graphical fluidity ($t=2.48$; $p>0.05$) and originality ($t=1.16$; $p>0.05$).

Fukkink and Tavecchio – Video feedback training for early childhood teachers: Fukkink and Tavecchio (2010) assessed the effect of the Video Interaction Guidance (VIG) intervention on the sensitivity and stimulating skills of early childhood teachers. The study involved an experimental group of 53 teachers who participated in four VIG training sessions and a control group of 43 teachers who did not attend the training. A multivariate analysis showed an overall statistically significant difference between the VIG group and the control group. In particular, study findings showed that teachers who had received the training were more stimulating after the intervention than the teachers in the control group and the statistically significant effect for stimulating caregiving was still apparent on the treated group three months after the training. The training also had a positive effect on the quality of verbal stimulation of the trained teachers, who made significantly more frequent eye contact with the children, verbally received the initiatives of children more often, and allowed the children to take turns more frequently. The statistically significant experimental gains reported in study findings, ranging from a medium effect size (stimulating caregiving, $ES = 0.61$) to a large effect size (verbal stimulation, $ES = 0.79$ and sensitive responsiveness, $ES = 1.09$), were found to be relatively large if compared to the aggregated effect size of 0.40 for the skills domain, reported in previous meta-analysis (Fukkink and Lont, 2007).

Hayes et al – Evaluating early childhood intervention: A randomised controlled trial study (Hayes et al, 2013) was carried out to evaluate the effectiveness of the Early Childhood Care and Education Programme of the Childhood Development Initiative that included both CPD (HighScope and Siolta training) and a working conditions component (staff–child ratio and non-contact time). The key findings from the study show that there was a programme effect on the quality of activities being planned and implemented in intervention services, as well as on the overall curricular and planning quality over time (this had a medium effect size in favour of the intervention group). Early Years practitioners in intervention services created a significantly better literacy environment by the end of the programme, whereas in the control group, there was no change in the literacy environment. In the control group there was a significant reduction in caregiver sensitivity scores from baseline to end phase, while in the intervention group there was no significant change in scores across the same time period. There were no statistically significant positive or negative programme effects on child cognitive and language end phase outcome scores. However, at end phase, more children from the intervention group were classified positively for their conduct, peer relationships, pro-social behaviour and hyperactivity and fewer intervention children than control children were classified as having borderline or abnormal hyperactivity levels.

Jensen et al – Effects of preschool programme on emotion and behaviour: In a randomised controlled trial, Jensen et al (2013) demonstrated that ongoing support provided to the staff in their efforts to critically reflect on their practices and change them can bring positive effects in ECEC settings. The CPD intervention studied included three activities: workshops in large groups; education and training in reflection groups; and conferences with pedagogical consultants. Children ($n=2,323$) in 59 pre-schools in two municipalities were assessed using the Strength and Difficulties Questionnaire at the start of the intervention, at mid-term, and by the end. The results indicated that in the intervention group, children developed fewer emotional symptoms and conduct problems, became less hyperactive and were more attentive. Therefore, the intervention had a positive effect on emotional symptoms, conduct problems, hyperactivity and inattention, but not on peer relationships and pro-social behaviour. The effect size was only 0.15–0.2 and effect sizes were larger in the children of more highly educated mothers than in children whose mothers had a lower level of education.

Palmerus – Impact of child–caregiver ratios on verbal interaction: Increased demand for high-quality public daycare places in Sweden allowed Palmerus (1996) to study the impact of caregiver–child ratios on the quality of ECEC services. The same caregivers and the same children were observed during two different time periods and detailed records of verbal interactions were studied. Audio recordings were made of verbal communication in one of the groups where the number of children per caregiver was substantially changed. Comparison between the period with a high ratio (more than

four children per caregiver) and a low ratio (fewer than two children per caregiver) showed that, with a high ratio, the proportion of child-initiated verbal activities to the caregivers decreased while the proportion of adult-initiated verbal activities increased. In particular, with higher ratios, caregivers initiated 80% of the communication: adults' monologues increased from 61% to 69% while dialogues decreased from 39% to 32%. The findings indicate that – with a high caregiver–child ratio – caregivers use verbal communication as a tool for control in the group; the author reports that in such conditions childcare becomes more similar to a school-like situation with a more authoritarian atmosphere.

Rhodes and Hennessy – Effects of specialised training on caregivers and children: Rhodes and Hennessy (2001) measured the effect of a continuing professional development course called 'Foundation Course in Playgroup Practice' on Irish ECEC practitioners' sensitivity and on the social and cognitive competence of enrolled children (two children per centre). The study found that ECEC practitioners who attended the training course ($n=16$) made significant gains in positive relationships from pre- to post-training $F(1,20) = 38.56, p < .05$, and scored significantly higher overall on positive relationship than the comparison participants at post-training only $F(1,20) = 7.54, p < .05$. Training participants also showed a significant reduction in levels of detachment from pre- to post-training $F(1,20) = 15.07, p < .05$. The comparison group ($n=17$) showed no change in ratings of sensitivity from pre- to post-training times. No significant impact was found on permissiveness and punitiveness. A significant difference was found in social play and cognitive play between the training and comparison groups. Children attending centres where groups of caregivers were being trained made significant gains in levels of complex social play from pre- to post-test $F(1,28) = 18.38, p < .05$ as well as significant gains in levels of complex cognitive play from pre- to post-test $F(1,28) = 5.615, p < .051$. In contrast, the comparison group did not make significant gains in complex social play and in complex cognitive play (Rhodes and Hennessy, 2001, p. 570–571).

Sheridan – Competence development in Swedish pre-schools: Sheridan (2001) evaluated a 'competence development intervention' in 20 Swedish pre-school units, by adopting the Early Childhood Environment Rating Scale (ECERS) as a tool for reflection and improvement of practices. The 'Model of Competence Development' evaluated in the study consisted of a combination of lectures, reflection in groups and pedagogical guidance (ECERS self-evaluation, reflective diaries and analysis of video-documentation). According to the results collected through ECERS external evaluation, the development work led to a higher quality in eight of the nine pre-school units in the intervention group. While the quality of pre-schools before the intervention was evaluated as equal in the experimental and control group (4.50 and 4.49 respectively, $p = 0.897$), after the intervention there was a significant difference of quality between the pre-school units in the experimental and the control groups of 4.98 and 4.18 ($p = 0.010$). In the daily work, the enhancement of quality was concretised in actions, in the interaction between the pedagogues and the children and in the pedagogical environment in such a way that it could be evaluated using the ECERS. The intervention enhanced quality despite a lower staff–child ratio, compared to control schools. Therefore, the authors concluded that, even in times of organisational changes and financial cutbacks, pre-school quality can be enhanced through developing staff competence.

Simon and Sachse – Promoting language skills in day care: Simon and Sachse (2011) evaluated the effects of the 'Heidelberger Trainingsprogramm' on language-promoting behaviour of early childhood educators and their pupils of 3–4 years ($n=499$). The educators were filmed and later the material was coded using a system developed by Bortz and Döring (2006). The study showed that the educators, who had few competences in language acquisition, increased their competence through the training programme, they used more opportunities to increase the active use of language by the children, they gave less language input themselves and the quality of their language input increased. Teachers in the intervention group scored higher than teachers in the control group in the observed dimensions related to applying language modelling techniques and corrective feedback, and more time was allocated for children's verbal expression (effect sizes were Cohens $d = -1.984$ with regard to a language-promoting behaviour at the time of follow-up, and 1.248 with regard to language modelling). Furthermore, children's initiative in verbal interaction was significantly higher in the intervention group in the post-test and follow-up.

Sundell – Comparing Swedish non-profit and for-profit childcare: Sundell (2000) also included comparisons that encompassed the relationship between type of childcare (profit or non-profit), staff–child ratio, age span in the class, teaching, and children’s development. The sample comprised children aged 3–5 years ($n=394$) from Swedish childcare centres ($n=32$). The classes were visited twice, once in the autumn and then five months later in the spring. Data collection was spread over a two-year period (Sundell, 2000). It was demonstrated that programme auspices (profit and non-profit) and different ratios of staff to children (1:4.6–1:8.7) were not systematically related to children’s social and cognitive achievements. The children’s cognitive, verbal, and social achievements were best predicted by age, sex, social background, and the age span of the class. These findings, however, may relate to context. In Stockholm, there are few differences between non-profit and for-profit childcare, as they both comply with government-regulated demands for quality (they hire trained teachers, carry out yearly evaluation and planning, and are open to disabled and at-risk children) and they receive approximately the same subsidies as public centres. In addition, as stated by the author, 13 out of 16 profit-centre directors had formerly worked in public centres and none of them raised the prospect of earning more money as an important motive for starting such a centre (evidence also indicated that none of them had made a significant profit during the year in which the study was conducted). Therefore, the author explains the study findings in relation to the specificity of the context, affirming that the high level of agreement on teaching practice among staff might compensate for a decreased adult–child ratio.

Vandenbroeck et al – Joint impact of municipal policy and training measures on expanding accessibility of childcare: Vandenbroeck et al (2008 and 2013) assessed whether the comprehensive support programme offered to the directors of the Flemish-funded early childcare centres in Brussels ($n=89$) encouraged changes in the availability, accessibility and enrolment of children from low-income, single-parent and ethnic minority families. The programme combined monthly training sessions with a trainer and coaching activities carried out within inter-professional exchanges with social and welfare workers. In addition, the training intervention was accompanied by policy measures enacted at municipal level that provided financial incentives to those centres that developed a policy of equal access. To test whether changes in priorities or in enrolment were related to participation in the programme, the centres were divided into four groups: non-participants ($n=19$); early participants (since 2007; $n=29$); middle participants (since 2008; $n=23$); and late participants (since 2010; $n=18$) (Vandenbroeck et al, 2013, p. 4). The findings showed that centre directors’ awareness of social priority criteria changed, resulting in a significant increase in the enrolment of children from single-parent ($p < 0.001$) and ethnic minority families ($p < 0.05$) whereas no significant effects could be found in the enrolment of children from low-income families. In addition, inequality in relation to the availability of childcare places remained. The results support the hypothesis that policy measures, combined with training and ongoing support, can influence inequalities in enrolment rates.

Summary of impacts

The question addressed in the in-depth review of CPD studies concerns the impact of in-service training interventions on ECEC quality, staff–child interaction and children’s outcomes. First, it was intended to determine whether CPD provision would make a contribution to the quality of educational experiences offered to children within early years’ settings and to what extent it would foster children’s cognitive and non-cognitive development. Secondly, the aim was to establish patterns between CPD components and their reported effects so that results could be drawn in regard to the effectiveness of certain intervention.

All studies included in the in-depth review showed that CPD had a positive impact on at least one of the outcomes studied.

In three studies, short-term intensive interventions integrated into the practice of ECEC centres through video supervision was found to be effective in fostering practitioners’ caregiving and language stimulation (Beller et al, 2007

and 2009; Fukkink and Tavecchio, 2010); this in turn has a positive impact on children's initiative in verbal interaction (Simon and Sachse, 2011). Evidence of the impact of such training interventions on children's outcomes has also been found in two studies documenting significant gains in terms of language acquisition and cognitive development (Beller et al, 2007 and 2009; Buschmann and Joos, 2011). The retention of training effects was reported in only one study (Fukkink and Tavecchio, 2010) in which a post-intervention measure was carried out after three months, whereas long-term impact of CPD was not reported in any of the studies. Out of the four studies in which evidence in favour of the effectiveness of video supervision training interventions was found, three were conducted in public ECEC centres in Germany (with two studies evaluating the same programme),⁹ while one was conducted in a context of private subsidised provision in the Netherlands. Given that the limited number of studies available were mostly carried out in one country, evidence from such studies might not be generalisable beyond national boundaries.

Long-term CPD interventions integrated into practices through the provision of ongoing staff support, such as pedagogical guidance and coaching in reflection groups (groups where participants reflect on their professional practice), were proven to be effective in five studies that are more heterogeneous in terms of geographical location. In the Danish and Swedish studies (Jensen, 2013; Sheridan, 2001), the CPD interventions examined were embedded in comprehensive public systems characterised by a well-established pedagogical tradition in the provision of ECEC services ('systematic quality work'), whereas in the study from Ireland (Hayes, 2013), the training intervention studied was part of a two-year funded Parenting Early Intervention Programme (PEIP) embedded in a context where ECEC provision tends to be patchy, fragmented and scarcely subsidised. Two studies were carried out in continental Europe, namely in Belgium (Vandenbroeck et al, 2008 and 2013) and Germany (Evanschitzky et al, 2008), in contexts where ECEC provision is mixed (mostly public and private not-for-profit) but publicly subsidised. The heterogeneity of the CPD interventions studied as well as of the contexts within which such initiatives took place makes it difficult to compare findings. However, it can certainly be stated that long-term pedagogical support provided to staff in reflection groups was found to be effective in enhancing the quality of ECEC services (Hayes et al, 2013; Sheridan, 2001; Vandenbroeck et al, 2008 and 2013) as well as in improving children's cognitive and social development.

Very limited evidence was found in regard to the impact of short-term integrated training interventions without a feedback component and the impact of training interventions that are not integrated into practice. Only two studies, one from Ireland (Rhodes and Hennessy, 2001) and one from Spain (Franco Justo, 2008), were found for each case. Details of these studies are given in the previous section.

To conclude, the in-depth review of CPD impact studies identified gaps in relation to:

- the impact of short-term training interventions integrated into ECEC practices without video feedback component (no evidence found);
- the impact of long-term interventions integrated into practices through the provision of ongoing staff support on staff-child interactions (limited evidence found, only one study);
- the impact of integrated short-term intensive training interventions without feedback component (limited evidence found, only one study that was judged 'sound' despite discrepancy with quality criteria);
- the overall impact of long-term and short-term training interventions that are not integrated into practices (limited evidence found, only one study);
- the evaluation of long-term impact of CPD interventions (retention of training effects).

⁹ Heidelberger Trainingsprogramm zur frühen Sprachförderung in Kitas

Synthesis of impact studies on working conditions

Only four studies included in the in-depth review evaluated the impact of working conditions on the quality of ECEC (Hayes et al, 2013), staff–child interactions (Palmerus, 1996; Hayes et al, 2013) and outcomes for children (Blatchford et al, 2001 and 2002; Hayes et al, 2013; Sundell, 2000).

Evidence on the impact of staff–child ratios on staff–child interactions were found in only one study, carried out in Sweden (Palmerus, 1996); no impact was found in the study carried out in Ireland (Hayes et al, 2013) which evaluated the effects of staff–child ratios as one of the components of a two-year funded PEIP. In the Irish case, findings from CPD and working conditions components could not be disentangled. However, within the same study it was demonstrated that the environmental quality of ECEC settings improved as an effect of the combined intervention, suggesting that the staff–child ratio component might have played a role.

Strong evidence on the effects of class size on children’s academic attainment was found in the Class Size Project (Blatchford et al, 2001 and 2002) conducted in reception classes in England. Despite the fact that this study provides the most extensive initial evidence for the existence of a real causal effect of class size on achievement, the authors warn that results may not generalise to other parts of the UK, where education policy and practice varies, and therefore generalisation of results beyond national boundaries would not be appropriate. Similar concerns were expressed in the study evaluating the effects of staff–child ratios in ECEC centres in Sweden (Sundell, 2000). The study found no evidence of an impact of the staff–child ratio on children’s cognitive, verbal, and social achievements. However, the author warns about the generalisation of results, stating that – in the context studied – the high degree of consensus among teachers and assistants concerning specific goals and the ways to accomplish them might have compensated for a decreased adult–child ratio.

