THE CAMPBELL COLLABORATION

Protocol:
The Relationship between Teacher Qualification and the Quality of the Early Childhood Care and Learning Environment: A Systematic Review

Matthew Manning, Susanne Garvis, Christopher Fleming, and Gabriel T.W. Wong

Submitted to the Coordinating Group of:

☐	Crime and Justice
☒	Education
	☐ Disability
☐	International Development
	☐ Nutrition
☐	Social Welfare
☐	Other:

Plans to co-register:

☒	No		
☐	Yes	☐ Cochrane	☐ Other
☐	Maybe		

Date Submitted:

Date Revision Submitted:

Approval Date:

Publication Date: 02 March, 2015

BACKGROUND

The Problem, Condition or Issue

Not all children are born healthy, provided with adequate health care, have access to good nutrition, or live in acceptable housing conditions. Further, not all children are born free of disabilities, or are raised by parents who can comfort, nurture, and provide opportunities to develop children's language, literacy, social problem-solving and behaviour management skills (Manning, 2008). Evidence demonstrates that an achievement gap (i.e. educational disparities) exists between racial and socio-economic groups (Editorial Projects in Education Research Center, 2011; Lee & Burkam, 2002; Magnuson & Waldfogel, 2005). Economically disadvantaged students and students of racially marginalized groups (e.g., African-American and Hispanic) in the U.S., for example, are more likely to receive lower grades and scores in standardized tests when compared to Caucasian students (Burchinal et al., 2011; Reardon & Galindo, 2009). Poor quality early childhood care and education can be detrimental to the development of children from all backgrounds, particularly if they fail to equalise some of the disparities and disadvantages that children face in the early developmental stages of their lives. Disparities, for example, may be present in children's cognitive, physical, and social-emotional development (National Institute of Child Health and Human Development Early Child Care Research Network, 2005; Peisner-Feinberg et al., 1999). Without access to high-quality services (e.g., health, care and education) that support the child and his/her family in the early years of life, potential negative pathways may lead to poor social, emotional, educational, health, economic and behavioural outcomes (Manning, Homel, & Smith, 2010).

A number of longitudinal research projects support the notion that high-quality (compared with low-quality) early childhood care and education (ECCE) is more likely to support optimal child social, emotional and cognitive development, promote growth experiences (including nurturing and attachment), and facilitate positive interaction among teachers and children (A. M. Gordon & Browne, 2014; Wolery, 2004). These positive developmental and social experiences, as well as a supportive and nurturing environment, in the early years (e.g., preschool years) are commonly translated into improved school readiness and subsequent successful academic achievement in areas such as reading and mathematics (Ramey & Ramey, 2004). School readiness, as measured by standardized assessments of cognitive and linguistic performance, is the key to an ongoing positive, successful and enriching educational experience (Manning et al., 2010). Further, school engagement (including being prepared for various transitions such as from preschool to elementary school) is positively correlated with perseverance, school adjustment, and school completion. Being prepared to learn, having positive social experiences in school, and ultimately being successful at school (i.e. academic achievement) minimizes the chances of future antisocial behaviour and engagement in criminal activity (Reynolds, Ou, & Topitzes, 2004).

High-quality ECCE programs (e.g., the HighScope Perry Preschool Program in Ypsilanti, Michigan) have been shown to produce tangible and intangible societal benefits. These

include increased taxes due to higher earnings of program participants, reduced victimisations and their associated personal and criminal justice costs, and improvement in quality of life (Schweinhart et al., 2005). The well-documented relationship between ECCE program quality and the tangible and intangible benefits provided by high-quality programs is a fundamental rationale for addressing and enhancing quality in the ECCE environment (National Institute of Child Health and Human Development Early Child Care Research Network, 2005). This idea is highly congruent with Vitaro, Barker, Brendgen, and Tremblay's (2011) emphasis on the 'school-related pathway' (involving school readiness and engagement) as a child developmental pathway that serves as the theoretical foundation for the development of early childhood education policy.

Defining the Quality of Early Childhood Education

Katz (1992) suggests that the quality of ECCE can be defined and assessed from four perspectives: top-down; bottom-up; inside; and outside-inside. Assessment based on the top-down perspective examines quality primarily by identifying selected features and characteristics of the program and environment, as recorded or observed by an assessor. The bottom-up perspective gives weight to the children's experience of the program and considers to what extent the young children find themselves being included and respected during the learning process. This approach is especially applicable for ECCE programs that focus on the inclusion and integration of children with developmental or learning delays and disabilities into the environment (Spiker, Hebbeler, & Barton, 2011). The inside perspective defines quality of an ECCE program as perceived by the staff. Three dimensions are considered; collegial relationships, staff-parent relationships, and staff-sponsor relationships. The outside-inside perspective focuses on the parent-teacher relationship. This perspective may reflect whether the parents' expectations or pedagogical goals are compatible with the curriculum. It is also suggested that the learning environment for children is more effective when parents are meaningfully engaged in the program through the teacher or service provider (National Association for the Education of Young Children, 1991).

Defining and measuring quality in ECCE has been a continuing challenge in terms of the methodology in research and formulation of policy to enhance quality (La Paro, Thomason, Lower, Kintner-Duffy, & Cassidy, 2012). Among the varying definitions or conceptualizations of quality in reference to ECCE, the predominant approach is the top-down perspective (Katz, 1992). Traditionally, the connotation involves both multiple distal (e.g., broad parameters of program and state policies) and proximal (e.g., curriculum and caregiver-child interactions) features of an ECCE environment that are expected to support children's development in various domains (e.g., cognitive, language, and social development) (L. Dunn, 1993; Kontos, 1991). The relative importance of indicators of either proximal or distal features varies across a multitude of perspectives, including that of the parent, caregiver, and child (Layzer & Goodson, 2006). In order to avoid vague and nonspecific operational definitions of quality (e.g., any "all-encompassing" term), early childhood researchers have

commonly conceptualized and disaggregated the multidimensional ECCE quality into two measurable interrelated components: (1) structural quality - this refers to structural indicators such as child-to-staff ratios and caregiver characteristics such as teacher formal education; and (2) process quality - including learning opportunities available to the children, and teacher-child and peer-to-peer interactions within the child care environment (Clifford, Reszka, & Rossbach, 2010). Both qualities generally share the same goal (or target), which is the enhancement of child development and learning outcomes (Taguma, Litjens, & Makowiecki, 2012). Previous literature reveals that both structural and process characteristics of quality are not only related, but are also important to children's developmental outcomes (Sammons et al., 2002).

Structural Quality

A number of studies have examined the effectiveness of structural features to predict quality outcomes. Three frequently studied features are child-to-staff ratio, class size, and staff educational attainment. Children enrolled in programs with low ratios (i.e., few children per caregivers) tend to be more socially competent, compliant, cooperative, and advanced in academic progress compared to the children from programs with high ratios (Clarke-Stewart & Gruber, 1984; Guo & Harris, 2000; Howes, 1988; Whitebook, 1989). High child-to-staff ratios are also more frequently associated with negative staff-child interactions (Rosenthal & Vandell, 1996). Smaller group sizes (compared to larger group sizes) are associated with better academic progress, higher levels of cooperation, compliance, consideration, and engagement in sophisticated social play. Children in smaller groups also have a lower tendency to answer with antisocial responses during social problem-solving tasks (Clarke-Stewart & Gruber, 1984; Dunn, 1993; Howes, 1988; Whitebook, 1989). When caregivers have higher education levels, children tend to have higher levels of social competence (Clarke-Stewart & Gruber, 1984). Education or training of teachers/caregivers in the ECCE environment is also correlated with higher scores on achievement tests and higher levels of compliance and cooperation in children (Whitebook, 1989).

It is noted, however, that structural indicators of an ECCE program and caregiver characteristics contribute to the overall quality or child developmental outcomes through relatively indirect ways compared to process features (Vandell & Wolfe, 2000). For example, Blau (2000) proposes a two-stage model, suggesting that structural features contribute to the process quality in ECCE settings during the first stage, which subsequently affects children's developmental outcomes. Similarly, Phillipsen, Burchinal, Howes and Cryer (1997) suggest that the effects of structural variables on child developmental outcomes are mediated by process quality (e.g., more nurturing and extensive teacher-child interactions).

