Fostering Effective Early Learning (FEEL) through a professional development programme for early childhood educators to improve professional practice and child outcomes in the year before formal schooling: study protocol for a cluster randomised controlled trial

Article (Accepted Version)

Melhuish, Edward, Howard, Steven J, Sira, Iram, Neilsen-Hewett, Cathrine, Kingston, Denise, de Rosnay, Marc, Duursma, Elisabeth and Luu, Betty (2016) Fostering Effective Early Learning (FEEL) through a professional development programme for early childhood educators to improve professional practice and child outcomes in the year before formal schooling: study protocol for a cluster randomised controlled trial. Trials, 17. a602. ISSN 1745-6215

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Fostering Effective Early Learning (FEEL): Study protocol for a cluster randomized controlled trial of a professional development program for early childhood educators to improve professional practice and child outcomes in the year before formal schooling

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Abstract

**Background:** A substantial research base documents the benefits of attendance at high quality early childhood education and care (ECEC) for positive behavioural and learning outcomes. Research has also found that the quality of many young children’s experiences and opportunities in ECEC depends on the skills, dispositions and understandings of the early childhood adult educators. Increasingly, research has shown that the quality of children’s interactions with educators and their peers, more than any other program feature, influence what children learn and how they feel about learning. Hence professional development focused on promoting sustained shared thinking through quality interactions could improve the quality of ECEC and, as a consequence, child outcomes.

**Methods/design:** The Fostering Effective Early Learning (FEEL) study is a cluster randomized controlled trial for evaluating the benefits of a professional development program for early childhood educators, compared with no extra professional development. Ninety long-day care and preschool centres in New South Wales, Australia, were selected to ensure representation across National Quality Standards (NQS) ratings, location, centre type and socioeconomic areas. Participating centres were randomly allocated to one of two groups, stratified by centre type and NQS rating: (1) an intervention group (45 centres) receiving a professional development intervention; or (2) a control group (45 centres) that continues engaging in typical classroom practice. Randomisation to these groups occurred after the collection of baseline environmental quality ratings. Primary outcomes, at the child level, are two measures of language development: verbal comprehension and expressive vocabulary. Secondary outcomes at the child level are measures of early numeracy, social development and self-regulation. Secondary outcomes at the centre level are measures of environmental quality derived from full-day observations. In all cases, data collectors are blinded to group allocation.
**Discussion:** This is the first randomized controlled trial of a new approach to professional development, which is focussed on activities previously found to be influential in children’s early language, numeracy, social and self-regulatory development. Results should inform practitioners, policy-makers and families of the value of specific professional development for early childhood educators.

**Trial registration:** ACTRN12616000536460

**Keywords:** Early childhood education and care, professional development, inservice training, relational and intentional pedagogy, child development, preschool education, intervention, language development, numeracy, self-regulation
**Background**

There is now widespread consensus that, relative to no early childhood education and care (ECEC), attendance in ECEC is more likely to confer a benefit on children [1]. Nonparticipation in ECEC programs thus places children at a developmental disadvantage both academically and socially [2,3]. Furthermore, major national surveys [4] and longitudinal research projects [5] show the enduring benefits that high quality ECEC provides for child outcomes into adolescence and beyond [1]. Indeed, there is strong evidence from various independent sources that the potential benefits of ECEC are to a great extent moderated by the quality of the service provision [1].

Recent initiatives in Australia at both the state and national level have begun to recognize the short- and long-term benefits of investing in ECEC. The National Quality Framework (NQF) and Early Years Learning Framework (EYLF) [6,7], for instance, have identified a range of structural and process quality indicators important in enhancing child outcomes. These state and national initiatives include measures to improve adult-to-child ratios, the introduction of minimum qualifications, regulation based on nationally recognized standards of practice and improvements in curriculum and reporting requirements. This implementation of nationally consistent quality standards is a significant transformation for the sector, and a move toward ensuring high quality educational experiences for children and workforce professionalization.