To conclude, given the scarcity of reliable evidence on staff working conditions, the review was unable to address the question concerning their impact on the quality of ECEC, staff–child interaction and children’s outcomes.

Results: Views studies 4

This chapter describes the findings of the in-depth synthesis of views studies concerning the effects of CPD initiatives and working conditions on practitioners (knowledge, practice and understanding), on their interactions with children and on children's learning and socialising experiences. The chapter is in two parts. The first part gives an overview of the studies included, by describing their features in terms of geographical location, research design and characteristics of the CPD intervention or working condition(s) studied. The second part analyses how practitioners, as result of taking part in CPD, reported changes to their professional knowledge and understandings, as well as to their pedagogical practice, contributing to improved overall quality of ECEC provision.

Overview of studies selected for in-depth review

Of the 41 views studies described in the mapping phase, 32 studies (78%) were included in the qualitative in-depth synthesis. Nine studies (22%) reporting qualitative findings in relation to the effects of CPD or working conditions were excluded from the in-depth synthesis on the basis of study design or methodological rigour criteria (low 'usefulness' and 'reliability' of reported findings).

One quarter of the studies included in the qualitative in-depth synthesis were from the UK (Ang, 2012; Aubrey et al, 2012; Blatchford et al, 2001, 2002; Blenkin and Hutchin, 1998; Jopling et al, 2013; Menmuir and Christie, 1999; Potter and Hodgson, 2007; Wood and Bennett, 2000), six were from Portugal (Cardoso, 2012; Craveiro, 2007; Leal, 2011; Lino, 2005; Peixoto, 2007; Oliveira-Formosinho and Araújo, 2011), five were from Ireland (Bleach, 2013; Hayes et al, 2013; McMillan et al, 2012; Share et al, 2011; SQW, 2012) and a further five from Sweden (Asplund Carlsson et al, 2008; Johansson et al, 2007; Rönnerman, 2003, 2008; Sheridan et al, 2013). Two were from Belgium (Peeters, 1993; Peeters and Vandebroek, 2011). The remaining six studies were carried out in Croatia (Vujičić, 2008), Germany (Richter, 2012), Italy (Picchio et al, 2012), the Netherlands (Van Keulen, 2010), Slovenia (Vonta et al, 2007) and Spain (Sandstrom, 2012).

The findings from the views studies focused overwhelmingly on the effects of CPD initiatives, reported in 30 studies, whereas findings on the effects of working conditions were reported in only two studies (Blatchford et al, 2001 and 2002; Sandstrom, 2012). Interestingly, both studies reporting findings on working conditions were carried out as mixed-method studies.

The methodological characteristics of the views studies included in the in-depth review varied greatly both in terms of research design and in terms of methods used for data collection and analysis. Fourteen studies (including the two on working conditions) adopted a participatory approach to the evaluation of CPD initiatives or working conditions investigated. The findings reported in such studies usually drew on the analysis of data collected through open-ended questionnaires, semi-structured or in-depth interviews, focus groups, reflective diaries, participant observations in ECEC settings and audiovisual recording of pedagogical practice. Fifteen studies adopted an action research approach that involved practitioners in the process of data collection and analysis. Therefore findings in these cases were co-constructed with practitioners taking part in the action research/CPD initiative reported and they mostly drew on data sources such as action plans, written accounts of practitioners' and children's experiences in ECEC settings, reports of group meetings and audiovisual documentation. Descriptive case study designs were adopted in just three studies reporting findings on the effects of CPD initiatives on practitioners' knowledge and understanding, as well as on their professional practices (Craveiro, 2007; Menmuir and Christie, 1999; Oliveira-Formosinho and Araújo, 2011).

The findings on CPD reported in the narrative synthesis below refer to a wide range of training initiatives, which differed in terms of delivery modes, scope and duration. However, all studies reported findings on the effects of CPD programmes that were integrated into ECEC practices through a combination of training sessions and follow-up activities in the settings. In particular, 22 studies investigated integrated programmes in which training sessions were

accompanied by coaching or supervision activities providing practitioners with the opportunity to exchange reflections and receive feedback on practice. The high number of views studies exploring CPD programmes accompanied by follow-up activities such as coaching, supervision and collective reflection is partly due to the fact that in action research designs, revision and transformation of practices are integral parts of the research process, which is carried out as a joint activity involving practitioners and researchers together. In this research design, the boundaries between the processes of CPD implementation and research investigation are less marked than in impact studies.

Furthermore, the majority of CPD initiatives reported in the views studies included in the in-depth synthesis are long-term programmes lasting from six months to one year (11 studies) or longer (13 studies). In six studies, however, the length of the CPD programme investigated was not clearly specified.

A full description of the methodologies and characteristics of the included studies about continuing professional development is given in Annexes 4–7.

Analysis of views studies on CPD

Effects of CPD on practitioners' knowledge and understanding

An overarching finding was that CPD improved participants' sense of confidence in themselves as practitioners and leaders in ECEC services (Ang, 2012; SQW 2012; Hayes et al, 2013; Sheridan et al, 2013; Richter, 2012). Through the demands of the CPD programmes and reflective tools used, practitioners increased their pedagogical awareness and professional understanding, which in turn allowed them to strengthen their capacities and address areas for improvement (Ang, 2012; Menmuir and Christie, 1999; Rönnerman, 2003; Hayes et al, 2013).

The key findings of an impact evaluation of the National Professional Qualification in Integrated Centre Leadership (Ang, 2012) revealed that attending the programme not only enhanced participants' knowledge and understanding of their leadership role, but also helped them to further develop their skills and more clearly define their values and beliefs. The increased confidence and awareness experienced by the leaders who attended the programme in turn had an impact on the way they were able to orient and support decision-making processes within their settings, which resulted in an improvement in the quality of teamwork, as well as on the way they engaged in partnership with local agencies and community stakeholders.

Increased skills and ability to reflect upon practices, as well as increased confidence in ability, skills and practices were also reported as the main effects of the 'Coordinated Mentoring Support Programme' aimed at facilitating the implementation of the Irish National Quality Framework in Early Years Education (Siolta). In particular, the Summary Evaluation of the programme states: 'practitioners were better able to articulate and demonstrate practices' and 'showed an increased ability in transferring/connecting theory to practice' as well as a 'greater awareness and understanding of quality' (SQW, 2012, p. 83). Similarly, Richter (2012), describing the effects of a training initiative directed at improving staff competency in enhancing science education in daycare centres in Germany ('Versuch macht klug') reported that, as result of the training, teachers experienced a positive development with regard to interest, frequency of experiments, self-concept and expertise. In addition, research findings indicated that the effects of training on teachers' practice persisted for six months after the end of the programme.

The study by Sheridan et al on the effects of 'systematic quality work' in ECEC services in Iceland, Sweden and Norway reported that the knowledge gained by teachers through the analysis of pedagogical documentation and the systematic evaluation of educational practice made them more aware of their competence and of the quality of their work. It gave teachers an insight into where their work leads and why. The author states that such initiatives foster teachers' ability to take into account multiple theoretical perspectives and to critically reflect on educational policies and curriculum

intentions. This enables teachers to create new understandings of how systematic improvement of pedagogical work can be achieved in the ECEC settings where they are employed (Sheridan et al, 2013, p. 147).

Menmuir and Christie (1999) found that attending a training module on ‘Children’s Development and Learning’, which adopted a Repertory Grid to elicit the constructions used by practitioners to describe children’s experiences, had clearly encouraged participants to challenge their own understandings and to co-construct new professional knowledge by discussing and negotiating the meanings emerging from the analysis of the grids.

A crucial aspect of CPD provision in influencing practitioners’ increased pedagogical awareness and deepened reflectivity is the active involvement of participants in transformative processes to improve educational practices within ECEC settings. By engaging in research-based enquiry, practitioners can critically explore the link between theory and practice in their everyday work and this gives them the ability to identify and address the gaps between intended pedagogical principles and enacted practices (Wood and Bennett, 2000; Johansson, 2007; Lino, 2005). Furthermore, involving practitioners actively in the process of change has an impact not only on their practical knowledge but also on their professional attitudes and understanding (Peeters and Vandebroek, 2011; Rönnerman, 2003 and 2008; Blenkin and Hutchin, 1998). One of the most salient effects of professional development, especially when accompanied by guidance, is the empowerment of practitioners to question taken-for-granted assumptions which underlie their enacted practices. Rönnerman found that ‘by letting the teachers find their own questions and by letting the question guide them in searching for new knowledge about their practices, the teachers retain authority over their improvement of practices’ (Rönnerman, 2003, p. 17); this, in turn, strengthens their professional competence. Several studies found that taking part in CPD led practitioners to reconceptualise their role as educators (Blenkin and Hutchin, 1998; McMillan et al, 2012; Potter and Hodgson, 2007; Rönnerman, 2003; Sheridan et al, 2013; Vujičić, 2008; Wood and Bennett, 2000). In some cases, such as where the focus of the CPD increased opportunities for reflective thinking, a reassessment of the role of the educator was seen as a successful outcome of participation in training.

Potter and Hodgson’s study of a training course designed to promote the key skill of reflection was focused on enabling children to take a greater lead in interaction. Study participants rapidly realised that their practice role needed to be subject to wider examination, so that they could ‘act as facilitators rather than directors of play sessions’ (Potter and Hodgson, 2007, p. 505). Similarly Rönnerman found that action research carried out in connection with the curriculum led to changes in how teachers understood their roles: ‘they are now more observant of the children’s own curiosity ... and are not so eager to plan the children’s play or activities. Instead the teachers support the children’s way of wanting to know by challenging their thinking and acting’ (Rönnerman, 2003, p. 19).

Wood and Bennett’s account of participatory research focusing on the relationship between play and learning also found that respondents had rethought their role as educators. One said that she had ‘rethought things ... because it was just too disorganised and I couldn’t run my classroom like that’ ... the study ‘has been very helpful in developing my thinking about play and helping me reflect on my classroom practice’ (Wood and Bennett, 2000, p. 641). Another study participant had decided to

allocate a daily session for free play, based on the HighScope plan-do-review approach ... which also allowed more time for observation and interaction. As a result ... the quality of play had improved significantly and she was better able to justify what the children were learning. She reflected that ‘I’ve changed my theory and my practice ... I’ve gone away from “choosing time” towards planning time ... its upped the quality of what is happening and upped my knowledge of what’s happening’ (Wood and Bennett, 2000, pp. 641–642).

Finally, the study by McMillan et al of the effectiveness of a social constructivist-based professional development model that incorporated written material alongside tutor support in Ireland found that one main outcome was ‘the evolution of

participants' views on early years pedagogy and, specifically, on their role within it'. Practitioners agreed that their understanding of how children learn 'had changed as a result of participating in the project', and particularly how to implement changes in practice. One participant said: 'I think [participating in the programme] made us better practitioners. I think it made us more reflective of our work. I think it made us realise the importance of the children's views and how they can give information and participate in the curriculum and the activities' (McMillan et al, 2012, p. 402).

In parallel with rethinking their own role, practitioners also began to reconceptualise children as protagonists in their own learning (Cardoso, 2012, p. 297; Sheridan et al, 2013, p. 139). Sheridan et al reported that Swedish teachers' perspective was that they had developed the competence to document children's learning rather than their participation in activities. Documentation is also a tool for making children's competence visible, and so helps teachers in the ongoing improvement of their performance. Cardoso reported the effects of a CPD programme carried out in a community ECEC centre through an action research process and highlighted how practitioners changed their view of the children from spectators to participants (Cardoso, 2012, p. 297). This implied a change in their practices, particularly in the organisation of the educational environment (space and time) within the setting. The way in which they planned and assessed practice also changed, reflecting a shift towards an approach focused on listening to children. The role of play was reconceptualised from something that children 'naturally' do (without the involvement of the adults) towards something that gives children the possibility to intervene directly in the everyday pedagogy and supports their opportunities to invent and find out about the world. The CPD also had the effect of increasing coherence between discourse and practice. The author identified the following key success factors:

- starting with the participants' views and practices, to identify real problems and areas of change;
- participation in decision-making in the process of change;
- the importance of using pedagogical references, quality instruments, documentation and reflection to discover pedagogic incoherence;
- allowing a slow process of change to take place.

Both Sheridan et al (2013) and Cardoso (2012) emphasise that CPD is a complex process involving the institution as a whole.

Menmuir and Christie's study of generating reflective thinking through workplace learning concluded that 'it was clear that all participants had found that the exercise had made them think more about the children or think about them in different ways' (Menmuir and Christie, 1999, p. 71). The programme evaluation also confirmed that the participants' set of constructs concerning children's experiences in the setting became progressively more complex over the duration of the training. In the case of Potter and Hodgson's study, the practitioners, after a second week of training, 'made a decision to just step right back and just observe the children. It was just absolutely fascinating and we then gave the support where they needed it. I think it allowed the children to run their own session ... we've empowered children' (Potter and Hodgson, 2007, p. 505).

The study by Share et al of a structured training programme focused on increasing parental involvement in children's education also referred to 'encouraging children's autonomy', albeit with varying success (depending on the characteristics of individual settings) (Share et al, 2011, p. 57). A study of a HighScope programme implemented in Ireland (SQW, 2012), based on active participatory learning, led to a greater understanding of children as holders of rights. A respondent in Wood and Bennett's study, which also followed implementation of HighScope, referred to the way in which rethinking the adult role led to 'the realisation that some teacher prescribed activities are changed completely by the children, the teacher may have an aim in mind, children may become engrossed in the activity and

follow their own ideas through' (Wood and Bennett, 2000, pp. 643–644). Finally, Blenkin and Hutchin's (1998) study adopted an action research approach to foster context-based professional development, and found that practitioners' understanding and perceptions of individual children, as well as of children's learning and socialising experiences within the peer group, changed dramatically as a result of their engagement in systematic observation. In turn, perceptual changes about children's abilities led practitioners to reconsider their role in interacting with children during play to scaffold child-initiated learning processes more responsively.

Engaging in CPD in highly socioculturally diverse ECEC contexts can lead practitioners to refocus on children's needs and potential and reconceptualise the role of parental involvement. For example, Oliveira-Formosinho and Araújo summarised the effects of a praxiological-research CPD intervention. This study reported that practitioners started to view 'listening to children as an important dimension that supported activity and projects' and 'listening to parents as a strategy to develop daily life in the classroom in a pluralist way' (Oliveira-Formosinho and Araújo, 2011, p. 8). Similarly, findings from participatory action research carried out in Flanders highlighted that practitioners became progressively 'more interested in the way parents educate their young children at home and in questioning how the childcare centre could take on some of the practices of the parents' (Peeters and Vandenbroeck, 2011, p. 67). Through these processes, children were increasingly considered as active citizens who could decide upon important aspects of the daily life in the childcare centre. Similarly, practitioners attending action research CPD in Croatian pre-schools stated that, as a result of participating in the programme, 'we dared to have full confidence in our children and we showed this to them. They accepted it, showing us daily that many of our beliefs concerning their (non)abilities and (im)maturity are in fact professional misconceptions, and surprising us with daily amounts and intensity of their abilities and knowledge' (Vujičić, 2008).