Process Quality

Process quality is found to be more predictive of children's learning and developmental outcomes than structural indicators (Vandell & Wolfe, 2000; Whitebook, 1989). The classroom dynamics, including proximal-level interactions and transactions among teachers, children and materials, reflect the core components within the early childhood learning environment. These components are associated with positive academic and social outcomes for young children (Love, Meckstroth, & Sprachman, 1997). A higher process quality classroom tends to be associated with fewer problem behaviours, better cognitive and social skills and academic progress – especially math skills (Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg et al., 2001). The concept that higher process quality supports better educational, social and emotional outcomes is also supported by the developmental prevention literature. This literature highlights that developmental and social experiences vary between groups (e.g., those living in high or low socio-economic status areas) and that these differences in experience may be affected by the environment in which the child grows and learns (Blokland & Nieuwbeerta, 2010; Homel, 2005). As such, ECCE institutions, together with the involvement of parents and caregivers, play a pivotal role in the social, emotional and educational development of the child (Sylva et al., 2006; Warash, Ward, & Rotilie, 2008). Further, these institutions need to move beyond traditional system silos where there may be common goals between institutions, but coordination is poor or non-existent. In this regard, it has been the priority of policy makers and education and developmental experts to monitor and enhance process quality in the ECCE sector.

Process quality is assessed primarily by observing the early childhood learning environment (Clifford et al., 2010). In some instances, the measures focus on specific aspects of the teacher-child interaction (e.g., the Caregiver Interaction Scale (CIS; Arnett, 1989), and the Student Teacher Relationship Scale (STRS; Pianta & Nimetz, 1991)). The Classroom Assessment Scoring System (CLASS) is one of the most widely used and reliable measurement tools to assess the quality of classroom interactional processes. Specifically, CLASS focuses solely on several dimensions of teacher-child interactions (Pianta, La Paro, & Hamre, 2007). These dimensions are organised into three broad domains (emotional support, classroom organisation and instructional support) reflecting two aspects (social and instructional) of interactions (Hamre et al., 2012; Mashburn et al., 2008). The social aspects of interactions focus on how sensitive and responsive teachers are with respect to children's needs and cues. The instructional features of interactions focus on teachers' behaviours that promote children's development and performance of skills. Hamre and Pianta (2005), who examined the influence of support from teachers on children's school readiness, found that high levels of instructional and emotional support reduce the probability (for children at risk of early school failure) of developing poor learning outcomes and reduce children's conflict with teachers. Mashburn and colleagues (2008) also discover that instructional interactions are able to predict academic and language skills of children and teachers' emotional interactions are able to predict teacher-reported social skills.

Environment Rating Scales

The entire notion of the learning environment, however, is beyond the specific interactional aspects as measured by CIS, STRS and CLASS, and is defined in a broader sense with interactions between program components and among people (e.g., teacher, parent and child) in the ECCE setting (Harms & Clifford, 1983). Hence, several Environment Rating Scales (ERS), as the global measure of ECCE quality, have been developed. They include the Early Childhood Environment Rating Scale (ECERS) (Harms & Clifford, 1980), the Infant Toddler Environment Rating Scale (ITERS) (Harms, Cryer, & Clifford, 2003) and their revised versions (ECERS-R (Harms, Clifford, & Cryer, 1998) and ITERS-R (Harms et al., 2003)). The ERS focus on multiple processes within the early childhood learning setting and are recognised as a set of standardised measurement tools that are widely used in research assessing ECCE quality (Clifford et al., 2010). The ERS, when compared to other commonly used measures (e.g., CLASS), focus not only on items related to teacher-child interactions, but also on available materials, and health and safety issues (Hamre, Goffin, & Kraft-Sayre, 2009).

ECERS and ECERS-R have, since their development, been the primary measurement tool for researchers and professionals in the ECCE field (Tout, Zaslow, Halle, & Forrey, 2009). Although other measurement tools are available that assess the early childhood learning environment (e.g., the Observational Rating of the Care Environment (ORCE) Qualitative Ratings (NICHD Early Child Care Research Network, 1999)), they tend not to be widely applied. This is also the case for a recent tool, the Supports for Early Literacy Assessment (SELA), which is, to date, underdeveloped (Committee on Developmental Outcomes and Assessments for Young Children, 2008).

Halle, Whittaker and Anderson (2010) produce a compendium of measures, reviewing some 50 instruments, which measure the quality in ECCE settings and compare them in terms of target age, purpose (e.g., accreditation and evaluation), method (e.g., observation, interview, and document), child developmental domains (e.g., language development, literacy, and general cognition), structure (e.g., family involvement, activities/scheduling, classroom organization, and classroom materials), administration (e.g., internal communication, leadership/ management), improvement (e.g., professional development, program/staff assessments), and training and administration (e.g., cost).

According to the 'cross-cutting' tables created by the authors, ECERS-R is the most comprehensive measure that assesses most of the quality features within ECCE environments reflecting on child development, administrative structure and staff development. With respect to the quality features that support school readiness and subsequent academic progress, ECERS-R covers eight out of nine domains including language development, literacy, math, science, creative arts, social and emotional development, approaches to learning, and health/physical development. General cognition is not measured by ECERS-R. For quality features related to structure, administration and

staff, ECERS-R covers four out of five domains under the structure category, all domains under the administration category, and two out of three domains under the monitoring and improvement category. The two domains that are not measured by ECERS-R are business practices and assessments/monitoring of students.

Both the breadth of multifaceted information measured by the ECERS-R and the general lack of supplemental measurement tools contribute to the predominant use of ECERS-R as the primary scale for assessing quality in ECCE settings (Tout et al., 2009). As a pioneering self-assessment tool in ECCE, the ECERS-R has been used in recent large studies of classroom quality such as the National Centre for Early Development and Learning's (NCEDL) Multi-State Study of Pre-Kindergarten and Study of State-Wide Early Education Programs (SWEEP) (La Paro et al., 2012). Further, ECERS-R has gained additional influence on practice and policy-related decisions in the field, as it has become the measure of quality in the state-wide Tiered Quality Rating and Improvement Systems (TQRISs) in the United States (Tout et al., 2009). In the State of California, for example, the ratings produced by ECERS-R have been used for the selection of mentor teachers in 70 community colleges. The California's Compensation and Recognition Encourage Stability (CARES) program also uses ECERS-R to assess teachers continued participation.

The first editions of ECERS and ITERS scales have been used as comprehensive quality measures in nation-wide studies. For example, the ECERS and its revised version (ECERS-R) are used in the Head Start Family and Child Experiences Survey (FACES) study in the U.S. (Espinosa, 2002). Both ECERS and ITERS were used in the National Child Care Staffing Study (Whitebook, 1989), and the Cost, Quality, and Child Outcomes Study (Helburn et al., 1995). Clifford and colleagues (2010) note that when information is not available for the revised version (i.e., ECERS-R and ITERS-R), the first edition of the scale is suitable. Evidence confirms that data from studies using ECERS are directly comparable to data from studies using the ECERS-R (Sakai, Whitebook, Wishard, & Howes, 2003). Further, the authors of the Environment Rating Scale (ERS) have intended to make ECERS, ITERS and their revised versions as comparable measures of quality (Sakai et al., 2003). Therefore, the scoring and formatting of ITERS and ITERS-R are consistent with that of the ECERS-R. Hence, for the purposes of this systematic review, quality of the ECCE environment will be assessed on studies that have used as their measurement tools, ECERS, ITERS and their revised versions (ECERS-R and ITERS-R).

Evidence of Predictive Validity of ECERS, ECERS-R, ITERS and ITERS-R

The scientific evidence linking process quality (as measured by the ERS) and child learning and developmental outcomes is compelling, although not unanimous. While some researchers (e.g., R. A. Gordon, Fujimoto, Kaestner, Korenman, & Abner, 2013) argue that the predictive validity of environment rating scales are not exceptionally consistent, others suggest that the practicality of ECERS is sound and supported by evidence. Cassidy and colleagues (2005) also argue that any unfavourable results, with respect to the predictive

validity of ERS, are due to collapsing the multitude of features of ECCE environments into a unidimensional comprehensive index – omitting the specific mechanisms responsible for development (e.g., language reasoning, and space and furnishings). Scientific examinations of associations between the scores on ERS and children's learning and developmental outcomes, therefore, commonly involve the use of both overall and subscale scores of ERS. For example, Howes and colleagues (2008) decompose the ECERS-R into two distinct factors; language/interactions and physical environment. They discover that language/interactions factors are more predictive of children's development than physical environment factors alone.

Previous research (e.g., Sammons et al., 2003a) suggests that the quality in ECCE environment is associated with children's learning and developmental outcomes in general. For example, Love and colleagues (2004), who measure child learning outcomes using the Bayley Scales of Infant Development Mental Development Index (BSID-MDI) (Bayley, 1993), discover that higher overall scores on ITERS/ECERS-R can predict higher scores on the intellectual and cognitive development screener. The screener covers several types of abilities including, for example, sensory/perceptual acuities, memory learning and problem solving, vocalization and beginning of verbal communication, mental mapping; complex language and mathematical concept formation. Furthermore, in view of the complexity and multidimensionality inherent in children's learning and developmental outcomes, some researchers have identified several outcome categories (e.g., mathematics and numeracy skills, language and literacy, and social outcomes) and developed measures to investigate the impact of ECCE programs on each outcome category.