In recognition of the important role ECEC plays in the lives of young children, the New South Wales (NSW) government has introduced initiatives to ensure that all children have universal access to early education in the year before formal schooling, which starts at 5 years of age. Over recent years, the number of young children participating in ECEC services across Australia has increased significantly, with the percentage of children accessing ECEC increasing by 39.5% from 2004 to 2012 [8,9].
While ECEC attendance in NSW is moving toward a universal provision, there remain questions about the prevalence of high quality ECEC (despite the NQF and EYLF initiative). In recent national research, for instance, positive long-term associations were documented between ECEC attendance and a range of learning outcomes in national assessments at 8 years of age (i.e., numeracy, reading and spelling) [10]. However, closer inspection of these results showed that the greatest benefits were found amongst children whose preschool teacher held a degree or diploma qualification [10]. Consistent with such findings, the Early Years Workforce Strategy 2012-2016 recognises the importance of a skilled workforce in ensuring “the delivery of high-quality ECEC services” [11]. Nevertheless, the Australian ECEC context continues to be plagued by significant variations in educators’ qualifications. As of January 2014, only ECEC centres with more than 25 places are required to have a fulltime degree-qualified early childhood educator. A further 50% of staff needs to be working toward a diploma level qualification, with the remainder only holding basic certification.

Given this variability in nature and duration of ECEC educators’ training, alternative models such as ongoing professional development (PD) need to be examined as a means of increasing pedagogical knowledge and improving quality in early childhood educational practice. Increasing child participation in ECEC and the associated reliance on ECEC educators means that the quality of many young children’s experiences and opportunities depends on the skills, dispositions and understandings of the adult ECEC workforce [12,13,14]. Despite some notable advances, there continue to be challenges with respect to remuneration and professional status of early years educators, working conditions and staff stability [15]. For example, the Productivity Commission [15] reported that the staff turnover rate within the early childhood sector was around 16%, and was highest amongst the most qualified early childhood educators. Staff retention within the ECEC sector presents unique challenges, particularly with respect to
the ongoing commitment to quality educational experiences. Such a set of challenges means that children’s potential may not be adequately realised.

**The Quality of ECEC, Child Outcomes and Professional Development**

The quality of ECEC is multidimensional, encompassing the physical ECEC environment, the educational curriculum, staff training and qualifications, child-staff ratios, group sizes, staff turnover and interpersonal relationships. Yet many studies have been discrepant in their conceptualization of quality and its impact on children’s outcomes. Recent large-scale literature reviews by Melhuish et al. [3] and Siraj and Kingston [16] have concluded, based on synthesis of current international evidence, that the following characteristics of ECEC quality are particularly important for enhancing children’s development:

1. Adult-child interaction that is responsive, affectionate and readily available
2. Well-trained staff who are committed to their work with children
3. A developmentally appropriate curriculum with educational content
4. Ratios and group sizes that allow staff to interact appropriately with children
5. Supervision that maintains consistency in the quality of care
6. Staff development that ensures continuity, stability and improving quality
7. Facilities that are safe, sanitary and accessible to parents
8. Working with families, sharing educational goals and supporting early home learning environments

Many studies have recognised that while physical resources, such as buildings and schools, are necessary for quality ECEC, the most important ingredient for quality provision is the quality of the staff who work with the children and families [17]. Cooke and Lawson [18] reported that
improving the quality of ECEC and learning outcomes for children required a highly skilled workforce – one which offered reflective practice, sound decision making and personalised care and education. Increasingly, research has shown that some of the strongest predictors of child outcomes pertained to the educators’ role; more specifically, the quality of adult-child and child-child interactions they promoted and supported. Children’s interactions with educators and their peers, more than any other program feature, are seen as determining what the children learn and how they feel about learning [13,19,20,21].