Particular CPD tools were highlighted as improving the quality of practice. These were tools that helped practitioners to be reflective thinkers, which was identified in several studies as a key ingredient in a cycle that usually included observation, documentation, action and review. Ang's (2012) study highlighted the use of journals as a specific aspect of the training that was found particularly useful and that centre leaders continued to draw on in their work with partner agencies as a tool facilitating inter-professional work.

Findings from Bleach's (2013) study in Ireland found that the action research cycle of planning, acting, observing and reflecting provided the structure for the project team to manage and support the implementation of Siolta (National Quality Framework) and Aister (Early Childhood Curriculum Framework) in ECEC settings. The action plan designed as a CPD tool helped practitioners to develop methodological skills such as planning and evaluation, required to improve the quality of teaching and learning processes within their centre; it also contributed to raising practitioners' awareness of the importance of such skills, which resulted in increased engagement in planning, preparation, monitoring and revision activities.

One of the main effects of documentation-based CPD training in the Italian city of Pistoia reported by Picchio et al is practitioners' increased competence in the use of methodological devices for analysing and improving the quality of children's everyday experiences in early childhood settings. The teachers confirmed that the competent use of written documentation of children's experiences within the setting (weekly and process reports) allowed them 'to grasp more fully the aspects of continuity and change' underlying the ongoing development of learning interactions and enabled them 'to re-direct educational practices' more responsively (Picchio et al, 2012, p. 164). However, the study findings also reported that the implementation of documentation practices was difficult to sustain in contexts where practitioners were not adequately supported in terms of working conditions – in particular, non-contact time granted for compiling, analysing and discussing the reports collectively.

Vonta et al (2007) found that reflection and self-evaluation was the biggest challenge in the process of professional development carried out as action and developmental research within Slovenian pre-schools. Practitioners viewed the quality of self-evaluation and self-reflection as closely related to the creation of new professional knowledge. Pre-school teachers recognised professional portfolios as an important tool for sustaining professional development, combined with CPD mentors who encouraged them, observed them and provided feedback as well as advising them about possible changes to be introduced in their professional work with children.

Effects of CPD initiatives on practitioner's practice

Most studies analysed so far – albeit not all of them – cite the chief benefits of CPD to be practitioners' increased pedagogical awareness, practical knowledge, methodological skills and questioning attitude to improving enacted practices within ECEC settings. The improvement of educational practices documented in research findings broadly referred to the enhanced quality of ECEC settings that unfolds in several dimensions. For the purpose of this analysis on the impact of CPD on quality of ECEC, two main areas of improvement were identified. The first is regarding practices related to the development, implementation and ongoing revision of the curriculum; the second area of improvement refers to the impact of CPD on collegial work, including inter-professional collaboration and parents' engagement in decision-making processes.

Curriculum development, implementation and innovation

Interventions guarantee change in the quality of practitioners' practice. Context-based training with an emphasis on ECEC pedagogy and supervision of teachers has more effect on overall quality of the setting than a traditional course that perceives CPD as an individual process based on acquiring sound theoretical foundations without a concern for the specific ECEC context. An action research project based on building bridges between research and practitioners showed that practice-based research can be a tool that highlights high quality pedagogical practice, and this can, in turn, raise the status of the ECEC service in the eyes of the public and policymakers (Johansson, 2007, p. 161).

Two studies report that the first year of a long-term CPD intervention (between two and five years) is a 'bedding-in' period with rather limited effects on the pedagogical practice, while during the second year there are significant effects on practitioners' practice (Hayes et al, 2013; Peeters, 1993).

In regard to this area of improvement, the studies analysed reveal that the systematic use of methodological tools, such as observation and documentation of children's experiences, action plans, diaries, portfolios and analytical grids, supported the enactment of educational practices that are more responsive to children's needs, potentialities and learning strategies.

In the first instance, this translates into enhanced purposefulness on the part of the practitioner, which is explicitly displayed in activity planning and evaluation as a result of their increased pedagogical awareness. For example, an action plan quoted by Bleach states that as a result of the CPD, there was 'more planning and preparation for play as [the] preschool day [was] shorter due to [a] free preschool year. This will need to be reviewed and monitored over the next couple of months' (Bleach, 2013, p. 374). One of the main benefits of practitioners' involvement in action research initiatives was the planning, implementation and evaluation of learning initiatives based on children's needs rather than on pre-determined choices made by practitioners (Bleach, 2013, p. 374). Similarly, Oliveira-Formosinho and Araújo reported that 'the development of systematic observations that identified children's interest and motivations allowed for educational planning that departed from children and not from an abstract child.' (Oliveira-Formosinho and Araújo, 2011, p. 8). In this case, educators' increased awareness of the importance of listening to children, coupled with their enhanced competence in observation strategies, allowed them to enact educational practices that were more supportive of children's agency in experiential learning situations.

The elaboration of more responsive strategies for enhancing children's learning were highlighted as one of the main effects of CPD in 15 studies (Asplund Carlsson et al, 2008; Blenkin and Hutchin, 1998; Jopling et al, 2013; Leal, 2011; McMillan et al, 2012; Picchio et al, 2012; Rönnerman, 2003 and 2008; Share et al, 2011; SWQ, 2012; Vujčić, 2008; Hayes et al, 2013; Johansson et al, 2007, Richter, 2012, Cardoso, 2012).

Jopling et al studied the impact of training associated with the 'Early Talk' programme. They highlighted that the participating centre's curriculum changed as a result of the training. After training there was 'more detailed and more precise child assessment; greater focus on planning for language and interaction; more small-group work, story time, music and singing' (Jopling et al, 2013, p. 80). Researchers' participant observation in these settings also documented changes in the learning environment. These revealed an increased focus on enriching children's language learning opportunities. Changes included

introducing visual timetables for children; increased use of signing [for deaf children]; use of pictorial and poster prompts to support language; displays placed at the child level; improved labelling of resources (some using photos) and access to resources; display boards used to celebrate language and initiate child discussion; reallocating indoor space to offer small group areas, better book and cosy talk areas; extending the classroom into outside areas (Jopling et al, 2013, pp. 80–81).

Qualitative interviews (Richter, 2012, p. 199) showed that a four-day intervention programme stimulating the teachers' own explorative learning helped them develop individual ways to integrate sciences into their work with children. Time and the age of the children were, however, restricting factors.

Blenkin and Hutchin's action research study found that the impact of CPD on the ongoing process of practice improvement was clearly visible in practitioners' case studies and action plans. The authors stated that it 'is clear from the case study evidence that a significant number [of participants] have shown a deepening understanding of the impact of their provision on children's learning. The actual child observations themselves and the commitment to reflect and analyse them became the key to change' (Blenkin and Hutchin, 1998, p. 67). In the study by McMillan et al the professional development training 'seemed to have the greatest impact on the quality of the teaching strategies of the practitioners' which could be seen in a 'more integrated pedagogical approach ... a better balance between play and work-based activities ... greater child agency and collaboration were allowed for, and practitioners tuned in more appropriately to the learning experience' (McMillan et al, 2012, pp. 405–406). Johansson (2007, p. 162) reported that research and developmental work made pedagogical practice more exciting, stimulating and varied, which promoted a sense of reward from and pleasure in the work. Interventions based on practice-based research can be regarded as contributing to developing, changing and improving the general work in the ECEC sector, and increasing the professional development of staff.

With regard to the systematic use of documentation, it was noted that weekly reports and process reports that arose from CPD enhanced teachers' practices in relation to the coherent development, implementation and evaluation of the curriculum (Picchio et al, 2012). A study participant stated: 'I became aware of the shortcomings. When I analyse the Process Report I can see whether the effects of the educational practice are consistent with the objectives' (Picchio et al, 2012, p. 167). Methodological and reflective competence developed through the training process allowed practitioners to identify critical issues in the educational context in which they were operating and to address them effectively through long-term planning. Sheridan et al (2013, p. 145) reported that documentation can empower teachers to critically analyse their work in relation to the objectives of the curriculum.

Leal's (2011) study evaluated the impact of an accredited educational programme on the assessment of competences in Portuguese pre-schools. The main effect was on learning assessment practices at a micro level (decisions made in the

activities room) and, to a lesser extent, at a meso level (decisions made within the institution). Early childhood educators integrated pedagogical practices into a number of assessment strategies implemented during the educational programme, creating an awareness of the importance of centring assessment on descriptive procedures, which focused on:

- the child's activity and on the documentation and recording of work carried out on a day-to-day basis;
- the development of competences of each child.

Rönnerman's action research studies (2003, 2008) found that subsequent to the intervention there was a deliberate shift towards trying to find out what the children knew before planning an activity. Daily work was no longer only pre-planned but included greater openness to listening to children's needs and ideas that arose during the day. Teachers asked the children, and used the information to plan new themes, giving children an active role in the planning of, for example, thematic work. One teacher reflected on the change to practice:

You have been more sensitive about the children's interests. Take their competence as a departure and spin on to it. You do not stop and stay within your frames anymore; you go a step further and find out things you might not have planned. You don't have to stick with your plans; if the child comes up with questions you find out the answers together with him/her (Rönnerman, 2003, p. 15).

Teachers in the study by Asplund Carlsson et al (2008) reported the effects of a two-year action research CPD project on children's aesthetic learning in Swedish pre-schools. They said it changed their way of talking about aesthetics. Teachers were involved in lectures, creative workshops and collective dialogue about their perceptions. As a result, they became more aware of the 'object of learning' – what they were supposed to teach children; that it was not only about having fun and enjoyment but also about children's learning. They reported developing a deeper understanding of children's learning processes and, as a consequence, they had become more actively involved with children and could ask questions that would direct the child's attention and help the children's discoveries in music, dance and poetry, for example. Teachers' understanding of their own role changed from 'doing' to 'learning and understanding' (Asplund Carlsson et al, 2008, pp. 45–50).

Aubrey et al (2012, p. 345) reported that the 'Let's Think' three-year intervention had, according to the teachers, a whole-school impact. All the schools mentioned changes in teachers' practices, and the thinking skills philosophy was used in other lessons in three of the four schools participating in the project.

A further aspect of the curriculum that changed as a result of CPD was reported by Peixoto (2007). The impact of a CPD programme focused on physical sciences and laboratory activities in Portuguese pre-schools was that teachers changed both their educational approach and didactic practices after being involved in training. In particular, initial data collection showed that pre-school teachers were convinced of the educational potential of laboratory activities but they were mostly implemented in a way that did not acknowledge children's previous ideas. By the training application phase, the teacher supervisor (researcher) led the participants to implement various types of laboratory activities organised in such a way as to foster children's conceptual and procedural knowledge development. The overall evaluation of the programme showed that: i) teachers overcame most of their initial conceptual and methodological difficulties; ii) the facilitator role of the teacher educator (supervisor) was a crucial factor in the changing of teachers' practices; iii) participants' conceptions about laboratory activities and their use in science teaching developed in such a way that they got closer to the epistemological conceptions adopted by the specialists in this area.

Share et al evaluated changes to early years' practices that were the direct result of practitioners' exposure to the values and strategies in the 'Pen Green training'. Their evaluation shows that these changes were wide-ranging. They included changes to daily routines, such as settling-in periods for new children, and changes to observation and assessment, such

as undertaking regular child observations and introducing portfolios documenting children's learning experiences (Share et al, 2011, p. 8). However, the impact of CPD was uneven across the settings studied, and was dependent on the conditions under which such centres were operating – for example, whether non-contact time was granted to practitioners, whether all or just a few of the staff had taken part in the training, and whether the funding for centres was secure. This is another example of the interrelationship of working conditions and CPD.

Similarly, SQW found that in response to CPD, practitioners made major changes to create a more effective learning environment, such as 'different activity spaces/areas around the classroom (including a new relaxation room in one setting), new equipment, pictures of activities and signs on the walls and neutral space for free play' (SQW, 2012, p. 80). A further impact was greater time allocated to free play. Peeters also found that as a result of quality improvement programmes carried out in the Flemish Region of Belgium there were changes to the educational environment provided by municipal childcare settings. Among the new provisions were 'mirrors on the walls, cushions on the floor, crawl-through corners and cosy soft toy corners' (Peeters, 1993, p. 56). Play equipment was made more accessible as result of staff's increased awareness of the importance of granting children freedom of movement and autonomous choices (Peeters, 1993, p. 59).

Finally, action research CPD in a Croatian pre-school highlighted that changing the arrangement of the room and equipment, as part of the intervention, had had a positive effect on the everyday experiences of children, who progressively gained ownership of the settings. One participant reflected that:

We don't hear so much crying anymore and there is not much sneaking either. Everyone finds their own games. However, they do not use boxes just as boxes, but they become a big train, a dust or floor cloth or a baby pram; they invent a hundred other things out of one. Seeing their satisfaction, joy and the way they influence each other and also us, we cannot feel anything else but satisfaction as well (Vujičić, 2008, np).

To conclude, the chief benefit associated with the impact of action-based CPD on the educational practices enacted within ECEC settings is practitioners' encouragement to undertake pedagogical experimentation to find new ways of dealing with the complexity of everyday interaction between adults and children.

Collaborative practices

As might be expected from CPD that was usually workplace-based and focused on practitioner learning in dialogue with colleagues, a clear area of impact was on collegiality, teamwork, working with parents and interprofessional collaboration.

Taking changes to practice reported within settings first, an impact of CPD on practitioners' teamwork through sustained workplace-based dialogue was reported by 13 studies (Bleach, 2013; McMillan et al, 2012; Picchio et al, 2012; Rönnerman 2003 and 2008; Share et al, 2011; SQW, 2012; Vujičić, 2008; Van Keulen 2010; Hayes et al, 2013; Wood and Bennett, 2000; Craveiro, 2007). In Bleach's study, practitioners both 'appreciated the openness and willingness of others to share' and gained from 'the opportunity to express their opinions and to discuss issues that concerned them' (Bleach, 2013, p. 375). The process of sharing ideas and viewpoints also helped them to voice matters that they considered needed to be reviewed or changed. Bleach noted that action plans devised within the CPD led to changes in the structure of the setting, allowing for more time for staff reflection and planning, and for including practitioners' ideas in team meetings, so enhancing opportunities for teamwork. Hayes et al (2013) reported that communities of practice meetings were identified by Early Years' practitioners as a method of support that informed their practice, helped them to reflect, and gave them a sense of how implementation of the training manual was progressing in other services.

Rönnerman also noted that keeping work teams together during CPD training ‘strengthened them as a group’, and gave them a common ‘language to explain things’. Work teams, an important concept in the organisation of Swedish pre-schools, gained the confidence to ‘give away our best ideas instead of keeping them to ourselves’ (as one pedagogue said) and to voice their opinions in staff meetings more readily (Rönnerman, 2003, p. 17). One particular method of strengthening teamwork considered valuable by Van Keulen (2010) was paired work with a colleague as ‘critical friends’, which enabled each pair to reflect, carry out assignments and give each other feedback on the learning process. Van Keulen reported that the technique of asking critical questions deployed during the action research CPD encouraged practitioners, the team and the organisation as a whole to formulate questions about practice, such as ‘What do I think? Why do I act the way I do? Who benefits? How does the team deal with parents that do not live up to our ideals? With which parents has the organisation had insufficient or no contact over the past period, and how come?’ Such a questioning attitude was considered productive at both a personal and at a team level (Van Keulen, 2010, p. 109). This study concluded that in the Netherlands, paying sufficient attention to developing the work team as a team was a key condition for creating sustainable change within ECEC services.