ERS have been shown to be predictive of children's performance in standard measures of mathematic achievement and numerical skills. For example, Peisner-Feinberg and colleagues (2001), using a shortened version of the ECERS, discover a positive correlation of ECERS ratings with higher scores on the math achievement applied problems subset of the Woodcock-Johnson Psycho-Educational Battery – Revised (WJ-R) (Woodcock & Johnson, 1990). WJ-R is designed to measure cognitive abilities, scholastic aptitude, and academic achievement in three areas; reading, mathematics, and written language. A positive relationship between the social interaction subscale on the ECERS-R and children's early number concept development has also been revealed (Sammons et al., 2003a). A more recent study (Burchinal et al., 2008), using the ECERS-R as the measurement of quality in pre-kindergarten and kindergarten settings, shows that the Teaching and Interactions factor is predictive of children's performance on the WJ-R math achievement applied problem subset. Anders and colleagues (2012), using the arithmetic subscale of the Kaufman Assessment Battery for Children (KABC) (Melchers & Preuss, 2003), found a marginally significant relation between the total score on ECERS-R and children's numeracy levels over the preschool period (from the first to the third year of preschool).

The predictive validity of ERS has also covered children's language and literacy performance. Love and colleagues (2004) discover that children in ECCE settings with higher overall

ECERS-R or ITERS scores tend to perform better in the Peabody Picture-Vocabulary Test – Third Edition (PPVT-III) (L. M. Dunn & Dunn, 1997). PPVT-III is a measure of receptive vocabulary for standard English and a screening test of verbal ability. Peisner-Feinberg and colleagues (2001), using the Peabody Picture Vocabulary Test – Revised (PPVT-R) (L. M. Dunn & Dunn, 1981), a former edition of PPVT-III, also discover an association between higher overall scores on a shortened version of the ECERS and children's scores on the PPVT-R. In addition, Bryant and colleagues (2003) note that children from higher quality preschool settings, as assessed by the ECERS, possess greater book knowledge and have a higher print awareness scores on Zill and Resnick's (1998) Concepts About Print Assessment. Further, children's expressive language development, as measured by the Oral Expression Scale from the Oral and Written Language Scale (OWLS) (Carrow-Woolfolk, 1995), is shown to be related to the ECERS-R total score (Mashburn et al., 2008), and the Teaching and Interactions subscale (Burchinal et al., 2008). Burchinal and colleagues also discover a positive relationship between receptive language scores on the PPVT-III and scores on the ECERS-R Teaching and Interactions subscale. In summary, Clifford (2010) argues that higher quality environment, as measured by environment rating scales, is associated with children's development in three areas, including receptive language, print awareness, and book knowledge.

With respect to social outcomes, several important social elements (e.g., social and behavioural development) can be predicted by using ERS (Sammons, 2010). Sammon and colleagues (2003b), who focus on four measures of social/behavioural development in Goodman's (1997) Strengths and Difficulties Questionnaire (i.e., self-regulation, hyperactivity, pro-social behaviour and anti-social behaviour), discover that the scores on the caring and emotional/relationship aspects of ECERS-R is associated with reduced hyperactivity and increased pro-social behaviour. Additionally, there is a negative relationship between the ECERS-R scores on the space and furnishings subscale and children's anti-social behaviours (Sammons et al., 2003b). Scores on the language and reasoning subscale are also positively related to children's cooperation and conformity skills (Sammons et al., 2003b). Further, Montes and colleagues (2005) have found sizeable effect sizes linking high total score on ECERS-R with the reduction of existing socio-emotional risk factors and prevention of the emergence of new socio-emotional risk factors. A recent study, that used the Teacher-Child Rating Scale (T-CRS 2.1; Hightower et al., 1986) to measure children's social competence scores, has demonstrated a positive relationship between the Teaching and Interactions factor of the ECERS-R and children's assertiveness, frustration tolerance, task orientation, and peer social skills (Burchinal et al., 2008).

The issue of high-quality ECCE provision and teacher policy

High-quality ECCE provision is recognised by international literature and state and federal governments as a pivotal policy target measure for the foundation of formal education. As stated earlier in this review, such targets are certainly based on the individual (e.g., cognitive, language, and social development) and societal benefits (e.g., human capital development/

accumulation) that are generated by high-quality ECCE provision. Hence, governments, especially those in the developed world, with a major responsibility for the funding of ECCE, have been allocating more resources and devoting greater policy attention to the quality of ECCE (International Labour Organization, 2012; New Zealand House of Representatives, 2013; OECD, 2013).

Over the past two decades, governments have been active in designing policies and programs that aim to improve the quality of ECCE and ensure access, irrespective of socio-economic status, to high-quality classroom environments (Dowling & O'Malley, 2009; Pianta et al., 2005). Often, these legislations focus on the manipulation of structural features such as child-to-staff ratio, class size, and staff educational attainment (Phillipsen et al., 1997). Studies have been conducted to identify influential characteristics that promote the quality of ECCE. For example, the relationship between teacher's level and type of education with the quality in ECCE has prompted policy makers and ECCE providers to consider requiring centres to increase the proportion of qualified registered teachers (Dowling & O'Malley, 2009; Elliott, 2006; Mitchell, 2010). The specific rationale behind any ECCE teacher policy (e.g., "bachelor's degree policy") is that lead teachers with a bachelor's degree or higher in ECCE are expected to have higher-quality classrooms (Ackerman, 2005).

Teacher qualification as an intervention to increase the quality of ECCE

Teacher qualification has been identified by policy makers as one of the regulatable features and crucial variables that can predict quality in ECCE (Ackerman, 2005). Approved early childhood teaching qualifications, however, vary between states and across countries. Based on current literature, teacher qualification can be categorised according to their level and type of education. Level of education can be referred to formal schooling in the primary, secondary and tertiary systems. The tertiary system can be categorised as community college, junior college and university. The details of intervention may also include years of education, course credits in any specialized early childhood or child development-related education, and title of program. Further, differentiation of qualification is based on the type of program and the degree earned, such as associate degree (AA), Child Development Associate (CDA) Credential/AA/certificate in ECCE, bachelor's degree (BA), BA in ECCE or primary education, master's degree (MA), MA in ECCE or primary education, PhD, and EdD (professional doctorate). One should note, however, that some of the literature does not separate degrees of ECCE and that of other majors. MA and PhD are sometimes categorised as post-graduate education.

How Teacher Qualifications May Influence ECCE Quality

The underlying conceptual framework of this review is based on the notion that a strong ECCE knowledge base involves a set of professional competencies, abilities and specific teaching skills, which can lead to high-quality ECCE and positive child developmental outcomes (Bowman, Donovan, & Burns, 2001; Vartuli, 1999). Berk (1985) discovers that tertiary education (e.g., AA and BA) is associated with greater early childhood teaching skills.

By comparing early childhood teachers with a high school diploma to those with two years or above college education, Berk finds that teachers with an AA or BA, regardless of the specific major, were more responsive, encouraging and inspiring when communicating with young children. On the other hand, Snider and Fu (1990) suggest that teacher education with more ECCE content is essential to produce high-quality teaching skills. This idea is supported by other empirical evidence, which demonstrate that teachers' beliefs, knowledge, and actual implementation of developmentally appropriate practice are positively correlated with ECCE education and early childhood coursework (McMullen & Alat, 2002; Snider & Fu, 1990; Vartuli, 1999).

According to File and Gullo (2002), students from child development-related programs also have a stronger and more consistent preference towards developmentally appropriate practices than those in other education programs. Teachers with a BA or tertiary-level specialized ECCE/child development-related qualification often display more sensitive and less harsh and detached behaviours (Howes, Whitebook, & Phillips, 1992). Moreover, the literature suggests that more knowledge in ECCE encourages teachers to adopt developmentally appropriate practices (Vartuli, 1999), which are likely to facilitate supportive and nurturing interactions that are essential to high-quality ECCE (Ackerman, 2005; L. Dunn, 1993).

Why it is Important to Undertake the Review

The extant literature, which includes primary studies and systematic reviews, has examined relationships between the common regulation or policy targets (e.g., the classroom features, staff characteristics, and administration) with the process quality of ECCE that is measured by standardised tools (e.g., ERS). Empirical evidence has been used to inform policy deliberation in this area (Vandell & Wolfe, 2000). Specifically, some large-scale studies of childcare quality were conducted, and researchers attempted to demonstrate relationships between program quality (as measured by the ECERS/ECERS-R/ITERS/ITERS-R) and variables such as staff stability and staff background characteristics (Huntsman, 2008; Phillipsen et al., 1997; Sakai et al., 2003).