A review and meta-analysis [22] concludes there is ample evidence that providing sectorspecific qualifications and PD for educators improves children’s learning and wellbeing. Evidence has also accrued on the particular value of interactions supporting sustained shared thinking. The term sustained shared thinking (SST) was originally coined from research considering and identifying components of excellent practice in the Effective Provision of Pre-school Education (EPPE) study in England [23]. Since this pioneering study, SST has been widely used in many Early Years Frameworks across the world. The EPPE project’s findings, including SST, influenced development of the Australian Early Years Learning Framework (EYLF) [24], as well as the English Early Years Foundation Stage (EYFS) [25]. However, the practices associated with SST have been found lacking in many ECEC settings [13,20,23,26]. Hence there is a need to develop staff capacity for fostering interactions that contain SST, as well as other types of interaction that similarly foster language development, critical thinking, self-regulation and social development.

In line with this thinking, a PD program has been developed that specifically addresses the enhancement of staff interactions with children in ways that the available evidence suggests should foster children’s development, especially in the areas of language development, self-regulation, early numeracy and social development. These child outcomes are particularly
important because they have been consistently linked to children’s longer-term development in terms of educational achievement and social adjustment in Australia [27,28], the UK [29], USA [30] and China [31].

**Aims of the Study**

The main objective of this study is to evaluate whether a PD program seeking to enhance the quality of ECEC interactions, compared to routine practice, can enhance ECEC quality and child outcomes. The primary outcomes at the child level consist of two measures of language development—verbal comprehension and naming vocabulary—as these may be particularly sensitive to environmental changes that may occur from the PD program [1]. Secondary outcomes at the child level include other central aspects of child development, notably early numeracy, social development and self-regulation. Secondary outcomes at the centre level are changes in two environmental rating scales: ECERS-E, the focus of which is curriculum content, concept development and pedagogy, and the SSTEW scale, the focus of which is interactional quality through relational and intentional pedagogy. It is hypothesized that the PD intervention will have a positive effect on the identified child outcomes and centre-level environmental quality ratings. If supported, this would provide evidence that improvements in professional practice are mediating child outcomes.

**Methods/Design**

**Study Design**

The study employs a clustered randomized controlled trial design. Ninety ECEC centres in New South Wales, Australia, were recruited to ensure representation across National Quality Standards (NQS) ratings (Working Towards, Meeting, Exceeding), location (metro, regional), centre type (long-day care and preschool) and socioeconomic areas (as based on the SocioEconomic Indexes for Australia; SEIFA). The sample ensured representation across these
variables, but was not intended to be fully representative of the population (see Centre Characteristics). Stratified random assignment of centres to control and intervention groups occurred after the collection of baseline environmental ratings. Once collected, participating centres were then stratified by centre type and NQS rating and randomly allocated to one of two groups: (1) the intervention group \( n = 45 \) centres receiving the PD intervention; or (2) the control group \( n = 45 \) centres that will continue engaging in typical classroom practice. Fieldworkers, blinded to group allocation, then conduct baseline child assessments early in the following year. The 9-month PD intervention then occurs throughout much of 2016. Postintervention child assessments and environmental quality ratings will occur again in late 2016 to evaluate any changes as a result of the intervention, relative to control. A flowchart depicting the sequence of recruitment, intervention and assessment for FEEL shown in Fig. 1. An outline of Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) time points and actions for the FEEL study is shown in Table 1.

Centre Characteristics and Recruitment

An initial list of ECEC centres in New South Wales, Australia \( N = 348 \) was examined for potential inclusion. Criteria for the potential inclusion of centres were: (1) being within 1.5 hours of one of the three study hubs; (2) being within socioeconomic (SEIFA) deciles 1-8 (thereby excluding very privileged areas); (3) not participating in other research; and (4) not being a Department of Education (study funder) centre. This yielded an initial working list of 181 eligible centres. A selection of 90 centres for initial recruitment approach was made on the basis of representation across NQS ratings (i.e., approximately equal numbers of Working Towards, Meeting, Exceeding), service type (i.e., 2/3 long-day care, 1/3 preschool), location