Craveiro (2007, p. 343) reported post-intervention changes in the team ‘climate’: the team becoming more open to sharing views, collaboration and peer support; more teamwork between teachers and auxiliary staff; and changes in teamwork between teachers. This led to a more open and inclusive ethos, in which staff were eager to improve quality and were less defensive and more proactive in problem solving and formulating challenges. Teachers started to write plans based on child observations (critical incidents) and to collect evidence of children’s learning and report this to parents.

Creating opportunities for teamwork does not necessarily have the desired effect. McMillan et al found that some practitioners were frustrated that staff discussions ‘do not necessarily lead to change [in] mindsets and routines’ (McMillan et al, 2012, p. 407). Difficulties sustaining changes in teamwork were experienced particularly where not all the practitioners had participated in the CPD (Picchio et al, 2012). Inadequate non-contact time for staff to plan together as a team was noted as a barrier to sustaining practice change introduced through CPD (SQW, 2012).

Reviewed studies reported that CPD had had a positive impact on working with parents (Share et al, 2011; SQW, 2012; Vujičić, 2008; Rönnerman, 2003; Van Keulen, 2010; Peeters, 1993; Hayes et al, 2013). Share et al found that Irish practitioners’ participation in CPD led to more, and more confident, dialogue with parents and a more welcoming approach, with the participation ‘generally fostering a spirit of openness with parents’, although at the point of evaluation not all the centres where staff had participated in the intervention (‘the Pen Green training’) operated formal parent–worker communication through a key worker system. Staff training helped parents to feel trust in the practitioners, which gave them confidence to ‘ask questions about their child’s learning’ (Share et al, 2011, p. 89). Dialogue with trained practitioners gave the parents confidence in, and reinforced, their own parenting practices and gave them new knowledge about how to describe what the children were doing, and that made their children’s learning more visible (Share et al, 2011, p. 89). Rönnerman (2003) and Van Keulen (2010) both reported that increased practitioner confidence in working with parents led to parents showing greater respect for staff. Vujičić found a higher level of parental engagement as a result of action research CPD, particularly in practical support, such as ‘bringing materials, sawing the cupboard and painting the walls’ (Vujičić, 2008, np). Similarly, Peeters highlighted that at the conclusion of the quality improvement project there was a noticeable increase in parental participation in childcare centres. Get-together events started to take place regularly and parent evenings began to be organised around a set theme (Peeters, 1993, p. 64). Hayes et al (2013, p. 3) also reported an increase in parental participation. Intervention services tended to have fewer instances of very low child attendance when compared to control services, which provided support for the overall CDI programme model in promoting attendance (Hayes et al, 2013, p. 4). However, a study in Portugal (Leal, 2011) of an action research programme found that there was no impact on practitioners’ conceptualisation of parents; they remained passive subjects.

Finally, in this section, CPD had an impact on collaborative practices and networking with external professionals (Ang, 2012; Bleach, 2013; SQW, 2012). Ang's evaluation of a leadership programme in children's centres found that the training led to more effective partnership when work was undertaken with people from different professional backgrounds. This partly came about through the establishment of a centre's vision and strategy and a realisation that 'we needed to be much more integrated both with other professionals and with the wider community in our area' (Ang, 2012, p. 295). Multidisciplinary training was also significant in creating integrated practice at local levels. Ang (2012) concluded that 'having a person to lead and drive the vision of the children's centre and having a clear focus on multi-agency work were ... considered essential by 12 of the 15 participants interviewed'. Where action research training brought together practitioners from a number of settings, networking and dialogue across settings helped dissemination of good practices and provided reflective opportunities through peer exchange (Bleach, 2013).

Hayes et al (2013) found that practitioners responded better if there were clear roles and responsibilities among the team involved in the intervention, and they also identified the value of having an accessible mentor for all components of the training manual, to enable focused practice.

In summary, the impact of CPD on ECEC practice as reported by practitioners in reviewed studies centres on the following:

- active participation in a learning cycle characterised by learning skills of reflective thinking, action and goal setting;
- through active participation, the generation of practitioner self-confidence both individually and as a team;
- reconceptualisation of the role of practitioners as educators and of children as active learners;
- more effective use, and a greater range, of pedagogical tools for documentation, including journals, video and professional guidance;
- encouragement to undertake pedagogical experimentation;
- more effective collaborative practices within teams, with parents and with external professionals.

Effects of CPD on staff–child interactions

The impact of CPD on staff–child interactions is a particular focus of this study. To give due prominence to this area of interest, the findings on staff–child interactions are presented separately from other effects of CPD, although it must be recognised that there is an overlap.

Five studies show that CPD has an impact on staff–child interaction (Blenkin and Hutchin, 1998; Jopling et al, 2013; Potter and Hodgson, 2007; Sheridan et al, 2013; SQW, 2012). These studies stated that changes in staff–child interaction occur when ECEC practitioners are given both the time and the opportunity to reflect on their practice.

For example, Potter and Hodgson (2007) described the benefits of the Adult Child Interaction (ACI) Course, a reflective training approach designed to enhance interactions between adults and children. One of the key benefits of the ACI training process was that practitioners began to engage in a process of critically reflecting on their practice. This appeared to be greatly facilitated by the use of video clips and work-based support visits. The viewing of practice video clips during training sessions acted as a vital catalyst prompting staff to question key aspects of their interactions with children. As a result of viewing a video clip of their own practice, practitioners began to challenge their habitual ways of thinking and acting.

Furthermore, analysis of pre- and post-ACI training videos demonstrated that staff had modified key aspects of their language behaviour. After the training, practitioners began fewer interactions with individual children than before, thereby providing greater opportunity for children to initiate more conversational turns. For example, they asked fewer questions which allowed children to take a greater lead in conversations.

These changes in adult language behaviour, however, seemed to be grounded in more fundamental shifts in how staff conceptualised their whole approach to working with children. As reported above, practitioners' focus on enabling children to take a greater lead in individual interactions quickly led to a wider examination of their role within the nursery and a reappraisal of how to support children to take a greater lead in a number of areas.

A HighScope Programme in Ireland (SQW, 2012) found that the way practitioners view children had a profound influence on their interactions with the children. Sheridan et al reported that there was a change of focus from the individual child to teachers themselves and to the relationships between child and teacher. The teachers stopped evaluating individual children. Instead, they assessed the relationship between their own work and expressions of interaction and communication both among children, and between them and the children (Sheridan et al, 2013, p. 142). The intervention created ways for children to make their voices heard and to participate in the documentation processes, but also elevated the status of the child to that of co-constructor in his or her own learning process.

Jopling et al (2013) described the implementation of Early Talk (ET), a programme designed to improve speech, language and communication (SLC) outcomes for children aged 0–5 years. Participant practitioners believed that the programme enhanced their confidence and brought positive changes to their practice such as staff communicative behaviour and practice, and improved interactions between practitioners and children.

Stimulating caregiver–child interactions was a key goal of a five-year intervention programme in six ECEC institutions (Peeters, 1993). Different types of CPD were undertaken to make practitioners more sensitive to the needs of children, leading to spectacular improvements in two groups of day and night childcare centres. The author observed that 'in both these groups there is an obviously individual approach to the children. The children are closely involved in events. The childcare worker actively involves herself in the game playing of the children' (Peeters, 1993, p. 61). Improvements in staff–child interactions were possible, over time, and with multiple investments at different levels, plus a spirit of 'willingness' among practitioners.

Besides the use of video as an observational tool for the evaluation of the actions of practitioners (Potter and Hodgson, 2007), video is also often used to make child observations (Blenkin and Hutchin, 1998; Sheridan et al, 2013). Blenkin and Hutchin (1998) stated that observing video helps practitioners deepen their understanding of their own professional practice, especially with regard to the role of the adult in children's activities and child–adult interaction. In the Principles into Practice (PIP) project, child observations were used as a method of evidence gathering in action research. This led to numerous changes regarding the interaction between children and adults. First, the process of analysing the observations changed perceptions of the children and their actions. This helped practitioners to assess the impact of their work with the children. The various discussions and the process of the analysis itself also helped practitioners gain confidence in their professional knowledge and understanding. Altogether, this influenced the interactions with the children.

Changes to practice initially occurred through planning new activities for the children, but later Kathy [a practitioner-participant] felt this approach had been simplistic and what she had needed to do was change practice in more complex ways; to think about the way the staff interacted with the children during and about their activities, rather than to alter physical provision and resources alone (Blenkin and Hutchin, 1998, p. 67).

Child observations clearly have a strong impact on developing reflective practice. Interestingly, where observations were used to assess the outcomes (development) for the children, the observations made during the PIP project (Blenkin and Hutchin, 1998) were used as a tool to evaluate the quality of the work itself. By observing children and discussing the observations with colleagues, practitioners were able to arrive at ideas to change their practices and their role in interaction with children.

This shift in focus of observation is also articulated in the study by Sheridan et al (2013) on Systematic Quality Work in Swedish pre-schools. As noted above, there was a change of focus from the individual child to the teachers themselves and the relationship and interactions between the teachers and the children. The teachers stopped evaluating individual children. Sheridan et al highlight pedagogical documentation as an important method of gaining knowledge not only of children's learning processes, but also of the teacher's interaction with the children and the process of pre-school quality. According to Sheridan et al, documentation can also be used as a tool for teachers to identify their own competence and to guide them in their work. It helps them to see that they are doing the right things with children, which in turn makes them feel confident in themselves. It gives them insight into where their work is leading and why.

The findings of the studies mentioned in this section demonstrate that practitioners can and do engage in high-level critical reflection when they are given both the time and the opportunity to do so, and when effective training strategies are employed. Such reflection, which in most cases involves some sort of observation, has the potential to deliver important improvements in the interaction between practitioners and children.

Effects of CPD on children's learning and socialising

The impact of continuing professional development on the cognitive and non-cognitive outcomes for children is a major concern of this review. However, this is the area with the least international evidence.

SQW (2012) evaluated the results of the support of the 3,4,5 Learning Years service. They observed that children's ability to make choices improved, they started expressing their ideas more openly, and their ability to solve problems increased. The children acted more independently by serving themselves food and drink and dressing themselves, they were more engaged in learning and had more communication with each other and with practitioners. Vujičić (2008) reported that after several episodes of training in continuous research on educational practice, practitioners changed the environment and overcame their anxiety, leading to the children crying less frequently, fighting less, and separating from their parents with fewer problems.

Aubrey et al (2012, p. 345) reported that all school staff where the intervention took place believed the 'Let's Think' programme enhanced their pupils' thinking skills. They engaged in more critical thinking and began thinking more for themselves. The teachers also noted improved use of language, more attentive listening, increased social cooperation and children having more confidence and independence. All schools mentioned a noticeable impact on children with English as an additional language and/or special educational needs.

Analysis of views studies on working conditions

Effects of working conditions on pedagogical practice

Only one study reported findings on the effects of working conditions on pedagogical practices from the point of view of practitioners, and this took place in Spain. Sandstrom (2012) found that the burden of dealing with too much school administration had an adverse impact on teachers' pedagogical practice. Escalating administrative tasks coupled with changes to the school day to cut rest periods meant that teachers had little opportunity to meet, plan, reflect on activities or engage in training.

Effects of working conditions on staff–child interactions

Observed effects

Two studies describe the effect of large classes on staff–child interactions (Blatchford, 2002; Sandstrom, 2012). Blatchford reported on one class with 35 children in a rural area of England (Shropshire). He concluded that the teacher, despite her high level of experience and competence, was working under stress. She was able to do effective teaching, but at great personal and emotional expense. She interacted with about 17 children every minute and she often repeated instructions. The teacher–child interactions were concerned with management activities and quelling rising noise levels. She was not able to talk to every child each day and she said that the children received less individual attention than they would in a smaller class. In small classrooms of 15 children or fewer, there was more interaction between teacher and children and more responsiveness of the teacher to the children’s interests. In smaller classrooms, teaching can be more flexible and activities are more open ended. The children also showed high levels of persistence.

Effects reported by practitioners

The teachers taking part in the study conducted by Blatchford et al (2002), when comparing large and small classes, reported that in large classrooms basic skills learning – such as letter formation – suffered, especially in reception class (for children aged four years). Teachers working in small classes reported that they had more time for monitoring, checking and understanding children’s learning; they could more effectively encourage children to work independently and they could get to know the children better as individuals.

Sandstrom (2012) explored the views of teachers from Andalusia (Spain) who had to adapt their teaching after an over-enrolment of children in their class (more than 25 for one teacher). This was due to the fact that pre-school became universal in Spain and early enrolment of younger children into pre-schools was introduced. For example, it was reported that teachers more often relied on lesson books with worksheet activities – in conjunction with centre-based activities – as a way of maintaining control of large groups of children. In addition, large classes were seen as particularly problematic because of the young age of the children (as young as two and a half years at the start of the school year; sometimes they were not yet toilet trained). This meant that the teacher had to carry out both educational and care tasks. Some teachers described experiencing burnout and even symptoms of depression. Teachers considered that 18 children per teacher was a good ratio. In this study, teachers also complained about a lack of adequate facilities, such as playgrounds and bathrooms situated outside the playroom, and appropriate toys and materials.

Only one study reported practitioners’ views on the impact of working conditions on children’s learning and socialising experiences. Blatchford et al (2001) reported that, overall, in smaller classes children seemed to experience interactions that were more productive for learning and more socially intense. In larger classes, an individual child was more likely to experience less intense contact with teachers and social contacts, and more contacts in whole-class contexts about procedural matters.

Conclusions and implications **5**

This review has analysed the existing research on the relationships between continuing professional development (CPD), working conditions, interactions between staff and children, and outcomes for children. The results have shed some light on the impact that in-service training opportunities and working conditions have on the quality of early childhood education and care (ECEC) services, on the interactions between staff and on the outcomes for children. This chapter reviews the main findings of impact and views studies in relation to the effectiveness of CPD and working conditions. By combining the main findings of impact studies (which examined what interventions were effective) with the main findings of views studies (which explored perspectives and experiences of participants), the cross-study synthesis helps achieve a deeper understanding of how interventions linked to staff CPD and working conditions can be made more effective. Recalling the issues raised in the background section with regard to systematic review approaches to complex interventions, the conclusions presented below address two questions.

- What do we know about the kind of CPD interventions or working conditions that are effective?
- What do we know about why, for whom and under which circumstances such interventions are effective?

European research evidence on CPD and working conditions

Specialist researchers involved in this review were surprised by the number of published studies on working conditions and continuing professional development throughout Europe. Whereas evaluation studies examining the impact of working conditions and CPD interventions on children's outcomes and staff-child interaction are more common in large English-speaking countries outside the EU (such as the US and Australia), European literature has a tendency to investigate the effects of CPD and working conditions within a broader pedagogical perspective. Such perspectives focus on the effects of CPD and working conditions on ECEC quality and its associated features, including practitioners' competences (knowledge, practices and understanding).

However, while a rich body of scholarly research and grey literature exists in relation to the theoretical conceptualisation of CPD approaches and in relation to the description of locally developed practices, empirical studies that aim to systematically evaluate the effectiveness of CPD interventions are extremely rare in EU Member States. Nevertheless, the total number of articles screened at full text was quite high (n= 454, including 173 documents in original, non-English languages). Some 39 English-language and 27 non-English-language studies were selected for the mapping exercise; after the quality appraisal, 44 studies in total remained for the in-depth review.