Among the vast array of variables that claim to impact on the ECCE environment, high staff qualification has been identified as one of the strongest predictors of high ECERS/ITERS ratings (with a score of 5 or higher on a 7-point scale) (Burchinal, Cryer, Clifford, & Howes, 2002; Peisner-Feinberg, Burchinal, Howes, & Cryer, 1997; Phillipsen et al., 1997; Whitebook, 2003b; Whitebook, Sakai, Gerber, & Howes, 2001). By distinguishing bachelor's degrees and specialised child development-related education from other levels of education and training, previous literature suggests that bachelor's degrees with specialised training in ECCE secure high quality childcare and education outcomes (Ackerman, 2005; Kelley & Camilli, 2007; Whitebook, 2003a).

There are, however, some studies that suggest no significant relationship exists between ECERS scores and the percentage of teaching staff with a bachelor's or advanced training in

ECCE in a centre. For example, Phillips, Mekos, Scarr, McCartney, and Abbott–Shim (2000) discover that teacher education did not significantly affect classroom processes for infants and children in preschool rooms. Also, focusing on the school-related learning and social skills over the pre-Kindergarten year, Howes and colleagues (2008) argue that there is a mixed relationship between teacher qualification and classroom quality (as measured by ECERS-R).

Whitebook (2003b) conducts a systematic review regarding the educational level of teachers and how the level of qualification potentially affects the early childhood learning environment. Whitebook's main findings suggest that teacher qualifications matter in terms of high-quality ECCE provision, and that the ECERS ratings are positively affected by higher qualifications. Whitebook's review, however, may have limited implications for the current education policy debate regarding raising teacher qualifications. To further Whitebook's review, and allow for more meaningful comparisons between individual studies regarding the impact of teachers' qualification on the quality of the ECCE environment, we propose that the target population should be further disaggregated (e.g., sampling at the level of the classroom or at the level of the learning centre) and a common metric (e.g., effect size) for measuring outcomes be calculated.

A more recent meta-analysis was conducted by Kelley and Camilli (2007), who analyse the results of 32 studies (18 treatment-comparison studies and 14 studies with correlations between teacher education and outcomes). The authors examine the relationship between teacher qualifications and the ECCE environment. The authors aggregate four different constructs, including global classroom quality, teacher-child interactions, teacher pedagogical beliefs and knowledge, and classroom instructional activities, into a group of ECCE outcomes. Aggregating these constructs, however, makes it difficult to estimate the additional effect on a specific outcome (e.g., quality of learning environment) as a result of higher educational attainments by teachers (e.g., bachelor's degree or associate degree). In this review, we will not aggregate these constructs. Rather, we focus on quality in the early childhood environment and ratings in the ERS subscales to tease out the relationship between teacher qualifications and process quality in an ECCE setting. This specific information is critical for policy makers, as single measures inform many of their decisions.

Summary

Existing research suggests that, in general, higher levels of teacher education are directly associated with higher quality in ECCE settings and more developmentally appropriate practices. Previous reviews, however, do not clearly or fully identify how teacher qualifications affect childhood learning environments. Further, the reviews include few studies that measure the early childhood learning environment using a set of standardised measurement tools, including ECERS, ITERS, ECERS-R and ITERS-R. This is problematic because the different measurement tools included in the previous reviews are not necessarily

comparable. In addition, there is a concern that increasing the qualifications of staff within ECCE centres will be prohibitively expensive (Elliott, 2006).

In order to inform the educational policy debate on the merits of increasing the qualifications of staff within ECCE centres, a systematic review of best available research findings on this topic is warranted. Previous reviews do not allow estimation of the precise improvement of process quality in the early childhood environment. In other words, the existing research is less consistent with respect to the improvements in ECERS/ECERS-R/ITERS/ITERS-R ratings that are obtained from incremental increases in staff qualifications (Whitebook, 2003b). By providing an updated review that furthers earlier reviews (i.e., follows the protocols outlined by Campbell Collaboration), and adjusts methodology, this study will examine the relationship between teacher qualification and the early classroom environment. Further, this review will provide a reliable answer to the current education policy debate regarding raising the level of teacher qualifications in the ECCE sector.

OBJECTIVES

The objective of this systematic review is to synthesise the extant empirical evidence on the relationship of teacher qualifications to the quality of the early childhood learning environment. Specifically, this review will seek to answer the following question:

> Is there a relationship between the level and type of education of the teacher, and the quality of the early childhood learning environment, as measured by the Early Childhood Environment Rating Scale, the Infant Toddler Environment Rating Scale and their revised versions?

METHODOLOGY

Criteria for Including and Excluding Studies

The most common methods used in evaluating the impact of teachers' education level to improve the quality of ECCE environment are: (1) non-randomized comparative design based on cross sectional and survey secondary data analysis; and (2) correlational design that reported a correlation between levels of education and ratings of classroom quality. Therefore, the following criteria will be used to identify studies for the review.

Types of Study Designs

A preliminary exploration of published and unpublished literature focusing on authors who have contributed to understanding ECCE quality (e.g., Whitebook, Clifford, and Howes) was conducted to determine the period of time that should be covered in this review. Eligible studies, therefore, will be those studies (both comparative and correlational studies) that

examine the relationship between teacher qualification and quality of the ECCE environment (as measured by ECERS/ECERS-R/ITERS/ITERS-R) from 1980 (this was when the ECERS was introduced) to 2014. To be eligible, a study must permit the identification of the education program (e.g., bachelor's degree) received by the lead teacher and provide comparison between two or more groups of teachers with different education qualifications. The details of the independent variable will include year of education, course credits in ECCE and title of the program.

Since teachers' education qualification cannot be controlled by the researcher, the study designs that will be included in the review are comparative and correlational non-randomized studies. In comparative studies, a group of teachers with high school education is compared to at least one group of teachers with other qualifications (i.e., AA, CDA Certificate, BA, BA in ECCE or primary education, MA, MA in ECCE or primary education, PhD and EdD). In correlational studies, analyses are typically conducted to explore the relationship between level of teacher education and study outcomes, reporting a correlation (e.g., via point biserial or Pearson correlation coefficient) between levels of education and ratings of classroom quality as measured by ERS.

Types of Participants

The population under consideration will be ECCE programs. These programs may be delivered in indoor settings (centre-based and home-based classrooms). We assume that most studies will focus on centre-based classrooms, thus our primary population of interest will be classrooms in ECCE centres that are affiliated with a state licensing agency. Specifically, our focus will be on ECCE settings that serve all ages from pre-kindergarteners and kindergarteners prior to elementary/primary school.

Types of Outcome Measures

Eligible studies will focus primarily on the quality of the early childhood learning environment (as measured by the ECERS/ECERS-R/ITERS/ITERS-R). Seven categories of outcomes will be identified according to the subscales and items of those tools, including, for example: Personal Care Routine; Space and Furnishings; Language-reasoning/Listening and Talking; Activities; Program Structure; Interaction; and Parents and Staff. Since some researchers may prefer using the two-factor scale (Activities/Materials and Language/Interactions) for follow-up analysis, these alternative outcomes will also be included as applicable and possible.

Duration of Follow-up

Multiple evaluations over time are not common for research in this area. Therefore, the literature is expected to be based on evaluation of outcomes in a single event.

Types of Settings

The review will include evaluation conducted in indoor centre-based settings that serve infants, toddlers, and preschool children. Studies conducted in outdoor settings will not be included in the review.

Search Strategy

We begin our search for relevant studies by conducting a manual search of key journals for the period 1980 (this was when the ECERS was introduced) to 2014 – examples include, Early Childhood Research Quarterly, Early Childhood Research and Practice, Contemporary Issues in Early Childhood, Child Development, Applied Developmental Science, and the Journal of Child Psychology and Psychiatry. We then scan relevant review articles, consult the bibliographies of articles that meet the selection criteria and ask key researchers for assistance in identifying other relevant studies.