<INSERT FIGURE 1 HERE>

<INSERT TABLE 1 HERE>
(i.e., approximately equal numbers of metro and regional centres) and socioeconomic areas (i.e., Decile 1-8, according to SEIFA Advantage and Disadvantage indices, with at least 1/3 of the sample derived from areas of known deprivation). A backup list of an additional 66 centres was also created to supplement recruitment if initial approach was unsuccessful. Centres were invited to participate in the study first by an initial call to gauge interest and identify the best contact person for follow-up. A member of the research team then made a follow up call the next day to interested centres to fully explain the study and, if appropriate, obtain a contact e-mail address to send Participant Information Sheets and Consent Forms for review. Participating centres were those that met the inclusion criteria and returned a signed Director Consent Form to participate in the study. The first 90 ECEC centres that responded positively to the invitation and gave written consent took part in the study.

**Randomized Allocation of Centres**

The study adopted a cluster randomized controlled trial design; participants (i.e., centres and children) were assigned to the control or intervention groups randomly by cluster (centre). Randomization did not occur until after: (a) recruitment of centres was complete; and (b) initial baseline environment ratings were complete. As such, those involved in recruitment of centres were unaware, at the time of recruitment, to which group centres would be allocated. Stratified randomization of centres (cluster) was conducted using centre type and NQS rating as core stratification variables. This randomization was also evaluated to ensure comparable SES, environmental rating and location profiles between the two groups, which subsequent analyses confirmed.

**Child Characteristics and Recruitment**

Early in the year following centre recruitment, and preceding the intervention, children in the year before formal schooling (4-5 years of age) will be recruited from participating centres.
This involves disseminating information sheets and consent forms, via the centre, to parents or legal guardians of suitably aged children. Participating children will be those that meet the age-inclusion criteria, returned a signed Parental Consent Form to participate in the study and themselves provide verbal assent to participate. Ninety centres are expected to yield a sample of approximately 1200 4-5 year old children with whom child assessments will be conducted. There were no further exclusion criteria for child participation.

**Outcome Measures and Procedures**

All measures will be administered at baseline and again after the 9-month intervention period (post-test). The battery of child measures was selected to include outcomes that are important for school readiness (i.e., literacy, numeracy, self-regulation, social development). Such outcomes have also been established by previous research as having a foundational role in child development. In total, the child outcome measurements involve 40-50 minutes of direct assessment per child (split into two sessions) and 10 minutes of educator time per child (i.e., ~3.3 hours of educator time per centre) at each data collection time point. In all cases, child assessments will be carried out by a trained fieldworker in a quiet area of the child’s ECEC centre. All environmental quality ratings will also be conducted by highly trained observers (reliable to a gold standard observer) through a 1-day observation of each pre-school room in participating centres. In all cases, the researchers involved in collecting baseline and outcome data are blinded to each centre’s group allocation.

Primary child-level outcomes consist of measures of children’s language development: verbal comprehension and expressive vocabulary. Specifically, the Verbal Comprehension subtest of the Differential Ability Scales [32] is a measure of the receptive language (comprehension) ability of the child, and takes 10-15 minutes to administer. The Expressive Vocabulary test from the Early Years Toolbox [33] is an assessment of expressive vocabulary to complement the receptive language measure, and takes 5 minutes to administer. Secondary outcomes at
the child level involve measures of early numeracy, social development and self-regulation. Get Ready to Read! (Revised) is a standardised assessment of young children’s early literacy skills [34], which takes 10 minutes to complete. The Early Number Concepts subscale of the Differential Ability Scales [32] and the Early Numeracy Assessment [35] include numeric concepts of counting, cardinality, number comparison and number combinations. These two assessments each take 10-15 minutes to complete. The educator-report Child Self-Regulation and Behaviour Questionnaire (CSBQ) [33] and Strengths & Difficulties Questionnaire (SDQ) [36] yield subscales of cognitive, emotional and behavioral self-regulation, antisocial and prosocial behaviors, sociability and anxiety/internalising, among others. Centre-level secondary outcomes involve observational ratings of the quality of provision in centres using the Early Childhood Environment Rating Scale – Extended (ECERS-E) [37] and the Sustained Shared Thinking and Emotional Well-being (SSTEW) scale [38]. ECERSE measures the quality of the curricula, environment and pedagogy in language and literacy, maths and number, science and environment, as well as quality related to meeting the needs of diverse students. The SSTEW scale is designed to consider practice that supports children aged 2 to 5 in developing skills in sustained shared thinking and emotional wellbeing within five subscales: (1) building trust, confidence and independence; (2) social and emotional well-being; (3) supporting and extending language and communication; (4) supporting learning and critical thinking; and (5) assessing learning and language.