Of the 66 studies included in the mapping, the majority are from six countries: the UK (9), Portugal (9), Ireland (8), Sweden (8), Germany (7) and Spain (6). Countries with a good reputation in international reports about ECEC – such as Denmark and Finland – have a limited number of studies on the topic (one and two respectively). In the new EU Member States (which have been members since 2004, 2007 and 2013), the number of studies is rather limited (five in total). In most countries represented in the review, research on services for the youngest children tended to be rather underrepresented, whereas research on family daycare related to such topics was virtually non-existent.

From the analysis of available evidence it seems plausible that in some countries (such as the English-speaking countries, the Netherlands and Germany), 'hard' scientific evidence for investing in ECEC might be more important than in others (Denmark, Finland, Italy, Belgium, Slovenia, Croatia) that have a long tradition in investing in ECEC. It is striking that there are no included studies from France, a country with a long tradition in studies on how professionalism in ECEC can be increased. The French studies were not focused on quality or children's outcomes and were therefore not included. We see the same focus – on how CPD and working conditions can be organised – in the Italian studies, and the same trend not to examine this in terms of quality or children's outcomes.

Of the total number of studies included in mapping, 76% focus on continuing professional development, 21% focus on working conditions and 3% investigate issues related to both working conditions and CPD. All the studies included in mapping have been carried out in EU Member States except for two comparative studies reporting findings on structural components of quality that are related to working conditions.

In term of the types of studies, most of them (n=41) report qualitative data derived from qualitative and mixed-method research studies. Some 35 studies report quantitative findings derived from quantitative and mixed-method research studies.

Concerning the quantitative studies, it is important to note that more than half the studies included in the mapping were carried out according to research designs that did not necessarily evaluate impact. The rest of the studies adopted a controlled before-and-after research design, using measures at baseline and a period after the intervention, and only two EU studies reported using a randomised control trial design: one in Denmark and one in Ireland. This suggests that there is a lack of reliable (hard) evidence about the effects of CPD and working conditions on ECEC quality, staff-child interactions and children's outcomes.

The quantitative studies mostly evaluated CPD interventions only (n=20); 14 studies focused on working conditions only and 1 focused simultaneously on CPD and working conditions (this study had a randomised controlled trial – RCT – design). However, most impact studies on working conditions were excluded due to the fact that their research design did not meet quality criteria. Therefore, it was not possible to give clear results on the impact of working conditions on ECEC quality and children's outcomes.

With regard to the 41 qualitative studies, the majority adopted either a participatory evaluation design (19; 46%) or an action research design (16; 39%). Interestingly, more than half the views studies that adopted an evaluation design were carried out in the UK and Ireland (11 out of 19) while action research designs were more commonly found in studies from Sweden and continental Europe.

The views studies focused overwhelmingly on CPD interventions only (n=37). It is noteworthy that more than one-third of the views studies on CPD (36%) included in the mapping described or evaluated the effects of long-term professional development initiatives. This is considerably more than the quantitative studies, of which only 24% evaluated the effects of long-term professional development initiatives.

Only 4 of the 41 views studies explored practitioners' perceptions in relation to staff working conditions. Interestingly three out of four were mixed-methods studies, which might indicate that the issues related to staff working conditions in ECEC settings are under-investigated in qualitative research.

For this review, the state of the European research evidence had clear implications for the number of studies that were included in the in-depth review. The strict quality appraisal meant that the amount of reliable evidence on the effects of working conditions on ECEC quality, staff-child interactions and outcomes for children was very scarce. Therefore, it was not considered possible to synthesise findings of impact and views studies on this topic.

What kind of interventions are effective?

In general, it is possible to conclude that interventions that are integrated into the ECEC centre's practice with a feedback component are effective. For short-term training, intensive intervention with a video feedback component has been found to be effective in fostering practitioners' competences in care-giving and language stimulation, and regarding outcomes for children there were significant gains in terms of language acquisition and cognitive development.

Long-term CPD interventions integrated into practice, such as pedagogical guidance and coaching in a reflection group, have been proven to be effective in very different contexts – in countries with a well-established system of ECEC provision and a high level of qualification requirements for practitioners, but also in countries with poorly subsidised ECEC systems and low qualification requirements. Hence, regardless of the type of ECEC system, long-term pedagogical support provided to staff by specialised coaches or pedagogical counsellors in reflection groups was found to be effective in enhancing the quality of ECEC services and in sustaining it over a long period of time. Evidence of impact on children’s cognitive and social outcomes has also been found.

When is CPD effective?

The qualitative studies indicate that CPD interventions have positive effects on practitioners’ knowledge, practice and understanding. The findings of the reviewed studies show that taking part in CPD activities increases practitioners’ pedagogical awareness and professional understanding and deepens reflectivity, enabling them to strengthen their capacities and address areas for improvement in their everyday work in ECEC settings.

Several studies found that by taking part in participative CPD, practitioners reconceptualised their role as educator: they began to see children as protagonists in their own learning.

Engaging in CPD interventions in highly socioculturally diverse ECEC contexts can lead practitioners to reconceptualise the role of parental involvement. They become more interested in how parents educate their children at home and in questioning how the ECEC centres could incorporate some of the practices of the children.

The elaboration of more responsive educational strategies for enhancing children’s learning was highlighted as one of the main effects of CPD on practitioners. CPD also enhances teachers’ practice in relation to the coherent development, implementation and evaluation of the curriculum or pedagogical framework.

CPD that is workplace-based has a clear impact on collegiality, teamwork and inter-professional collaboration: it strengthens the team as a group. In particular, it was found that video supervision might be an effective strategy for the delivery of training programmes. Practitioners reported that viewing video recordings of their own pedagogical practice acted as a vital catalyst in prompting staff to question key aspects of their interactions with children and to enhance the quality of their pedagogical practice. CPD interventions as reported by the practitioners also had effects on children: it increased their ability to solve problems and to make choices, and they were able to express their ideas more openly. The teachers also noted improved use of language, more attentive listening, increased social cooperation and more self-confidence and independence.

Conditions for effectiveness

The reviewed evidence gives an indication of what might be critical success factors of CPD provisions for practitioners. First, the CPD intervention has to be embedded in a coherent pedagogical framework or curriculum that builds upon research and addresses local needs. Second, practitioners have to be actively involved in the process of improving educational practice within ECEC settings. And third, CPD needs to be focused on practitioners learning in practice, in dialogue with colleagues and parents: therefore, a mentor or coach has to be available during the non-contact hours of ECEC staff.

The findings of the qualitative studies show which kind of interventions integrate those three critical factors. An engagement in research-based enquiry or action research can be an effective way to critically explore the link between theory and practice in the staff’s everyday work and to improve their pedagogical practice. The cycle of planning, acting,

observing and reflecting that is used in interventions around documentation or in action research can provide the structure to implement quality frameworks or curricula and to focus more on children's needs rather than on pre-determined choices made by the practitioners. Furthermore, practice-based research can contribute to raising the quality of ECEC services through the dissemination and exchange of good practice, which in turn might help increase the status of ECEC in the eyes of the public and policymakers.

Concerning the desirable duration of the intervention, evidence shows that intensive CPD programmes with a video feedback component might be more effective for the achievement of short-term outcomes. Long-term CPD initiatives accompanied by pedagogical guidance and coaching in reflection groups might be more effective for enhancing and sustaining the quality of ECEC services over long periods of time. In this sense, different combinations of CPD delivery modes should be seen not in opposition but rather as complementary, serving different goals in different contexts.

Working conditions and effective change

Only five studies rated as reliable found that, broadly speaking, staff-child ratio and class size have positive effects on the quality of practitioners' practices and on staff-child interaction. However, there are considerable difficulties in generalising such findings across settings, given the effects of the type of setting and the range of study design, observations and tests adopted for the studies.

With regard to the type of setting, two Swedish studies reported the effects of working conditions in a context of well-established ECEC systems operating to a high standard (for example, in terms of the training of teachers and childcare workers). The English study reported on early education settings that are provided within the compulsory school system. The Spanish study reported on the effects of structural quality conditions coming into force after a national reform was enacted, whereas in the Irish study the type of provision studied (early intervention programme) was established within a government-funded project that lasted for only two years.

With regard to the second aspect, the studies adopted different measurements of staff-child ratio and class size as well as different tools to evaluate their effects on practitioners' practice or their impact on staff-child interactions and children's outcomes. There must, therefore, be concerns about comparability of outcome measures across countries.

Strengths and limitations of this review

Strengths

This study is the first systematic review on CPD and working conditions with a focus and scope on all Member States of the European Union. Former systematic reviews included mainly studies from English-speaking countries outside Europe, where the context of ECEC is quite different. This systematic review is also the first to cover studies published in languages other than English. The researchers discovered impact studies on CPD with high quality appraisal that were not published in English scientific journals (for example, the German impact studies).

Methodological difficulties

The research team experienced some difficulties in establishing inclusion criteria that would be as comprehensive as possible to cover the diversity of research traditions within Europe. The concepts relating to CPD and working conditions are expressed in many different ways in the various European languages. Because of this, the researchers had to work with a high number of key terms, which explains why there were so many records found at first stage (19,452). This had unexpected consequences for the research team, which had to manually screen 13,670 abstracts after 5,782 had been excluded due to low priority screening.

The team also encountered severe problems during the data extraction phase due to the heterogeneity of research designs and also due to the different types of interventions that were studied. These interventions were often embedded in wider ECEC systems and pedagogical assumptions that were frequently taken for granted and not reported in the articles or reports.

The Quality Appraisal (QA) stage also presented some challenges, since most impact studies on working conditions were excluded because their research design did not comply with the types of studies typically included in systematic reviews (most of the impact studies included in the mapping were not RCT or controlled before-and-after studies).¹⁰ Therefore, it was not possible to give any conclusive results on the impact of working conditions on quality and children's outcomes.

A final difficulty was encountered at the synthesis stage: due to the heterogeneity of research designs adopted by the studies and the heterogeneity of interventions investigated, it was not possible to directly compare findings but only to analyse them narratively.

Involvement of national experts

More and more governments and international organisations are requiring systematic reviews of evidence to support their policymaking. When doing this systematic review, several problems were encountered due to the many different languages in Europe and to the different European research traditions.

In most continental EU Member States, there are no databases for research on ECEC. This made it very difficult and time-consuming to do a systematic review, since country representatives had to carry out searches manually by entering a combination of key terms in institutional websites and relevant journals. The role of the country representative is therefore very important, which can cause serious problems with regard to the reliability of the systematic review. There were considerable differences in the numbers of studies that were presented for screening by country representatives. Therefore, the authors recommend that research organisations in the Member States set up databases where all ECEC research in the language of the country can be gathered, with abstracts in the major European languages.

Another problem is the many different languages of the studies. There is considerable potential to extend systematic reviews into European countries. For studies in languages other than English, the research team needs to be as multilingual as possible, but it is of course not possible to have a team that can speak all European languages. For the languages that are unknown to the research team, it is impossible to check if the procedure is being followed in the right way. Therefore it is recommended that research organisations in the Member States invest in developing new ways of carrying out systematic reviews to overcome these challenges. It would also be advisable to invest in the training of researchers in exploring innovative ways of conducting systematic reviews across contexts that are characterised by different research traditions and epistemological approaches.

¹⁰ http://www.campbellcollaboration.org/artman2/uploads/1/C2_Research_Design_Policy_Brief-2.pdf

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Annex 1: Tables relating to Chapter 3

Table A1: Characteristics of studies included in the in-depth review

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
Beller and Beller (2009) Enhancing the quality of language stimulation in ECEC institutions to increase educational outcomes for 4- and 5-year-old children from families with low SES and immigrant background. A pedagogical intervention model. Final report. [translation from German]	Germany	<ul style="list-style-type: none"> Evaluate whether the intervention enhances the educational outcomes for children from low SES and immigrant families (Beller et al, 2009) Aim of the study was to assess the impact of the training intervention for teachers on children's language and cognitive development (Beller et al, 2007). 	<p>Sample characteristics:</p> <p>Beller et al (2009):</p> <ul style="list-style-type: none"> Children: 4 and 5 years old; 55% male, 45% female Teachers: characteristics not stated <p>Beller et al (2007):</p> <ul style="list-style-type: none"> Children: 1-3 years old; 49% male, 51% female Teachers: characteristics not stated <p>Settings:</p> <p>Beller et al (2009): 26 different groups in ECEC centres in Berlin.</p> <p>Beller et al (2007): ECEC centres in Berlin.</p> <p>Objectives of programme:</p> <ul style="list-style-type: none"> Enhance the quality of language stimulation in ECEC institutions. Help teachers to develop a democratic and affirmative educational approach which is considered to have a positive impact on the development of children's language and cognitive skills. <p>Programme description and content:</p> <p>Training integrated into practices with feedback provided through video supervision</p> <p>Theoretical model underpinning the programme: language stimulation is embedded in everyday pedagogical practice in ECEC services and addresses all children. It is in line with the constructivist German 'Situationsansatz' (situational approach).</p> <p>Delivery: Training sessions take place in a weekly cycle when trainers visit the ECEC group; trainer and ECEC teacher alternately plan and engage in 'typical' situations with children (e.g. teacher-initiated activities, free play, meals). The other person is in the role of observer and produces a video clip of the observed situation. During the one-to-one feedback session video clips are analysed and rated together with regard to language stimulation and educational behaviour. The video feedback allows the teachers (and trainers) to watch and reflect on their own practice and identify opportunities for language stimulation. At the same time the trainer can serve as an inspiring role model for the teacher.</p> <p>Duration: 6 months</p>	<p>Design: Pre-test and post-test design.</p> <p>Comparison group and sample size:</p> <p>Beller et al (2009):</p> <ul style="list-style-type: none"> 151 children 4 and 5 years old from 26 different groups in ECEC centres (n=73 for the intervention group, n=78 for the control group) 38 ECEC teachers (n=18 for the intervention group, n=20 for the control group). <p>Beller et al (2007):</p> <ul style="list-style-type: none"> 155 children 1-3 years old (n=88 for the intervention group, n=67 for the control group) 31 ECEC teachers (n=18 for the intervention group, n=13 for the control group) <p>Data collection methods:</p> <p>Beller et al (2009):</p> <ul style="list-style-type: none"> Teachers: The quality of verbal stimulation and educational behaviour were rated according to rating scales developed by Beller et al (1996, 2006) in a pre-post design on the basis of video clips. Children: Heidelberger Sprachentwicklungstest, Coloured Progressive Matrices, Mann-Zeichen-Test, Persönlichkeits-Motivations-Rating. <p>Beller et al (2007):</p> <ul style="list-style-type: none"> Teachers: The quality of verbal stimulation and educational behaviour were rated according to rating scales developed by Beller et al (1996, 2006) in a pre-post-design on the basis of video clips. Children: Cognitive and language development were assessed by ECEC teachers based on a development index ('Entwicklungsstabelle', Beller and Beller 2000). Additionally, children's language skills were tested with SETK-2 (Grimm, 2000). <p>Outcomes measured:</p> <ul style="list-style-type: none"> Child: Language development, cognitive skills Teacher: verbal stimulations, educational practice.
Beller et al (2007) Final report of a qualification programme of educators for enhancing the language stimulation in ECEC institutions – an intervention study. [translation from German]		Linked study		