We search a number of electronic databases covering the years 1980 to 2014. Compound terms (e.g., teacher qualification; staff education) are considered as a single term and entered into searches in quotes (i.e., "teacher qualification"). These databases include: Academic Search Premier; CBCA-Education; Cochrane Controlled Trial Register; Database of Abstracts of Reviews of Effectiveness (DARE); Dissertation Abstracts; EconLit; Education Full Text; Educational Resources Information Center (ERIC); Journal Storage Archive (JSTOR); Medline; Proquest Digital Dissertations; Proquest Direct; Project Muse; PsychInfo; Scopus; SocINDEX with Full Text; and SSRN eLibrary. Within each database, we will search using combinations of keywords from three categories:

1) Outcome: Scores/ratings OR Subscales OR Early Childhood Environment Rating Scale, ECERS/ECERS-R/Infant Toddler Environment Rating Scale, ITERS/ITERS-R

AND

2) Independent variable: Teacher's education OR Teacher's qualification OR Training OR Program OR Levels of qualification OR Associate degree (AA) OR Child Development Associate (CDA) OR Bachelor's degree (BA) OR BA in ECCE OR master's degree (MA) OR MA in ECCE OR PhD OR EdD

AND

3) Targeted population: Classrooms OR Centre-based (/Center-based) classrooms OR home-based classrooms OR Child care centres OR Kindergartens OR Pre-schools OR Pre-K (/PreK) OR Pre-kindergartens (/Prekindergartens)

This strategy ensures that the database searched for the entire term rather than "teacher" AND "qualification", which would clearly produce very different results. In addition, search terms with multiple iterations from a base word stem (e.g., quality) are typed in as word* (e.g., quality*). This approach enables the researcher to capture relevant literature with fewer searches. Where a database included the function to manipulate the search field

option, researchers limit the keyword search to title, abstract, reference list, whole document or a combination of fields. Results from a series of pilots indicate that the search 'anywhere' in the document option produced more hits with a lower inclusion percentage than searches conducted on the abstract only or title, abstract and descriptors. A fundamental objective in this review is to develop a search strategy that can be replicated. Consequently, the focus is to utilize electronic databases/resources that can be generally accessed (i.e., not restricted material through an organization's intranet).

Further, it is also important to locate grey literature or material that is not formally published (e.g., working papers, unpublished dissertations, and reports including government, non-government, technical reports etc.). Websites of any relevant government, research institutes and early childhood associations will be searched for published and unpublished studies. Some relevant websites include, hfrp.org, melycaba.com, tnstarquality.org, sped.dpi.wi.gov, ceelo.org, ric.ed.gov, and aplus-education.co.uk.

Efforts are made to track down any unpublished studies highlighted in the search. Authors of published articles are also contacted to ascertain if additional results relating to our key outcomes are available. This strategy aims to identify other studies that may be overlooked in previous reviews. Further, identify relevant data that may have been omitted in the publication of these studies. To date, in some cases authors have provided more detailed information about their data (e.g., standard deviations) so that effect sizes can be calculated in a similar way.

Researchers record search information (date of search, database and search terms used), research information (design, method(s), agency, outcome, population) and reference information in a spreadsheet so that further interrogation of the data can be conducted at a future date.

Criteria for Determination of Independent Findings

We are primarily interested in one outcome measure, process quality as measured by ECERS/ECERS-R/ITERS/ITERS-R. Therefore, the issue of data independence should not be a factor in the analysis of the data. When a study provides data of the sub-scales, we will extract and code the effect sizes for each sub-scale and conduct a separate analysis. Regarding the dependencies on the independent variables, multiple measures of teacher qualifications (e.g. credits of ECCE courses, years of education and level of education) have been used in some of the studies. The different measures of teacher qualifications will be analysed separately and/or together using multi-level meta-analysis or robust standard errors.

Details of Study Coding

One of the reviewers will be responsible for reviewing and screening all titles and abstracts found through the search procedures. At the abstract screening stage, studies that are

deemed as inappropriate would be those that do not involve the target participants (e.g., ECCE settings that serve all ages of pre-kindergarteners and kindergarteners prior to elementary/primary school) or are descriptive in nature where no relationship between teacher's qualification and ECCE quality is being measured.

The eligibility of relevant articles will be screened based on the criteria for eligibility (see Section two "Criteria for Eligibility" in Appendix A). All eligible studies that meet the initial criteria are coded using an instrument developed by the authors to extract the specified information. The coding instrument includes items related to bibliographic information and source descriptors; analysis characteristics; sample characteristics; methodology/research design; and outcome data needed to calculate effect sizes.

All eligible studies will be independently coded by two individuals to ensure the reliability of coding procedures and decisions. Coding schemes will be refined to resolve any inter-rater discrepancies or differences. Discrepancies that remain unresolved will be discussed and resolved by consensus with a third author.

Statistical Procedures and Conventions

Effect Size Computation

A common effect size metric, either the correlation coefficient or the standardized mean difference, will be selected based on the frequency with which the different forms of data are present in the literature. We expect that for some studies (i.e., those with comparative designs), the scores on ERS and their subscales will be reported in natural units that are available for the calculation of standardized mean differences (i.e., Hedges' g). When means and standard deviations are not reported, effect sizes will be calculated from other test statistics (e.g., t-tests, F-ratios) using formulas outlined by Lipsey and Wilson (2000). If there are binary measures of the same outcomes, we use procedures recommended by Sanchez-Meca and colleagues to convert odds ratios (OR) to Hedges' g. We also expect to locate a number of correlational studies, for which the appropriate effect size metric is the correlation coefficient. Should there be more studies with correlation coefficients, the standardized mean difference effect sizes will be converted to correlation coefficients using the formula outlined in Lipsey and Wilson (2001). Should standardized mean differences be more common, the correlation coefficients will be converted to standardized mean differences for analysis. In either case, sensitivity analyses will be performed to explore whether our choice of effect size metric differentially impacts the results.

Meta-analysis

Data synthesis is conducted using a specialized statistical meta-analysis software package (e.g., Comprehensive Meta-Analysis (CMA) version 2, 2006). If correlation coefficients are used, the Fisher's z-transformation will be applied to all cases. For the calculation of meta-analytic mean effect size, the inverse variance weight (w) will be calculated for each study

using the appropriate standard error (Lipsey & Wilson, 2001). Regarding the method of variance estimate to compute the random effects mean, the method of moments using weighted least squares, which provides a closed solution for the random effects variance component (τ^2) (Raudenbush, 2009), is adopted by the CMA. The inverse variance will be used so that effect sizes with greater precision (i.e., smaller variances) are weighted more heavily in the analysis. We will be employing a random effects model for pooling intervention effects. An assumption is made that there are unexplained sources of heterogeneity across studies. The *Q* statistic, which was calculated in each fixed effects analysis, will be used for the calculation of the τ^2. In addition, we employ the I^2 statistic (Higgins & Thompson, 2002) as an additional, albeit related, method of assessing heterogeneity for the fixed effects analysis. An I^2 value greater than 50% suggests moderate heterogeneity even if the *Q* statistic is not statistically significant. All effect sizes will be calculated using a 95% confidence interval. Forest plots will be used to display the results from the effect sizes. The plot will display the effect size, confidence intervals and significance level with respect to each study.

Moderator Analysis

We examine possible moderators of process quality in ECCE settings. These are likely to include characteristics of the study participants and settings. There characteristics include types of ECCE settings (e.g., centre-based vs. home-based classrooms), types of teacher qualification (e.g., associate degree (AA), Child Development Associate (CDA) Credential/AA/certificate in ECE, bachelor's degree (BA), BA in ECCE or primary education, master's degree (MA), MA in ECCE or primary education, PhD, and EdD (professional doctorate)), baseline characteristics of teacher (e.g., age, gender, race/ethnicity), and country in which the study was conducted, duration of follow-up (e.g., 1 year vs. 6 months), and type of outcome measure (e.g., ECERS, ITERS, ECERS-R and ITERS-R).

We analyse these potential moderating factors using an analog to the Analysis Of Variance (ANOVA) and weighted least squares regression when appropriate. The analog to the ANOVA is a method of testing the ability of a single categorical value to explain excess variability in a distribution of effect sizes (Lipsey & Wilson, 2000). CMA will be used to conduct moderator analyses. Forest plots are used to graphically display these moderator effects.

Missing Data

In the event that a study does not provide suitable data for calculation of effect sizes (e.g., means and standard deviations, valid Ns), we will endeavour to contact the author(s) of the primary studies in order to obtain the missing information.

Sensitivity Analysis

A sensitivity analysis will be conducted to test the robustness of the conclusions with respect to the quality of the available data and approaches to the analysis. Any differences in terms of the results will be examined according to our choice of effect size metric. We inspect funnel plots, and utilise 'trim and fill' methods that estimate intervention effect by adjusting for the number and outcomes of missing studies.

Treatment of Qualitative Research

Qualitative studies will not be included in the current study. We do, however, acknowledge seminal pieces of research in our discussion.

REFERENCES

Ackerman, D. J. (2005). Getting teachers from here to there: Examining issues related to an early care and education teacher policy. *Early Childhood Research & Practice, 7*(1). http://ecrp.uiuc.edu/v7n1/ackerman.html

Anders, Y., Rossbach, H., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., & von Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. *Early Childhood Research Quarterly, 27*, 231-244. doi: 10.1016/j.ecresq.2011.08.003

Arnett, J. (1989). Caregivers in day-care centers: Does training matter? *Journal of Applied Developmental Psychology, 10*(4), 541-552. doi: 10.1016/0193-3973(89)90026-9

Bayley, N. (1993). *Manual for the Bayley Scales of Infant Development* (2nd ed.). San Antonio. TX: THe Psychological Corporation.