**Professional Development Intervention**

The PD program is focused on enhancing staff interactions and relational and intentional pedagogy with children. The program, delivered in three distinct phases over 9 months, provides opportunities to observe, discuss, practice and reflect on important attributes of the effective educator’s role, including: engaging in high quality interactions and sustained shared thinking, developing and extending concepts, and modelling critical and reflective thinking.
Links are made to appropriate frameworks including the Australian NQS and the Australian EYLF. Fundamental to each session is evidence-based understandings of how young children learn best. The PD has been designed to support the collective participation of attendees, as well as promote collaborative working to gain deeper knowledge of leadership, change management, quality improvement and self-assessment.

The PD program covers eight core content areas, delivered across three phases:

2. How high quality interactions extend children’s development.
3. The relevance of self-regulation to children’s educational success.
4. The links between early language development and later literacy.
5. Mathematical and scientific concept development in the early years.
6. Ways to use observation, assessment of practice and planning to improve quality.
7. The importance of home learning and connections across ECEC settings and the home learning environment.
8. The relevance of leadership for learning for children’s development and ways to improve it.

Phase 1: Intensive Professional Development (Week 1 - Week 3, delivered at each of 3 hubs)
A 2-day intensive face-to-face training providing: an overview of national and international research; an introduction to relevant environmental quality characteristics; coverage of key concepts and ideas; as well as strategies to foster early language, cognitive, self-regulatory and social development, engage in high quality interactions, and work with homes.

Phase 2: Follow-up Professional Development (Week 3 - Month 3, at each of 3 hubs) Five half-day face-to-face sessions, delivered every two weeks, beginning two weeks after a hub’s completion of Phase 1. The sessions include time for reflection, planning and critical analysis,
as well as the introduction of knowledge and pedagogical content on areas not covered in Phase 1.

Phase 3: Model for sustainability (Week 3 - Month 9)

To promote centre commitment, limit the effects of staff turnover and increase the likelihood of a positive impact, PD support will be provided for the full 9-month intervention through online modules (beginning at the end of Phase 1 and continuing for 9 months). Activities and resources, designed to promote staff engagement and establish an online community of educators are contained within modules or E-books. Each E-book combines video-streamed content with questions and text, including links to activities and a discussion forum. Staff participation and discussions feed into a learning portfolio, tracking and reflecting how their ideas about pedagogy, children, families and communities have changed. Access to this online environment is provided to all centre staff, not only those attending Phase 1 and 2.

Session Details

All sessions will be delivered at each of three central hubs, to ensure all centres are within 1.5 hours of the PD delivery location. Sessions are to be conducted by four of the study's Chief Investigators, who are researchers and international experts in early childhood education and care. All sessions are delivered in a group setting for centres most proximal to that hub.

Statistical Analyses and Power

The primary outcomes are changes in child outcomes that will be analyzed in multi-level models where a specific intervention-control comparison will be included. Subsequently we will compare 45 intervention and 45 control centres for environmental quality in order to estimate the effect upon staff behavior in the centres.

Analyses will be carried out using two different types of dataset:
1. The intention-to-treat datasets: Data will be analysed based on participants according to the random allocation, irrespective of whether the intervention was or was not entirely or partly taken up.