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
Blatchford et al (2002) Relationships between class size and teaching: A multimethod analysis of English infant schools. Linked study	United Kingdom	<ul style="list-style-type: none"> Assess the effects of class size differences on pupils' academic progress (literacy and mathematics) during the reception year 	<p>Sample characteristics:</p> <ul style="list-style-type: none"> 9,330 children <p>Settings:</p> <ul style="list-style-type: none"> 220 schools with 368 classes <p>Hypothesised impact: Relationship between class size and achievement for children [p. 1]</p> <p>Description of working conditions:</p> <ul style="list-style-type: none"> Class size. 	<p>Design: Large-scale longitudinal study (two cohorts of children over the first three years of school) [p. 7]</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> n=9,330 children [p. 7] no control group <p>Data collection methods:</p> <p>Standardised/validated measurement tools:</p> <ul style="list-style-type: none"> Avon Reception Entry Assessment [p. 7] Literacy Baseline component of the Reading Progress Test [p. 8] <p>Other:</p> <ul style="list-style-type: none"> Teacher-administered test (in case of mathematics) Termly questionnaire on class sizes and classroom activities [p. 8]. <p>Outcomes measured:</p> <ul style="list-style-type: none"> Child: cognitive (literacy and mathematics)
Buschmann and Joos (2011) Language promotion in day care facilities for children: Effectiveness of speech-based interaction training for educational professionals [translation from German].	Germany	<ul style="list-style-type: none"> Evaluate the effectiveness of speech-based interaction training in comparison to conventional skill enhancement (one-day knowledge transfer). 	<p>Sample characteristics:</p> <ul style="list-style-type: none"> Language-delayed children at 21 months of age. <p>Settings: 14 ECEC centres in Heidelberg and Stuttgart.</p> <p>Objectives of programme:</p> <ul style="list-style-type: none"> Child: increase vocabulary Child: improved language production at the age of 30 months Teachers are trained to respond sensitively to children's language skills, adopt a stimulating attitude, apply language modelling techniques, and identify opportunities for language learning in everyday interactions. <p>Programme description and content:</p> <p>Training integrated into practices with feedback provided through video supervision</p> <p>Theoretical model underpinning the programme: Language-based interaction training named 'Heidelberger Trainingsprogramm zur frühen Sprachförderung in Kitas'</p> <p>Delivery: Group sessions with intensive use of role play, supported by the video supervision of a picture book situation in the ECEC setting (5 sessions)</p> <p>Duration: not specified</p>	<p>Design: Pre-test and post-test design.</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> 30 ECEC teachers (n=17 for the intervention group, n=13 for the control group) 28 language-delayed children at 21 months of age (n=15 for the intervention group, n=13 for the control group). <p>Data collection methods:</p> <ul style="list-style-type: none"> Assessment of children's language skills: SETK-2 (Grimm, 2000), ELAN-questionnaire for parents to assess the active vocabulary of children (Bockmann and Kiese-Himmel, 2006). <p>Outcomes measured:</p> <ul style="list-style-type: none"> Child: vocabulary; language skills including understanding and production of words and sentences.

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
Evanschitzky et al (2008) Mathematics, science and technology in kindergarten. Study of the impact of in-service training for kindergarten teachers [translation from German].	Germany	<ul style="list-style-type: none"> Assess the effectiveness of a training programme (MINT) for kindergarten teachers in the field of mathematics, science and technology Investigate the effects of the programme on children's development of mathematical concepts and interest in science. 	<p>Sample characteristics:</p> <ul style="list-style-type: none"> 35 teachers, 217 children. <p>Settings: 12 ECEC centres.</p> <p>Objectives of programme:</p> <ul style="list-style-type: none"> Aim of the training is to change ECEC teachers' attitudes towards topics such as mathematics, science and technology and thereby also encourage children's competences and interest in this field (by emphasising the process of explorative learning) Child: development of mathematical concepts, curiosity and an explorative attitude. <p>Programme description and content:</p> <p>Training integrated into practices with feedback in reflection groups</p> <p><u>Theoretical model underpinning the programme:</u></p> <p>Not stated</p> <p><u>Delivery:</u> Group sessions focused on observation, critical reflection, and experimentation. During the course the educators themselves follow a learning path of practical scientific research, so that they are able to develop those competence by the children they are caring for (90 sessions, lasting 4–5 hours each)</p> <p><u>Duration:</u> 2 years</p>	<p>Design: Pre-test and post-test design.</p> <p>Comparison group and sample size: 35 teachers (n=23 for the intervention group, n=12 for the control group).</p> <ul style="list-style-type: none"> 217 children (n=176 for the intervention group, n=41 for the control group). <p>Data collection methods:</p> <ul style="list-style-type: none"> Teachers and parents were asked to fill in a questionnaire before and after one year of teachers' training Children: Osnabrücker Test zur Zahlbegriffsentwicklung to assess the development of pre-mathematical skills. <p>Outcomes measured:</p> <ul style="list-style-type: none"> Child: mathematical concepts Child: development of mathematical skills Child: curiosity, explorative attitude
Franco Justo (2008) Programme of relaxation and self-esteem improvement in kindergarten teachers and their relationship with the creativity of their students [translation from Spanish].	Spain	<ul style="list-style-type: none"> Analyse the effects of the programme (relaxation and improvement of self-esteem), on the levels of anxiety, self-esteem and graphical creativity 	<p>Sample characteristics: 24 female pre-school teachers from the Andalusian Autonomous Community; 285 children aged between 4 years, 9 months and 5 years, 9 months.</p> <p>Settings: Public centres of Education (Educación Infantil in Almería).</p> <p>Objectives of programme: improve self-esteem of practitioners and children's graphical creativity (fluidity, flexibility and originality)</p> <p>Programme description and content:</p> <p>Training not integrated into practices (off-site training without follow-up activities in ECEC settings)</p> <p><u>Theoretical model underpinning the programme:</u></p> <p>not specified</p> <p><u>Delivery:</u> 40 group-based sessions on relaxation, assertiveness and self-esteem (practical techniques)</p> <p><u>Duration:</u> 20 weeks</p>	<p>Design:</p> <ul style="list-style-type: none"> Pre-test and post-test design. <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> 24 teachers (n=12 for the intervention group, n=12 for the control group) 285 children (n=136 of which 48% boys and 52% girls for the intervention group, n=149 of which 46% boys and 54% girls for the control group) <p>Data collection methods:</p> <p>Standardised measurement tools:</p> <ul style="list-style-type: none"> Beck Anxiety Questionnaire for assessment of the level of anxiety Rosenberg Self-Esteem Scale for assessment of the level of self-esteem

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
Franco Justo (2008) Programme of relaxation and self-esteem improvement in kindergarten teachers and their relationship with the creativity of their students [<i>translation from Spanish</i>]. (cont'd)	Spain	<ul style="list-style-type: none"> Evaluate the effectiveness of the Video Interaction Guidance (VIG) Training for trainers in ECEC. Investigate the effect of the training on the sensitivity and stimulating skills of ECEC teachers Investigate whether the training generates increases in the concrete behaviors that are distinguished by the VIG method 	<p>Sample characteristics: 52 teachers in ECEC Settings.</p> <p>Settings: ECEC Settings</p> <ul style="list-style-type: none"> Assignment to the experimental and the control condition was randomised at the level of the childcare centre; particular day-care centres were assigned to the experimental training group, whereas other centres were assigned to the control group. <p>Objectives of programme:</p> <ul style="list-style-type: none"> Providing childcare staff with this opportunity helps them to gain a realistic perception of their job performance, while reflecting on their interactional behaviour promotes teachers' critical thinking about their interactional behaviours. Video feedback functions as a catalyst for critical reflection and provides teachers and their trainers with a tool to engage in a dialogue. <p>Programme description and content:</p> <p>Training integrated into practices with feedback provided through video supervision</p> <p><u>Theoretical model underpinning the programme:</u></p> <p>Video Interaction Guidance Training. A central component of the VIG training that was implemented is the analysis of video clips of interactions with children in the actual work setting, followed by a discussion with a trainer: its unique feature is that trainees watch themselves from a distance and have time for self-reflection.</p> <p><u>Delivery:</u> teachers were videotaped while working with their groups. The trainer watched the video subsequently and selected a number of video fragments for review. In a next session, the trainer and the teacher engaged in a detailed discussion of these video clips</p> <ul style="list-style-type: none"> Group based 4 sessions. <p><u>Duration:</u> not stated</p>	<p>Data collection methods:</p> <p>Standardised measurement tools:</p> <ul style="list-style-type: none"> Torrance Figure Battery Tests of Creative Thinking for level of graphic creativity. <p>Outcomes measured:</p> <ul style="list-style-type: none"> Child outcomes: Graphical fluidity, flexibility and originality Teacher: level of anxiety and self-esteem <p>Design: Pre- and post-test design</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> 95 teachers were involved in the study: 52 for the experimental group 43 for the control group The third filming session (which was only for the VIG group) took place three months after the training. n=52 for the treatment group <p>Data collection methods:</p> <ul style="list-style-type: none"> 'Job Resources' scale scale for sensitive responsiveness Verbal stimulation scale Caregiver interaction scale The caregivers were filmed for about 10–15 minutes for each measurement. After each filming session, the filmer and the caregiver each completed a separate short questionnaire. <p>Outcomes measured:</p> <ul style="list-style-type: none"> Staff-child interactions Sensitivity and stimulating skills of early childhood teachers.
Fukkink and Tavecchio (2010) Effects of video interaction guidance on early childhood teachers.	The Netherlands	<ul style="list-style-type: none"> Evaluate the effectiveness of the Video Interaction Guidance (VIG) Training for trainers in ECEC. Investigate the effect of the training on the sensitivity and stimulating skills of ECEC teachers Investigate whether the training generates increases in the concrete behaviors that are distinguished by the VIG method 	<p>Sample characteristics: 52 teachers in ECEC Settings.</p> <p>Settings: ECEC Settings</p> <ul style="list-style-type: none"> Assignment to the experimental and the control condition was randomised at the level of the childcare centre; particular day-care centres were assigned to the experimental training group, whereas other centres were assigned to the control group. <p>Objectives of programme:</p> <ul style="list-style-type: none"> Providing childcare staff with this opportunity helps them to gain a realistic perception of their job performance, while reflecting on their interactional behaviour promotes teachers' critical thinking about their interactional behaviours. Video feedback functions as a catalyst for critical reflection and provides teachers and their trainers with a tool to engage in a dialogue. <p>Programme description and content:</p> <p>Training integrated into practices with feedback provided through video supervision</p> <p><u>Theoretical model underpinning the programme:</u></p> <p>Video Interaction Guidance Training. A central component of the VIG training that was implemented is the analysis of video clips of interactions with children in the actual work setting, followed by a discussion with a trainer: its unique feature is that trainees watch themselves from a distance and have time for self-reflection.</p> <p><u>Delivery:</u> teachers were videotaped while working with their groups. The trainer watched the video subsequently and selected a number of video fragments for review. In a next session, the trainer and the teacher engaged in a detailed discussion of these video clips</p> <ul style="list-style-type: none"> Group based 4 sessions. <p><u>Duration:</u> not stated</p>	<p>Data collection methods:</p> <p>Standardised measurement tools:</p> <ul style="list-style-type: none"> Torrance Figure Battery Tests of Creative Thinking for level of graphic creativity. <p>Outcomes measured:</p> <ul style="list-style-type: none"> Child outcomes: Graphical fluidity, flexibility and originality Teacher: level of anxiety and self-esteem <p>Design: Pre- and post-test design</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> 95 teachers were involved in the study: 52 for the experimental group 43 for the control group The third filming session (which was only for the VIG group) took place three months after the training. n=52 for the treatment group <p>Data collection methods:</p> <ul style="list-style-type: none"> 'Job Resources' scale scale for sensitive responsiveness Verbal stimulation scale Caregiver interaction scale The caregivers were filmed for about 10–15 minutes for each measurement. After each filming session, the filmer and the caregiver each completed a separate short questionnaire. <p>Outcomes measured:</p> <ul style="list-style-type: none"> Staff-child interactions Sensitivity and stimulating skills of early childhood teachers.

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
Hayes et al (2013) Evaluation of the Early Years Programme of the Childhood Development Initiative.	Ireland	<ul style="list-style-type: none"> Evaluate the effectiveness of the Early Childhood Care and Education Programme of the Childhood Development Initiative, a two-year programme including an on-site training component as well as staff no-contact hours and more favourable child-staff ratio of 1:5 than the national comparison of 1:6 	<p>Sample characteristics:</p> <ul style="list-style-type: none"> children aged 2 years 6 months to 4 years (n=311 at baseline, n=331 at mid-phase, n=294 at end-phase) early years practitioners: characteristic not specified <p>Settings: ECEC settings in Tallaght West. The research was designed as a cluster randomised trial, an experimental method by which social units or clusters (Early Years services) were randomly allocated to intervention or control groups</p> <p>Objectives of programme: the CDI Early Years Programme was designed to support and target all families in Tallaght West, including those whose children may face barriers to educational achievement and well-being.</p> <p>Programme description and content:</p> <p>Training integrated into practices combined with the provision of no-contact hours and favourable staff:child ratio.</p> <p><u>Theoretical model underpinning the programme:</u> not stated</p> <p><u>Delivery:</u> all intervention Early Years practitioners were trained in the delivery of the HighScope curriculum and the Stolta framework, an extra Early Years practitioner was introduced to allow a ratio of 1:5. Furthermore practitioners operated a key worker system and worked a 37-hour week, which, being longer than typical childcare working weeks, allowed for curriculum and daily planning and individualised record-keeping.</p> <p><u>Duration:</u> 2 years</p>	<p>Design: randomised controlled trial.</p> <p>Comparison group and sample size:</p> <p>Two cohorts of children:</p> <ul style="list-style-type: none"> first cohort intervention group (n=77, 78, 70), control group (n=75, 52, 54) second cohort control group (children n=76, 69, 58) <p>Two cohorts of practitioners working in intervention and control group settings (not further specified)</p> <p>Data collection methods:</p> <p>Child assessment:</p> <ul style="list-style-type: none"> British Ability Scales Rhyme and Alliteration Lower letter recognition Adaptive Social Behaviour Inventory Strengths and Difficulties Questionnaire <p>Assessment of ECEC services' quality:</p> <ul style="list-style-type: none"> ECERS-R ECERS-E The Arnett Caregiver Interaction Scale (CIS) <p>Outcomes measured:</p> <ul style="list-style-type: none"> Children's cognitive and non-cognitive outcomes Staff-child interactions (CIS) ECEC environmental quality
Jensen et al (2013) Effectiveness of a Danish early year preschool programme: A randomised trial.	Denmark	<ul style="list-style-type: none"> Establish effects of a new method for enhancing pre-school quality, 'Action Competences in Social Pedagogical Work with Socially Endangered Children and Youth' on child competences, both in children in general and in children from disadvantaged families. 	<p>Sample characteristics: The participating 58 pre-schools were first stratified into three groups on the basis of the parents' level of education, social welfare dependency and unemployment status; then randomly selected to either the intervention group (n=29) or the reference group (n=29) [p. 118].</p> <p>Settings: a randomised controlled trial was carried out in two Danish municipalities. It included a total of 37 and 200 pre-schools, respectively. In a first step all pre-schools with at least 39 children were selected, i.e. 19 pre-schools of the 37 participating pre-schools in the first municipality, and 39 pre-schools of 200 participating pre-schools in the second municipality [p. 118].</p>	<p>Design: randomised controlled trial.</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> Reported total sample: 2,314 children of 3-6 years of age in 58 pre-schools; 1,141 children in 29 treatment daycare centres; 1,173 children in 29 control daycare centres.