Berk, L. (1985). Relationship of educational attainment, child-oriented attitudes, job satisfaction and career commitment to caregiver behavior toward children. *Child Care Quarterly, 14*, 103-129.

Blau, D. M. (2000). The production of quality in child-care centers: Another look. *Applied Developmental Science, 4*(3), 136-148. doi: 10.1207/S1532480XADS0403_3

Blokland, A. A. J., & Nieuwbeerta, P. (2010). Life Course Criminology. In S. G. Shoham, P. Knepper & M. Kett (Eds.), *Internatinal Handbook of Criminology* (pp. 51-94). London: CRC Press-Taylor & Francis Froup.

Bowman, B. T., Donovan, M. S., & Burns, M. S. (2001). *Eager to Learn: Educating Our Preschoolers*. Washington, DC: National Academy Press.

Bryant, D., Maxwell, K., Taylor, K., Poe, M., Peisner-Feinberg, E., & Bernier, K. (2003). Smart Start and Preschool Child Care Quality in NC: Change Over Time and Relation to Children's Readiness. Chapel Hill, NC: FPG Child Development Institute.

Burchinal, M. R., Cryer, D., Clifford, R. M., & Howes, C. (2002). Caregiver training and classroom quality in child care centers. *Applied Developmental Science, 6*(1), 2-11. doi: 10.1207/S1532480XADS0601_01

Burchinal, M. R., Howes, C., Pianta, R., Bryant, D., Early, D., Clifford, R., & Barbarin, O. (2008). Predicting child outcomes at the end of kindergarten from the quality of pre-kindergarten teacher–child interactions and instruction. *Applied Developmental Science, 12*(3), 140-153. doi: 10.1080/10888690802199418

Burchinal, M. R., McCartney, K., Steinberg, L., Crosnoe, R., Friedman, S. L., McLoyd, V., & Pianta, R. (2011). Examining the Black–White achievement gap among low-income children using the NICHD study of early child care and youth development. *Child Development, 82*(5), 1404-1420.

Carrow-Woolfolk, E. (1995). *Oral and Written Language Scales*. Circle Pines, MN: American Guidance Service.

Cassidy, D. J., Hestenes, L. L., Hansen, J. K., Hegde, A., Shim, J., & Hestenes, S. (2005). Revisiting the two faces of child care quality: Structure and process. *Early Education and Development, 16*(4), 505-520. doi: 10.1207/s15566935eed1604_10

Clarke-Stewart, K. A., & Gruber, C. (1984). Day care forms and features. In R. C. Ainslie (Ed.), *Quality Variations in Day Care* (pp. 35-62). New York: Praeger.

Clifford, R. M., Reszka, S. S., & Rossbach, H. (2010). *Reliability and Validity of the Early Childhood Environment Rating Scale*. Chapel Hill: University of North Carolina, FPG Child Development Institute.

Committee on Developmental Outcomes and Assessments for Young Children. (2008). Measuring Quality in Early Childhood Environments. In C. E. Snow & S. B. V. Hemel (Eds.), *Early Childhood Assessment: Why, What, and How* (pp. 145-178). Washington, D.C.: The National Academies Press.

Comprehensive Meta-Analysis Version 2. (2006). Englewood, NJ: Biostat.

Dowling, A., & O'Malley, K. (2009). Preschol education in Australia. Melbourne: Australian Council for Educational Research.

Dunn, L. (1993). Proximal and distal features of day care quality and children's development. *Early Childhood Research Quarterly, 8*(2), 167-192. doi: 10.1016/S0885-2006(05)80089-4

Dunn, L. M., & Dunn, L. M. (1981). Peabody Picture Vocabulary Test - Revised. Circle Pines, MN: American Guidance Service.

Dunn, L. M., & Dunn, L. M. (1997). Peabody Picture Vocabulary Test - Third Edition Manual. Circle Pines, MN: American Guidance Service.

Editorial Projects in Education Research Center. (2011). Achievement Gap. *Education Week*. http://www.edweek.org/ew/issues/achievement-gap/

Elliott, A. (2006). Early childhood education: Pathways to quality and equity for all children *Australian Education Review*. Camberwell: Australian Council for Educational Research Press.

Espinosa, L. M. (2002). High-Quality Preschool: Why We Need It and What it Looks Like. New Brunswick, NJ: National Institute for Early Education Research.

File, N., & Gullo, D. F. (2002). A comparison of early childhood and elementary education students' beliefs about primary classroom teaching practices. *Early Childhood Research Quarterly, 17*(1), 126-137. doi: 10.1016/S0885-2006(02)00130-8

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*, 581-586.

Gordon, A. M., & Browne, K. W. (2014). Types of Programs. In L. Ganster (Ed.), *Beginnings and Beyond: Foundations in Early Childhood Education* (9th ed., pp. 39-63). Belmont: Wadsworth - Cengage Learning.

Gordon, R. A., Fujimoto, K., Kaestner, R., Korenman, S., & Abner, K. (2013). An assessment of the validity of the ECERS-R with implications for measures of child care quality and relations to child development. *Developmental Psychology, 49*(1), 146-160. doi: 10.1037/a0027899

Guo, G., & Harris, K. M. (2000). The mechanisms mediating the effects of poverty on children's intellectual development. *Demography, 37*(4), 431-447.

Halle, T., Vick Whittaker, J. E., & Anderson, R. (2010). Quality in Early Childhood Care and Education Settings: A Compendium of Measures (R. a. E. Child Trends for the Office of Planning, Administration for Children and Families, U.S. Department of Health and Human Services, Trans.) (2 nd ed.). Washington, DC: Child Trends.

Hamre, B. K., Goffin, S. G., & Kraft-Sayre, M. (2009). Classroom Assessment Scoring System (CLASS) Implementation Guide. http://www.teachstone.org/about-the-class/

Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development, 76*(5), 949-967. doi: 10.1111/j.1467-8624.2005.00889.x

Hamre, B. K., Pianta, R. C., Burchinal, M., Field, S., LoCasale-Crouch, J., Downer, J. T., . . . Scott-Little, C. (2012). A course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. *American Educational Research Journal, 49*(1), 88-123. doi: 10.3102/0002831211434596

Harms, T., & Clifford, R. M. (1980). *Early Childhood Environment Rating Scale*. New York: Teachers College Press.

Harms, T., & Clifford, R. M. (1983). Assessing preschool environments with the Early Childhood Environment Rating Scale. *Studies in Educational Evaluation, 8*, 261-269.

Harms, T., Clifford, R. M., & Cryer, D. (1998). *Early Childhood Environment Rating Scale-Revised Edition*. New York: Teachers College Press.

Harms, T., Cryer, D., & Clifford, R. M. (2003). *Infant/Toddler Environment Rating Scale-Revised Edition*. New York, NY: Teachers College Press.

Helburn, S. W., Culkin, M. L., Morris, J., Mocan, H. N., Howes, C., Phillipsen, L., . . . Rustici, J. (1995). Cost, Quality, and Child Outcomes in Child Care Centers: Executive Summary. Denver: University of Colorado.

Higgins, J. P., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine, 21*(11), 1539-1558. doi: 10.1002/sim.1186

Hightower, A. D., Work, W. C., Cowen, E. L., Lotyczewski, B. S., Spinell, A. P., & Guare, J. C. (1986). Teacher-Child Rating Scale 2.1. *School Psychology Review, 15*, 393-409.

Homel, R. (2005). Developmental crime prevention. In N. Tilley (Ed.), *Handbook of crime prevention and community safety* (pp. 71-106). Cullompton, Devon, U.K: Willan Publishing.

Howes, C. (1988). Relations between early child care and schooling. *Developmental Psychology, 24*, 53-57.

Howes, C., Burchinal, M., Pianta, R., Bryant, D., Early, D., Clifford, R., & Barbarin, O. (2008). Ready to learn? Children's pre-academic achievement in pre-Kindergarten programs. *Early Childhood Research Quarterly, 23*(1), 27-50. doi: 10.1016/j.ecresq.2007.05.002

Howes, C., Whitebook, M., & Phillips, D. (1992). Teacher characteristics and effective teaching in child care: Findings from the national child care staffing study. *Child and Youth Care Forum, 21*(6), 399-414. doi: 10.1007/bf00757371

Huntsman, L. (2008). Determinants of quality in child care: A review of the research evidence. Ashfield, NSW: Centre for Parenting and Research, Service System Development, NSW Department of Community Services.

International Labour Organization. (2012). Global Dialogue Forum on Conditions of Personnel in Early Childhood Education. Geneva: International Labour Office, Sectoral Activities Department.