2. The per-protocol datasets: Because it is possible that participants may not receive the intervention, the intention-to-treat analysis might underestimate the potential efficacy of intervention. A per-protocol analysis will therefore be carried out in addition to the intention-to-treat analysis. The per-protocol datasets will include data pertaining to all outcomes, restricted to participants who complied fully or partly with their assigned intervention.

Primary analyses will use the intention-to-treat dataset. Centre and participant characteristics at trial entry will also be tabulated using the intention-to-treat datasets. Descriptive statistics for continuous variables will include the mean, standard deviation, median, range and the number of observations. Categorical variables will be presented as numbers and percentages. Centre-level outcomes will be analysed by linear regression models with baseline measures as covariates. Secondary analyses from explicit hypotheses (e.g., subgroup, including level of deprivation) will be specified in advance in a statistical analysis plan. This detailed statistical analysis plan will be written as soon as possible. Sensitivity analyses will be conducted for all primary and secondary outcomes. Inverse probability weighting will be considered if missing data are more prevalent than expected and/or there is differential attrition between trial arms. Additionally, reasons for the differential attrition will be fully explored.

Ninety centres are expected to further yield a sample of approximately 1000 to 1300 4-5 year old children for whom child outcome assessments will be conducted. The effect of the PD intervention will be considered in two ways. Firstly, we will compare 45 intervention and 45 control centres for environmental quality in order to estimate the effect upon staff behaviour in the centres. The changes in child outcomes between pre-test and post-test will be analysed in a
multi-level model where a specific intervention-control comparison will be included. In applying power calculations, we took into account that children are clustered in centres. Conservative power estimates, after adjusting for the clustered (nested) design, indicate that we can detect an effect size as low as 0.17 SD with 80% power for all child outcomes. This is based on a conservative estimate of 13 children per centre, yielding an estimated sample size of 1170. For continuous outcomes, these correspond to differences between the means in the treatment and control groups in units of the standard deviation.

Detectable effect sizes depend on:

1. The Type I error rate
2. The unit of comparison, i.e., children (N = 1170), or centre (N = 90)
3. For children, whether measures are independent observations or clustered within centres
4. Where children are assumed to be clustered within centres, how much of the variability is between centres and how much of the variability is between children within centres.

For 80% power, this study would be capable of detecting an effect size for the child outcomes of between 0.17 and 0.20 (p < .05) or between 0.21 and 0.24 (p < .01), depending on the ratio of the standard deviation of children within centres to the standard deviation of centres. This compares with detectable effect sizes of between 0.16 (p < .05) and 0.20 (p < .01) if the child measures could be assumed to be independent.

Some of the secondary outcomes involve differences between intervention and control groups at the centre level. Contrasting the child-level outcomes, the differences at the centre-level would need to be of the order of 0.60 standard deviation units for statistical significance. The design is thus less sensitive for detecting centre-level differences than for detecting difference at the child-level. While sensitivity for detecting centre-level differences could be improved by increasing the sample size in terms of centres, the cost implications made this impractical.
Ethical and Research Governance Approval

The study was granted ethical approval by the University of Wollongong Human Research Ethics Committee Social Sciences (HE15/309) on 08 September 2015. Written consent was obtained from Centre Directors (for overall participation and centre observations), educators (who will complete educator-report measures) and children’s parent(s) or legal guardian(s) as a condition for participation. All participants consented for publication of the study results in anonymized aggregate format. Per Consolidated Standards of Reporting Trials (CONSORT) guidelines, the study’s final reporting will follow the CONSORT statement and its relevant extensions (e.g., cluster trials, non-pharmacological interventions).

Study Timeline

Recruitment of centres commenced in September 2015 and recruitment of children began in February 2016. Figure 1 provides details of the stages of the study. The trial is set to finish in December 2016.