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
<p>Jensen et al (2013) Effectiveness of a Danish early year preschool programme: A randomised trial. (cont'd.)</p>	<p>Denmark</p>		<p>Objectives of programme: In the programme 'Action Competences in Social Pedagogical Work with Socially Endangered Children and Youth' pre-school staff members were supported in their efforts to critically reflect on current practices and to change these.</p> <p>Programme description and content: Training integrated into practices with coaching activities in ECEC settings</p> <p><u>Theoretical model underpinning the programme:</u> 'Action Competences in Social Pedagogical Work with Socially Endangered Children and Youth' building on the principle of systematic quality improvement of early year pre-school.</p> <p><u>Delivery:</u></p> <ul style="list-style-type: none"> • Two 6-hour workshops in large groups (100 people) held once a year • Education and training in reflection groups within ECEC settings with coaching of university consultants (approx. 17 hours, 3 hours each session) • Conferences with pedagogical consultants at municipal level (3 in total) <p><u>Duration:</u> 2 years</p>	<p>Data collection methods: standardised tool – Strengths and Difficulties Questionnaire (SDQ) to assess the psycho-social adjustment of the children (Goodman, 1997). Data were collected immediately prior to, during (eight months into the intervention) and at the end of the intervention (after 20 months) [p. 119]. Two different statistical approaches were used: non-parametric growth-curve model (Goldstein, 2010); difference-in-difference approach, explained in more detail below (Bertrand, Duflo, and Mullainathan, 2004) [p. 120].</p> <p>Outcomes measured: child competences, both in children in general and in children from disadvantaged families [p. 118].</p>
<p>Palmerus (1996) Child-caregiver ratios in day care center groups: Impact on verbal interactions.</p>	<p>Sweden</p>	<ul style="list-style-type: none"> • Elucidate the effect of adult-child ratio on communication patterns in a day care setting. In this study the ratio is calculated on the number of children actually present in the setting and not, as is mostly done, on the number of children enrolled. By comparing periods with a relatively low ratio of present children/caregiver with periods with a high ratio, examined the impact of this ratio on verbal interaction between caregivers and children was examined [p. 45]. 	<p>Sample characteristics: Two caregivers were each observed. In both observation-periods 17 children were enrolled [p. 48].</p> <p>Settings: In a large study of the impact of adult-child ratio on quality factors in daycare centres on activity patterns, social interactions, and language activities, the staff of 6 centres were observed for 12 hours each (Palmerus and Hagglund, 1991) [p. 47]. The [previous] study included six day care centre groups and the staff members in the groups, a total of 20 employees. The current study included two of the original caregivers.</p> <p>Hypothesised impact: by comparing situations with a high ratio to situations with a low ratio, several hypotheses were tested. In situations with a high ratio compared to a low ratio, the following was predicted: 1. Fewer words are uttered and shorter sentences are used. 2. The adult addresses him/herself more often to groups of children and less often to individual children. 3. The frequency of monologues increases and the frequency of dialogues decreases. 4. Verbal interactions of caregivers with other adults are less frequent. 5. Staff verbal alterations are more often related to demands of the work situation and less often related to personal concerns [pp. 47–48].</p> <p>Description of working conditions: caregiver-child ratio.</p>	<p>Design: Data for this report are drawn partly from the earlier study (Palmerus and Hagglund, 1991) and partly from additional data collections. The current study included two of the original caregivers, who were each observed for an additional 12 hours, creating samples of their interactions with children under low and high ratio conditions [p. 47].</p> <p>Comparison group and sample size: 2 teachers and 17 children, no comparison group.</p> <p>Data collection methods: A year after the main observation period, the adult-child ratio changed dramatically in one of the centres. Two of the original caregivers were each observed for an additional 12 hours, creating samples of their interactions with children under low and high ratio conditions. In this study the verbal interactions of these 2 caregivers were analysed [p. 47].</p> <p>Outcomes measured:</p> <ul style="list-style-type: none"> • Staff-child interaction.

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
Rhodes and Hennessy (2001) The effects of specialised training on caregivers and children in early-years settings: An evaluation of the foundation course in the playgroup practice.	Ireland	<ul style="list-style-type: none"> Examine the effects of a 120-hour pre-school training course on caregivers' behaviour and children's development in early years settings. 	<p>Sample characteristics:</p> <ul style="list-style-type: none"> Pre-test: 33 caregivers Pre-test: 66 children Post-test: 29 caregivers Post-test: 50 children Trainees are required to work with children during the course and to have previously completed a 20-hour introductory course. <p>Settings: 33 childcare centres.</p> <p>Objectives of programme:</p> <ul style="list-style-type: none"> Improvement of practitioners' sensitivity Improvement in children's complex social and cognitive play. <p>Programme description and content:</p> <p>Training integrated into practices without supervision or coaching (no feedback)</p> <p><u>Theoretical model underpinning the programme:</u> not specified</p> <p><u>Delivery:</u> Foundation Course in Playgroup Practice involving 120 hours of training:</p> <ul style="list-style-type: none"> 90 hours tuition 30 hours of child observation and project work in ECEC settings within which practitioners are working <p><u>Duration:</u> Trainees attended classes two evenings per week over 24 weeks, and each class was of 2 hours' duration.</p>	<p>Design:</p> <ul style="list-style-type: none"> Pre-post training design with observational measures of caregiver behaviour and child development Without random assignment ('non-equivalent control group design'). <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> Caregivers: intervention group n=16 (participants who successfully completed the training course) and control group n= 17. Children: 66 children participated in the study at pre-test (two children from each centre where training and comparison participants were employed) and 50 (76%) children remained at post-test. There was a similar drop-out rate for the children in the training and comparison groups from pre- to post-test (25% and 24%, respectively). <p>Data collection methods:</p> <ul style="list-style-type: none"> Caregiver Interaction Scale (CIS) Child Development Social competence was rated on the 5-point Peer Play Scale (PPS) Cognitive competence was rated on the 5-point Play with Objects Scale (POS). <p>Outcomes measured:</p> <ul style="list-style-type: none"> Caregiver sensitivity Social and cognitive development of the children.
Sheridan (2001) Quality evaluation and quality enhancement in preschool: A model of competence development.	Sweden	<ul style="list-style-type: none"> Investigate whether quality in pre-school can be enhanced through a 'Model of Competence Development' which adopts ECERS as a tool for stimulating pedagogues' reflection and sustained improvement of practices. 	<p>Sample characteristics: 31 pedagogues in the intervention group.</p> <p>Settings: 20 pre-school units.</p> <p>Objectives of programme:</p> <p>The Model of Competence Development is expected to lead to increased competence in pedagogical practice.</p> <p>Programme description and content:</p> <p>Training integrated into practices accompanied by pedagogical guidance in ECEC settings</p> <p>Theoretical model underpinning the programme: the Model of Competence Development is built on the assumption that reflection leads to greater pedagogical awareness of what goes on in various pedagogical processes in pre-school which in turn improves practices.</p>	<p>Design: pre-post evaluation with comparison group</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> Total sample: 20 pre-school units Intervention group: 31 practitioners working in 9 pre-school units Control group: 11 pre-school units. <p>Data collection methods:</p> <ul style="list-style-type: none"> ECERS (used both as an instrument to evaluate the quality and as a 'tool' for reflection). <p>Outcomes measured:</p> <ul style="list-style-type: none"> Environmental quality

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
<p>Sheridan (2001)</p> <p>Quality evaluation and quality enhancement in preschool: A model of competence development. (cont'd.)</p>	<p>Sweden</p>		<p>Delivery: the programme is delivered through a combination of:</p> <ul style="list-style-type: none"> lectures and literature studies (8 lectures held once a month) reflection in groups (sharing knowledge and experiences among pedagogues) guidance (self-evaluation using ECERS, reflective diaries and analysis of video-documentation) <p>Duration: 1 year</p>	
<p>Simon and Sachse (2011)</p> <p>Promoting language skills in daycare. Can interaction training improve childhood educators' language-promoting behaviour? [translation from German]</p>	<p>Germany</p>	<ul style="list-style-type: none"> Evaluated the effectiveness of the 'Heidelberger Trainingsprogramm' on the language-promoting behaviour of early childhood teachers. 	<p>Sample characteristics:</p> <ul style="list-style-type: none"> 499 three- and four-year-old children who were weak in language acquisition (79% of the parents agreed to participate); ECEC teachers: qualified at upper secondary level – 95% in the intervention group, 81.8% in the control group <p>Settings: 27 groups of ECEC centres where the educators followed the 'Heidelberger Trainingsprogramm' were selected. The control group consisted of 25 groups of ECEC. The number of bilingual children was comparable in experimental training group and in control group.</p> <p>Objectives of programme: improve the language production of language-delayed children; improve teachers' language-promoting behaviour vis-à-vis language delayed children.</p> <p>Programme description and content:</p> <p>Training integrated into practices with feedback provided through video supervision</p> <p>Theoretical model underpinning the programme:</p> <p>Language-based interaction training named 'Heidelberger Trainingsprogramm zur frühen Sprachförderung in Kitas'</p> <p>Delivery: 5 group sessions (4 sessions every 3–4 weeks followed by a fifth session 3 months later) with intensive use of role play and practical sequences between the sessions. The training is supported by the video supervision of a picture book situation in the ECEC setting</p> <p>Duration: 6 months.</p>	<p>Design: a pre-test and post-test design</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> 146 children, 3–5 years (n=77 for the intervention group, n=69 for the control group) 49 ECEC teachers (n=27 for the intervention group, n=22 for the control group) [p. 467]. <p>Data collection methods:</p> <p>Validated instruments: Aktiver Wortschatztest for children 3–5 years (AWST-R, Kiese-Himmel, 2005), Grammatiktest (TROG-D, Fx 2007), SET-K for children 3–5 years (Grimm, 2000), Heidelberger Sprachentwicklungstest (HSET, Grimm and Schöler, 1991)</p> <p>Additional video analyses assessed children's verbal expression and the percentage of time they spoke in the total communication.</p> <p>The educators were filmed and a coding system was developed according to pre-defined categories (Bortz and Döring, 2006).</p> <p>Outcomes measured:</p> <ul style="list-style-type: none"> Child: linguistic skills (active vocabulary assessed through AWST-R; grammatical understanding assessed through TROG-D, semantics, morphology and phonological memory assessed through HSET; production of sentences assessed through SETK-3) Teachers: language promoting behaviour

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
Sundell (2000) Examining Swedish profit and nonprofit childcare: The relationships between adult-to-child ratio, age composition in childcare classes, teaching and children's social and cognitive achievements.	Sweden	<ul style="list-style-type: none"> Examine the potential effects of adult-child ratio and profit vs non-profit childcare on teaching and children's social and cognitive achievements [p. 92]. Because of severe cuts in the childcare budget in Sweden from 1990 to 1993, a sharp increase in the number of children in childcare classes has been observed (Lidholt and Norrman, 1994) [p. 91]. 	<p>Sample characteristics: 394 children (3 to 5 years old):</p> <ul style="list-style-type: none"> 106 in public centres; 79 in private non-profit centres; 209 in private profit childcare centres [p. 94]. <p>Settings: 32 child centres (16 for-profit and 16 non-profit) located in Stockholm [p. 95].</p> <p>Hypothesised impact: Effects of programme auspice (non-profit vs. for-profit childcare), adult-to-child ratios (1:4.6–1:8.7), and age span of the childcare class on teaching and children's social and cognitive achievement [p. 91].</p> <p>Description of working conditions:</p> <ul style="list-style-type: none"> Staff-child ratio. 	<p>Design:</p> <ul style="list-style-type: none"> Simple random sample <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> No control group Final study group was composed of 394 (90%) of the original sample of children <p>Data collection methods: Standardised/ validated measurement tools:</p> <ul style="list-style-type: none"> Cognitive Achievement. Coloured progressive matrices; vocabulary test (Ljungblad, 1989), similar to the Peabody Picture Vocabulary Test; test to measure children's capacity to report a story to a doll. <p>Other:</p> <ul style="list-style-type: none"> peer nominations; behavioural ratings; behavioural observations. <p>Outcomes measured: Child outcomes:</p> <ul style="list-style-type: none"> Cognitive and social competences (verbal abilities; intelligence; social competence).
Vandenbroeck et al (2008/2013) The impact of policy measures and coaching on the availability and accessibility of early childcare: A longitudinal study. Linked study	Belgium	<ul style="list-style-type: none"> Evaluate the impact of policy measures and the intervention programme on the centre director's access policies and on enrolment rates. 	<p>Sample characteristics: The data analysis on accessibility and enrolment is based on 88 of the 89 centres [p. 4]. However, data on family income were obtained from only 49 centres, as many centre directors did not report income due to the administrative work it takes to generate these data [p. 4].</p> <p>Settings: All 89 Flemish-funded centres were initially invited, 31 of which are organised by state schools, 16 by municipalities and 42 by private Christian organisations.</p> <p>Objectives of programme: Comprehensive support programme for centre directors regarding accessibility issues.</p> <p>Programme description and content: Training integrated into practices through coaching activities in ECEC settings</p>	<p>Design: To test whether changes in priorities or in enrolment were related to participation in the programme, the centres were divided into four groups: non-participants (n=19); early participants (since 2007; n=29); middle participants (since 2008; n=23); and late participants (since 2010; n=18) [p. 4].</p> <p>Comparison group and sample size:</p> <ul style="list-style-type: none"> Reported total sample at the baseline: 29 Reported total sample when intervention/study finishes: 70. <p>Data collection methods: self-reported measures – postal questionnaire asking centre directors to assess 12 priorities for access on 5-point Likert scale [p. 4].</p>

Author, year, title	Country	Aims and objectives of study	What was studied?	How was it studied?
<p>Vandenbroeck et al (2008/2013)</p> <p>The impact of policy measures and coaching on the availability and accessibility of early childcare: A longitudinal study.</p> <p>Linked study (cpnt'd.)</p>	<p>Belgium</p>		<p>Theoretical model underpinning the programme: not specified</p> <p><u>Delivery</u>: directors met the trainer on a monthly basis to discuss their plans for accessibility, exchange good practice and meet with workers who work with diverse populations in their area, such as employment agencies, providers of language courses for immigrants, welfare workers and so forth. They were also offered the opportunity to let their staff participate in a two-day training course on accessibility and social inclusion.</p> <p><u>Duration</u>: 2 years</p>	<p>Outcomes measured:</p> <ul style="list-style-type: none"> Quality: availability and accessibility of childcare.