Katz, L. G. (1992). Multiple perspectives on the quality of early childhood programmes. *European Early Childhood Education Research Journal, 1*(2), 5-9. doi: 10.1080/13502939385207411

Kelley, P., & Camilli, G. (2007). The Impact of Teacher Education on Outcomes in Center-Based Early Childhood Education Programs: A Meta-analysis. New Brunswick, NJ: National Institute for Early Education Research, Rutgers University.

Kontos, S. J. (1991). Child care quality, family background, and children's development. *Early Childhood Research Quarterly, 6*(2), 249-262. doi: 10.1016/0885-2006(91)90011-9

La Paro, K. M., Thomason, A. C., Lower, J. K., Kintner-Duffy, V. L., & Cassidy, D. J. (2012). Examining the definition and measurement of quality in early childhood education: A review of studies using the ECERS-R from 2003 to 2010. *Early Childhood Research & Practice, 14*(1), n 1.

Layzer, J. I., & Goodson, B. D. (2006). The "quality " of early care and education settings: definitional and measurement issues. *Evaluation Review, 30*(5), 556-576. doi: 10.1177/0193841x06291524

Lee, V. E., & Burkam, D. T. (2002). *Inequality at the Starting Gate: Social Background Differences in Achievement as Children Begin School*. Washington, DC: Economic Policy Institute.

Lipsey, M. W., & Wilson, D. B. (2000). *Practical Meta-Analysis* (Vol. 49). Thousand Oaks, CA: SAGE Publications.

Love, J. M., Constantine, J., Paulsell, D., Boller, K., Ross, C., Raikes, H., . . . Brooks-Gunn, J. (2004). The Role of Early Head Start Programs in Addressing the Child Care Needs of Low-Income Families with Infants and Toddlers: Influences on Child Care Use and Quality. Washington, DC: Administration for Children and Families, U.S. Department of Health and Human Services.

Love, J. M., Meckstroth, A., & Sprachman, S. (1997). Measuring the Quality of Program Environments in Head Start and Other Early Childhood Programs: A Review and Recommendations for Future Research. Washington, DC: U.S. Departgment of Education, National Center for Education Statistics.

Magnuson, K. A., & Waldfogel, J. (2005). Early childhood care and education: Effects on ethnic and racial gaps in school readiness. *The Future of Children, 15*(1), 169-196.

Manning, M. (2008). *Economic Evaluation of the Effects of Early Childhood Intervention Programs on Adolescent Outcomes*. (PhD), Griffith University, Brisbane.

Manning, M., Homel, R., & Smith, C. (2010). A meta-analysis of the effects of early developmental prevention programs in at-risk populations on non-health outcomes in adolescence. *Children and Youth Services Review, 32*, 506-519.

Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., . . . Howes, C. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development, 79*(3), 732-749. doi: 10.1111/j.1467-8624.2008.01154.x

McMullen, M. B., & Alat, K. (2002). Education matters in the nurturing of the beliefs of preschool caregivers and teachers. *Early Childhood Research & Practice, 4*(2), n 1.

Melchers, P., & Preuss, U. (2003). *Kaufman Assessment Battery for Children (KABC)* (6th ed.). Göttingen: Hogrefe.

Mitchell, L. (2010). Constructions of childhood in early childhood education policy debate in New Zealand. *Contemporary Issues in Early Childhood, 11*(4), 328-341. doi: 10.2304/ciec.2010.11.4.328

Montes, G., Hightower, A. D., Brugger, L., & Moustafa, E. (2005). Quality child care and socio-emotional risk factors: No evidence of diminishing returns for urban children. *Early Childhood Research Quarterly, 20*, 361-372.

National Association for the Education of Young Children. (1991). Guidelines for Appropriate Curriculum Content and Assessment in Programs Serving Children Ages 3 through 8. Washington, DC: National Association for the Education of Young Children.

National Institute of Child Health and Human Development Early Child Care Research Network. (1999). Child outcomes when child care center classes meet recommended standards for quality. NICHD Early Child Care Research Network. *American Journal of Public Health, 89*(7), 1072-1077.

National Institute of Child Health and Human Development Early Child Care Research Network. (2005). *Child Care and Child Development: Results from the NICHD Study of Early Child Care and Youth Development*. New York: The Guilford Press.

New Zealand House of Representatives. (2013). Inquiry into Improving Child Health Outcomes and Preventing Child Abuse, with a Focus on Preconception until Three Years of Age: New Zealand Kindergartens Inc.

OECD. (2013). Education at a Glance 2013: OECD Indicators: OECD Publishing.

Peisner-Feinberg, E. S., & Burchinal, M. (1997). Concurrent relations between child care quality and child outcomes: The study of cost, quality, and outcomes in child care centers. *Merrill-Palmer Quarterly, 43*, 451-477.

Peisner-Feinberg, E. S., Burchinal, M. R., Clifford, R. M., Culkin, M. L., Howes, C., Sharon Lynn, K., & Yazejian, N. (2001). The relation of preschool child-care quality to children's cognitive and social developmental trajectories through second grade. *Child Development, 72*(5), 1534-1553. doi: 10.2307/3654403

Peisner-Feinberg, E. S., Burchinal, M. R., Clifford, R. M., Howes, C., Kagan, S. L., Yazejian, N., . . . Zelazo, J. (1999). The Children of the Cost, Quality, and Outcomes Study Go to School: Technical Report. Chapel Hill: University of North Carolina at Chapel Hill, Frank Porter Graham Child Development Center.

Peisner-Feinberg, E. S., Burchinal, M. R., Howes, C., & Cryer, D. (1997). The prediction of process quality from structural features of child care. *Early Childhood Research Quarterly, 12*(3), 281-303. doi: 10.1016/S0885-2006(97)90004-1

Phillips, D., Mekos, D., Scarr, S., McCartney, K., & Abbott–Shim, M. (2000). Within and beyond the classroom door: assessing quality in child care centers. *Early Childhood Research Quarterly, 15*(4), 475-496. doi: 10.1016/S0885-2006(01)00077-1

Phillipsen, L., Burchinal, M., Howes, C., & Cryer, D. (1997). The prediction of process quality from structural features of child care. *Early Childhood Research Quarterly, 12*, 281-303.

Pianta, R. C., Howes, C., Burchinal, M., Bryant, D., Clifford, R., Early, D., & Barbarin, O. (2005). Features of pre-kindergarten programs, classrooms, and teachers: Do they predict observed classroom quality and child–teacher interactions? *Applied Developmental Science, 9*(3), 144-159.

Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2007). *Classroom Assessment Scoring System—CLASS*. Baltimore: Brookes.

Pianta, R. C., & Nimetz, S. L. (1991). Relationships between children and teachers: Associations with classroom and home behavior. *Journal of Applied Developmental Psychology, 12*(3), 379-393.

Ramey, C. T., & Ramey, S. L. (2004). Early learning and school readiness: Can early intervention make a difference? *Merrill-Palmer Quarterly, 50*(4), 471-491. doi: 10.1353/mpq.2004.0034

Raudenbush, S. W. (2009). Analyzing effect sizes: Random-effects models. In H. Cooper, L. V. Hedges & J. C. Valentine (Eds.), *The Handbook of Research Synthesis and Meta-Analysis* (2nd ed.). New York: : Russell Sage.

Reardon, S. F., & Galindo, C. (2009). The Hispanic-White achievement gap in math and reading in the elementary grades. *American Educational Research Journal, 46*(3), 853-891.

Reynolds, A. J., Ou, S. R., & Topitzes, J. W. (2004). Paths of effects of early childhood intervention on educational attainment and delinquency: A confirmatory analysis of the Chicago Child-Parent Centers. *Child Development, 75*(5), 1299-1328. doi: 10.1111/j.1467-8624.2004.00742.x

Rosenthal, R., & Vandell, D. L. (1996). Quality of care at school-aged child-care programs: regulatable features, observed experiences, child perspectives, and parent perspectives. *Child Development, 67*(5), 2434-2445.

Sakai, L., Whitebook, M., Wishard, A., & Howes, C. (2003). Evaluating the Early Childhood Environment Rating Scale (ECERS): Assessing differences between the first and revised edition. *Early Childhood Research Quarterly, 18*(4), 427-445. doi: 10.1016/j.ecresq.2003.09.004

Sammons, P. (2010). Does pre-school make a difference? Identifying the impact of pre-school on children's cognitive and social behavioural development at different ages. In K. Sylva, E. Melhuish, P. Sammons, I. Siraj-Blatchford & B. Taggart (Eds.), *Early Childhood Matters: Evidence from the Effective Pre-school and Primary Education Project* (pp. 92-113). New York: Routledge.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., & Elliot, K. (2003a). Measuring the impact of pre-school on children's cognitive progress over the pre-school period. In K. Sylva (Ed.), *The Effective Provision of Pre-School Education (EPPE) Project*. London: Institute of Education.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., & Elliot, K. (2003b). Measuring the impact of pre-school on children's social/behavioural development over the pre-school period. In K. Sylva (Ed.), *The Effective Provision of Pre-School Education (EPPE) Project*. London: Institute of Education.