Discussion

The study is dependent upon the cooperation of the centres recruited to the study, the staff within those centres and the parents of the children in those centres. Hence substantial efforts have been expended in producing information leaflets for all concerned to explain the study, its aims and the potential benefits of the study for ECEC centres in the future and the children who will use them. A substantial amount of time has been required for meetings and other liaison between the research team and potential centres for recruitment. Thus far we believe that the necessary groundwork has been made and hope that the study will proceed according to plan. This would mean that the next publication regarding this trial will concern its results, demonstrating whether there is an impact of the professional development program on child outcomes as a consequence of improved centre staff behaviour and competence. These results
should inform decision-making about future practice and policy regarding the provision of PD to ECEC staff, as well as potentially informing the content of staff training. Such an impact would be of benefit to ECEC centres and their staff, as well as the communities, families and children who utilise these centres.

**Trial Status**

Recruitment of ECEC centres began in September 2015 and 90 centres have been recruited. Pre-test centre environmental ratings have been completed, random assignment to treatment and control groups has been achieved and recruitment of children is ongoing. Pre-test child assessments should be complete before the end of May 2016. Professional development for the treatment group has started and will proceed until the end of the year, with post-test child assessments and environmental ratings starting in November 2016.

**List of Abbreviations**

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
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<tr>
<td>ACTRN</td>
<td>Australian New Zealand Clinical Trials Registry</td>
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<td>COAG</td>
<td>Council of Australian Governments</td>
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<td>CSBQ</td>
<td>Child Self-regulation and Behaviour Questionnaire</td>
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<tr>
<td>DEEWR</td>
<td>Department of Education, Employment and Workplace Relations</td>
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<td>DfE</td>
<td>Department for Education (UK)</td>
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<td>ECERS-E</td>
<td>Early Childhood Environment Rating Scale – Extended</td>
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<td>ECEC</td>
<td>Early childhood education and care</td>
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<td>EYLF</td>
<td>Early Years Learning Framework</td>
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<td>NSW</td>
<td>New South Wales</td>
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<td>NQS</td>
<td>National Quality Standards</td>
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Competing Interests

None of the study investigators has any financial interests in the outcome of the trial.

Authors’ contributions

IS and EM are Lead Investigators. EM, SH, IS, CNH and MdR contributed to study design. EM and SH provided measurement, trial and statistical expertise. SH supervised the centre randomization, and EM and SH will conduct primary analyses. CNH and MdR contributed to recruitment and retention of participants. IS, DK and CNH contributed to design of the PD program and IS, DK, CNH and ED were involved in PD implementation. SH will supervise data collection and is the academic project manager supported by BL. All authors contributed to refinement of the paper and approved the final manuscript.

Acknowledgements

Thanks are due to the New South Wales Department of Education for their support in setting up funding for this study. The study is funded through a competitive tender provided by the
Department of Education (RFT DECEAR-15-35), which provides support for fieldworkers to collect data, a project manager and partly supports SH, CNH and ED.
References


<table>
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<th>Timepoint</th>
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<th>Pre intervention</th>
<th>Allocation</th>
<th>Post-allocation</th>
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<tr>
<td></td>
<td>Eligibility screen</td>
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<td>Initial centre contact</td>
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<td>Centre informed consent</td>
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<td>Allocation</td>
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<td>Recruitment of children &amp; parent informed consent</td>
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**Intervention**

PD intervention X
Regular practice (control) X

**Assessments**

Child Assessments
- DAS Verbal Comprehension X X
- EYT Expressive Vocabulary X X
- Get Ready to Read! (Revised) X X
- DAS Early Number Concepts X X
- Early Numeracy Scales X X
- Strengths & Difficulties (SDQ) X X
- Child Self-Regulation (CSBQ) X X
- Centre-Level Assessments ECERS-E Environ. Rating X X
- SSTEW Environ. Rating X X

PD professional development. DAS Differential Ability Scales. EYT Early Years Toolbox. SDQ Strengths & Difficulties Questionnaire. CSBQ Child Self-Regulation and Behaviour Questionnaire.
Fig. 1 Consolidated Standards of Reporting Trials (CONSORT) flow diagram of the stages of the FEEL study