Table A2: Summary of quality appraisal; weight of evidence

Author, year and title	Authors' reports of findings	Weight of evidence			Soundness of the study
		Selection Bias	Bias due to loss to follow-up	Selective reporting Bias	
Fukkink and Tavecchio (2010). Effects of video interaction guidance on early childhood teachers	Video feedback training for early childhood educators increases their socioemotional support and verbal stimulation in childcare practice. Video Interaction Guidance training improved the interaction skills of early childhood education and care teachers and the training results were still apparent three months after the training.	Avoided Participants were allocated using an acceptable method of randomisation. Groups are equivalent/ balanced and this is assessed by using statistical tests.	Avoided The attrition rate is reported separately according to allocation group. Baseline values of major prognostic factors were balanced between groups for all those remaining in the study for analysis.	Avoided Authors report on all outcomes they intended to measure as described in the aims of the study. Outcomes reported for all individuals/groups. Information for all outcomes collected at follow-up presented.	Sound Study avoided all three of the specified types of bias.
Jensen et al (2013). Effectiveness of a Danish early year pre-school program: A randomised trial	A new pre-school intervention, the ASP Programme, had a positive effect on emotional symptoms, conduct problems, hyperactivity and inattention of children in Danish pre-schools, but not on peer relationships and pro-social behaviour. Although all effect sizes found were small (0.15–0.2), the effect sizes were larger in children of well-educated mothers when compared with low-educated mothers. The intervention did not decrease the socioeconomic differences in the children, which was the original intention of the programme.	Avoided Participants were allocated using an acceptable method of randomisation. Baseline values of major prognostic factors were balanced between groups.	Avoided Attrition rate was reported separately according to allocation group and baseline values of major prognostic factors were balanced between groups for all those remaining in the study for analysis.	Avoided Authors report on all outcomes they intend to measure as described in the aims of the study. Outcomes are reported on all individuals.	Sound Study avoided all three of the specified types of bias.
Hayes et al (2013). Evaluation of the Early Years Programme of the Childhood Development Initiative	The two-year Early Years Programme of CDI showed no effect on child cognitive and language end-phase outcome scores. The findings show modest gains for the quality of the curriculum and activities provided in the services. In terms of outcomes for children, gains were indicated in areas such as improved behaviour and social skills, child attendance, and better speech and language prognosis on entry to school. The intervention improved the ability of those around the children to support their learning and development, and to interact meaningfully with children, whether the setting was the home or the Early Years service.	Avoided Participants were allocated using an acceptable method of randomisation. Groups are equivalent/balanced	Avoided Attrition rate was reported separately according to allocation group.	Avoided Authors report on all outcomes they intend to measure as described in the aims of the study. Outcomes are reported on all individuals.	Sound Study avoided all three of the specified types of bias.

Author, year and title	Authors' reports of findings	Weight of evidence			Soundness of the study
		Selection Bias	Bias due to loss to follow-up	Selective reporting Bias	
Beller et al (2007/2009). Enhancing the quality of language stimulation in ECEC institutions to increase educational outcomes for 4 and 5 year old children from families with low SES and immigrant background – A pedagogical intervention model (Linked study, Translation from German)	Children: Positive impact on language development of children of 4 years of age. No significant impact on language skills of children of 5 years old. No significant impact on cognitive skills of children. Teachers: professionals of the intervention group also showed a more positive educational behaviour in 3 out of 4 areas measured; no significant effect was observed on responsiveness	Avoided Participants were allocated using acceptable method of randomisation. Baseline values of major prognostic factors were balanced between groups or analysis adjusted. Invalid data were statistically controlled.	Avoided The study reports that there were no drop-outs.	Avoided Authors report on all outcomes they intended to measure as described in the aim of the study. Outcomes are reported for all individuals/ subgroups.	Sound Study avoided all three of the specified types of bias.
Evanschitzky et al (2008). Mathematics, science and technology in kindergarten. Study of the impact of an in-service training for kindergarten teachers. (Translation from German)	Children in the intervention kindergartens showed faster/more advanced development of mathematical concepts than children in the control kindergartens. Children in the intervention group show an increased interest in numbers and other mathematical concepts, whereas these changes were not found in the control group.	Avoided Authors controlled it with OSTZ.	Avoided The study reports that there were no drop-outs.	Avoided Extensive and well elaborated reporting.	Sound Study avoided all three of the specified types of bias.
Franco Justo (2008). Programme of relaxation and self-esteem improvement in kindergarten teachers and their relationship with the creativity of their students. (Translation from Spanish)	This study showed the effects of a relaxation programme on teachers' performance, level of anxiety and self-esteem. It also showed an increase in the graphic flexibility of children.	Avoided Participants were selected randomly.	Avoided All participants participated in both surveys.	Avoided The authors described the results and the outcomes clearly and very objectively.	Sound Study avoided all three of the specified types of bias. The study was a little experimental, but contributed some ideas about the implications of anxiety and the self-esteem of teachers
Sundell (2000). Examining profit and non-profit childcare: The relationships between adult-to-child ratio, age composition in childcare classes, teaching and children's social and cognitive achievements.	For-profit childcare centres had larger child groups than non-profit childcare centres, a lower adult-child ratio, and a positive staff attitude toward teaching goals. Age, gender, social background, and age span of the childcare class were significant predictors of children's social and cognitive achievements. Adult-child ratio and teaching style did not prove to be good predictors of children's social or cognitive achievements.	Avoided Participants were selected using a simple random sample method. Major prognostic factors were reported for the subjects in the study.	Avoided Attrition rate reported. Attrition rate = 0% (n=394).	Avoided Authors report on all outcomes they intended to measure as described in the aims of the study.	Sound Study avoided all three of the specified types of bias. There were no drop-outs. The study avoided selective reporting bias, because authors reported on all outcomes they intended to measure as described in the aims of the study.

Author, year and title	Authors' reports of findings	Weight of evidence			Soundness of the study
		Selection Bias	Bias due to loss to follow-up	Selective reporting Bias	
Simon and Sachse (2011). Promoting language skills in day care. Can interaction training improve childhood educators' language-promoting behaviour? (Translation from German)	<p>The training led to gains in speech productivity and heightened complexity of the children's verbal utterances through improvement in the early childhood educators' language interaction behaviour. Tests revealed that the intervention benefited the semantic skills of the children at the lowest competence level.</p> <p>The joy of speaking was significantly greater in the group of children in which the educator followed the training. The time that the children of this group talked also increased significantly.</p> <p>The educators, who had few competencies in language acquisition, increased their competencies through the training programme; they used more opportunities to increase the active use of language by the children, they gave less language input themselves and the quality of their language input increased.</p>	<p>Avoided</p> <p>Authors corrected the selection bias</p>	<p>Avoided</p> <p>Attrition rate is reported and there were very few losses (137/ 117).</p>	<p>Avoided</p> <p>Extensive reporting on all aspects.</p>	<p>Sound</p> <p>Study avoided all three of the specified types of bias.</p>
Rhodes and Hennessy (2001). The effects of specialised training on caregivers and children in early-years settings: An evaluation of the foundation course in playgroup practice.	<p>Caregivers who received a 120-hour pre-school training course made significant gains in positive relationship and decreased levels of detachment.</p> <p>The children in their care made significant gains in complex social and cognitive play from pre- to post-training.</p> <p>The comparison group adults and children showed no significant improvements from pre- to post-test times.</p>	<p>Avoided</p> <p>The study was based on a pre- and post-test control group design without random assignment (i.e. non-equivalent control group design).</p> <p>Baseline values of major prognostic factors are reported for each group for virtually all participants as allocated and baseline values of major prognostic factors are balanced between groups.</p> <p>The equivalence of the groups was assessed by comparing descriptive data.</p>	<p>Avoided, to some extent</p> <p>Attrition rate is reported separately according to allocation group and the attrition rate is less than 30% overall.</p> <p>But the attrition rate differs across groups by more than 10% [attrition rate for training group = 0%, attrition rate for control group= 29%] and there is no information on whether the baseline values of major prognostic factors were balanced between groups for all those remaining in the study for analysis.</p>	<p>Avoided</p> <p>Authors report on all outcomes they intended to measure as described in the aims of the study. Information on outcomes for all individual groups was reported.</p>	<p>Sound, despite discrepancy with quality criteria</p> <p>The study avoided two of the specified types of bias (selection bias and selective reporting bias), but only partially avoided the bias due to loss to follow-up.</p>

Author, year and title	Authors' reports of findings	Weight of evidence			Soundness of the study
		Selection Bias	Bias due to loss to follow-up	Selective reporting Bias	
Sheridan (2001). Quality evaluation and quality enhancement in pre-school: A model of competence development.	Quality in pre-schools can be enhanced through competence development at the same time as there are organisational changes and financial cutbacks. According to the results, as evaluated by the ECERS and the participant questionnaire, the development work has led to a higher quality in eight of the nine pre-school units. The results also show that structural aspects of quality are of great importance for the quality, but no guarantee of it. Of importance to quality in pre-school are good physical and material conditions as well as a high awareness and professionalism on the part of the pedagogue.	Avoided, to some extent Randomised but no details provided.	Avoided, to some extent In the third stage of the study a new evaluation of quality with the ECERS was conducted on 19 of the original 20 pre-school units by three observers. One unit was eliminated as both pedagogues and children who participated in the first evaluation changed.	Avoided Authors report on all outcomes they intended to measure as described in the aims of the study.	Sound, despite discrepancy with quality criteria The study clearly avoided selective reporting bias, but did not provide details about the method for randomisation. Also, one pre-school unit was eliminated in the third stage of the study.
Vandenbroeck et al (2008/2013). The impact of policy measures and coaching on the availability and accessibility of early childcare: A longitudinal study. (Linked study)	Policy measures, combined with support, can influence inequalities in enrolment rates. While inequality in availability has remained in the centres studied, centre directors' awareness of social priority criteria has changed, resulting in a significant increase in the enrolment of children from single-parent and ethnic minority families; and – to a lesser extent – an increase in the enrolment of children from low-income families.	Avoided, to some extent Participants were not allocated using randomisation. Baseline values of major prognostic factors were provided. No comparison groups.	Avoided, to some extent Attrition rate is reported. The number of settings increased significantly over time because more centres joined.	Avoided Authors report on all outcomes they intended to measure as described in the aims of the study.	Sound, despite discrepancy with quality criteria Study clearly avoided one type of bias (reporting bias). It also avoided, to some extent, selection bias and bias due to loss to follow-up.
Buschmann and Joos (2011). Language promotion in day care facilities for children: Effectivity of a speech-based interaction training for educational professionals. (Translation from German).	Children whose teachers had participated in the interaction training showed a significantly increased vocabulary and significantly better results in the standardised language developmental test at the age of 30 months.	Avoided, to some extent It is unclear why they chose the cities Heidelberg and Stuttgart. There is a good and systematic recruitment process, but, to have a bigger sample, they raised the scores on the selection tests with 5 percentile rank.	Avoided, to some extent There were no drop-outs (28 children on both pre- and post-test). But it is unclear why five children who were selected and approved eventually did not take part in the study.	Avoided, to some extent The authors reported on all outcomes they intended to measure. However, the findings are not well elaborated.	Sound, despite discrepancy with quality criteria To some extent, the study avoided the three types of bias. However, the findings are not well elaborated, some selection criteria are unclear and it is also not clear why five children who were selected and approved eventually did not take part in the study.

Author, year and title	Authors' reports of findings	Weight of evidence			Soundness of the study
		Selection Bias	Bias due to loss to follow-up	Selective reporting Bias	
Blatchford et al (2001/2002). Relationships between class size and teaching: A multimethod analysis of English infant schools. (Linked study)	There is a clear causal effect of class size on children's achievement and children's academic attainment over the reception year, both before and after adjusting for possible confounding factors. The results show, overall, that in smaller classes there is more individualised teacher support for learning.	Avoided Participants were selected using an acceptable method of randomisation.	Not avoided Attrition rate was not reported.	Avoided Authors report on all outcomes they intended to measure as described in the aims of the study.	Sound, despite discrepancy with quality criteria Study has avoided two of the specified types of bias (selection bias and selective reporting bias). However, there is not enough information to assess the selective reporting bias, because the attrition rate is not reported in the study.
Palmerus (1996) Child-caregiver ratios in day care centre groups: Impact on verbal interactions.	In daycare centre groups with a high child-staff ratio, the proportion of child-initiated verbal activities to the caregivers decreases while the proportion of adult-initiated verbal activities increases. Also, with a high child-staff ratio, the amount of verbal interaction between caregivers reduces. Caregivers with many children to take care of use verbal communication as a tool for control and dominance in the group.	Not avoided It is unclear which type of selection was used for selecting the sample. Baseline values of major prognostic factors were not reported for participants.	Avoided Bias due to loss to follow-up was avoided, because there were no drop-outs.	Avoided Authors report on all outcomes they intended to measure as described in the aims of the study. Outcomes reported for all individuals.	Sound, despite discrepancy with quality criteria Study avoided two of the specified types of bias (bias due to loss to follow-up and selective reporting bias), but not enough information is provided concerning the selection bias.

Table A3: Components of CPD interventions studied in relation to ECEC quality, staff–child interactions and children’s outcomes

CPD instructional characteristics		Evidence of impact		
		Quality of ECEC	Staff–child interactions	Outcomes for children
Training integrated into ECEC centres’ practice	Short-term intensive training interventions with video feedback component		Positive impact on practitioners’ language stimulation performance (Beller 2007–2009)* Positive impact on practitioners’ performance: stimulating caregiving and verbal stimulation (Fukkink and Tavecchio, 2010)* Positive impact on practitioners’ performance: use of language modelling techniques, corrective feedback and time allocation for children’s verbal expression. Combined with positive impact on children’s initiative in verbal interaction (Simon and Sachse, 2011)*	Overall positive impact on children’s language and cognitive development irrespective of their ethnic background or family language, although no impact on outcomes of 5-year-old children subgroup (Beller, 2007–2009)* Positive impact on children’s vocabulary and language development outcomes (Buschmann and Joos, 2011)**
	With feedback component	Positive impact on curricular / planning quality and on quality of literacy environment* (Hayes et al, 2013) Positive impact on environmental and pedagogical quality (Sheridan, 2001)** Positive impact on accessibility of ECEC services for children from single-parent and ethnic minority families. No impact on accessibility for low-income families and on availability** (Vandenbroeck et al, 2008 and 2013)	No impact (Hayes et al, 2013)*	Positive impact on children’s cognitive outcomes related to pre-mathematical skills (Evanschitzky et al, 2008)* No impact (Hayes et al, 2013)* Positive impact on children’s emotional symptoms, conduct problems, hyperactivity and inattention. No impact on peer relationships and pro-social behaviour (Jensen et al, 2013)*
	No feedback component		Positive impact on practitioners’ performance: increased positive relationship and decreased level of detachment. No impact on punitiveness and permissiveness (Rhodes and Hennessy, 2001)**	Positive impact on children’s social play and cognitive play (Rhodes and Hennessy, 2001)**
Training not integrated into practice	Offsite short-term intensive training			Positive impact on children’s outcomes in relation to fluidity and originality (Franco Justo, 2008)*

* study judged sound ** study judged sound despite discrepancy with quality criteria

Recent EU policy documents highlight the importance of improving working conditions and enhancing the professional development of the workforce in the early childhood education and care field – both in ensuring equitable access to services and in boosting the quality of provision. This report reviews research evidence from all 28 EU Member States to identify how the training and development of ECEC workers can be tailored to improve the quality of the services available for children below primary-school age in EU Member States. Among other findings, it concludes that interventions in professional development that are integrated into existing practice – with a focus on reflection – can result in more effective practice and curricula. A video feedback component has been found effective in fostering practitioners’ competences in care-giving and language stimulation; in addition, there is some evidence that higher staff–child ratios and smaller class sizes have positive effects on the quality of practitioners’ practices and on staff–child interaction.