Sammons, P., Sylva, K., Melhuish, E. C., Siraj-Blatchford, I., Taggart, B., & Elliot, K. (2002). The Effective Provision of Pre-school Education Project (EPPE), Technical Paper 8a: Measuring the Impact of Pre-School on Children's Cognitive Progress over the Pre-School Period. London: DfES/Institute of Education, University of London.

Schweinhart, L. J., Montie, J., Xiang, Z., Barnett, W. S., Belfield, C. R., & Nores, M. (2005). *Lifetime Effects: The HighScope Perry Preschool Study through Age 40*. Ypsilanti, Michigan: High/Scope Press.

Snider, M. H., & Fu, V. R. (1990). The effects of specialized education and job experience on early childhood teachers' knowledge of developmentally appropriate practice. *Early Childhood Research Quarterly, 5*, 69-78.

Spiker, D., Hebbeler, K. M., & Barton, L. R. (2011). Measuring Quality of ECE Programs for Children with Disabilities. In M. Zaslow, I. Martinez-Beck, K. Tout & T. Halle (Eds.), *Quality Measurement in Early Childhood Settings* (pp. 229-256). Washington, DC: Brookes Publishing.

Sylva, K., Siraj-Blatchford, I., Taggart, B., Sammons, P., Melhuish, E., Elliot, K., & Totsika, V. (2006). Capturing quality in early childhood through environmental rating scales. *Early Childhood Research Quarterly, 21*(1), 76-92. doi: 10.1016/j.ecresq.2006.01.003

Taguma, M., Litjens, I., & Makowiecki, K. (2012). Quality Matters in Early Childhood Education and Care: New Zealand 2012. http://www.oecd.org/edu/school/NEW ZEALAND policy profile - published 3-8-2012.pdf

Tout, K., Zaslow, M., Halle, T., & Forrey, N. (2009). Issues for the Next Decade of Quality Rating and Improvement Systems. Washington, DC: Child Trends.

Vandell, D. L., & Wolfe, B. (2000). Child Care Quality: Does It Matter and Does It Need to be Improved? Madison: Institute for Research on Poverty, University of Wisconsin.

Vartuli, S. (1999). How early childhood teacher beliefs vary across grade. *Early Childhood Research Quarterly, 14*(4), 489-514. doi: 10.1016/S0885-2006(99)00026-5

Vitaro, F., Barker, E. D., Brendgen, M., & Tremblay, R. E. (2011). Pathways explaining the reduction of adult criminal behaviour by a randomized preventive intervention for

disruptive kindergarten children. *Journal of Child Psychology and Psychiatry, 53*(7), 748-756. doi: 10.1111/j.1469-7610.2011.02517.x

Warash, B. G., Ward, C., & Rotilie, S. (2008). An exploratory study of the application of early childhood environment rating scale criteria. *Education, 128*(4), 645-659.

Whitebook, M. (1989). Who Cares? Child Care Teachers and the Quality of Care in America. Final Report, National Child Care Staffing Study. Berkeley, CA: Child Care Employee Project.

Whitebook, M. (2003a). Bachelor's Degrees are Best: Higher Qualifications for Pre-Kindergarten Teachers Lead to Better Learning Environments for Children. Washington, DC: Trust for Early Education.

Whitebook, M. (2003b). Early Education Quality: Higher Teacher Qualifications for Better Learning Environments - A Review of the Literature. Berkeley, CA: Center for the Study of Child Care Employment.

Whitebook, M., Sakai, L., Gerber, E., & Howes, C. (2001). Then and Now: Changes in Child Care Staffing, 1994-2000. Washington, DC: Center for the Child Care Workforce.

Wolery, M. (2004). Assessing children's environments. In M. McLean, M. Wolery & D. Bailey (Eds.), *Assessing Infants and Preschoolers with Special Needs* (3rd ed., pp. 204-235). Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Woodcock, R. W., & Johnson, M. B. (1990). *Woodcock-Johnson Psycho-Educational Battery-Revised*. Allen, TX: DLM Teaching Resources.

Zill, N., & Resnick, G. (1998). *Head Start Family and Child Experiences Survey (FACES)*. Rockville, MD: Westat.

APPENDIX 1

CODING SHEET

I. Document Information

1. Document ID:
2. Surname of First Author:
3. Title of Study:
4. Publication type
5. Journal:
6. Volume:
7. Issue:
8. Coder's Initials:
9. Date Eligibility Determined:

II. Criteria for Eligibility – A study must meet the following criteria to be eligible for inclusion.

1a. The study is a comparative or correlational study that evaluates the association between teacher qualification and the quality of the early childhood care and education environment (as measured by ECERS/ECERS-R/ITERS/ITERS-R)

(Options include: Yes – go to *1b* / No – go to *1e*)

1b. The study reports on at least one outcome (i.e. total or subscale scores on ECERS/ECERS-R/ITERS/ITERS-R)

(Options include: Yes – go to *1c* / No – go to *1e*)

1c. Can an effect size be calculated from data presented in the paper?

(Options include: Yes – go to *1d* /No – go to *1e*)

1d. Is the language used in the study understandable or translatable to a language that is understandable to the researchers?

(Options include: Yes – go to *2* / No – go to *1e*)

*If the study does not meet the above criteria answer the following question:

1e. The study is a review article that is relevant to this project (e.g. may have references to other studies that are relevant to the project, may have pertinent background information)

2. Eligibility status (tick appropriate box)

☐ Eligible

☐ Not Eligible

☐Relevant to Review

Notes:

III. Coding Protocol for Eligible Papers

Reference Information

1. Document ID:

2. Study Authors:

3. Study Title:

4a. Publication Type: Book (Options include: Book, Book Chapter, Journal Articles, Thesis or Doctoral Dissertation, Government Report, Technical Report, Conference Paper, and Other (specify))

4b. Specify (Other):

5. Publication Date (Year):

6a. Journal Name:

6b. Journal Volume:

6c. Journal Issue:

7. Date Range of Research (When research was conducted):

Start:

Finish:

8. Source of Funding for Study:

9. Country of Publication:

10. Date Coded:

11. Coder's Initials:

IV: Analysis Characteristics

The following questions are regarding the population identified in the study.

1a. Unit of analysis (Individual specify):

1b. Unit of analysis (Classroom specify):

1c. Unit of analysis (Centre specify):

1d. Unit of analysis (Sector specify):

1e. Unit of analysis (Other specify):

V: Sample Characteristics

1a. What was the target population of the study? Classroom (Options include: Classroom, Centre, and Other (specify))

1b. Specify (other):

2. Total population of target population (if known):

3. Gender composition of target population: Mixed (Options include: Mixed, Mostly Male, Mostly Female, and Unknown)

4. Age composition of target population: Baby (Options include: Baby, Infants, Toddlers, and Preschoolers)

5. Socio-economic status of target population: Mostly below poverty line (Options include: Mostly below poverty line, Mostly above poverty line, Unknown/Not mentioned, and Other (specify))

6a. Race/ethnicity of the sample: African_American (Options include: African American, Asian, White/Caucasian, Indigenous, and Other (specify))

6b. Percentage Other (specify):

7. Country of study:

8. What was the initial sample size recruited into the study and what was the final N (sample number related to outcomes examined in the review)?

Initial N:

Final N:

VI: Methodology/Research Design

1a. Type of study: Pre-post Test (no control group) (Options include: Pre-post test (no control group), Non-randomised comparison study, Non-equivalent control group, Correlational study, and Other (specify))

1b. Other (specify):

VII: Outcomes Reported

1. How many outcomes are reported in the study?

2. What is the specific outcome recorded on this coding sheet?

3. Was it the primary outcome of the study? Yes (Options include: Yes, No, and Cannot tell/no priorities outcomes reported)

4a. Was this initially intended as an outcome of the study? Yes (Options include: Yes, No, and Cannot tell)

4b. If no, explain why:

VIII: Dependent Variable

1a. What type of measurement tool was used to measure the outcome in this study? ECERS

1b. Other data (specify):

2. Did the researcher assess the quality of the data collected? Yes (Options include: Yes and No)

3a. Did the researcher(s) express any concerns regarding the quality of the data? Yes (Options include: Yes and No)

3b. If yes, explain:

4a. Does the evaluation data correspond to the initial stated problem? Yes (Options include: Yes and No)

4b. If no, explain the discrepancy:

5. Was the assessor an internal staff member or independent?): Internal assessor (Options include: Internal assessor and Independent assessor)

IX: Effect Size/ Reports of Statistical Significance

1. What is the total sample size in the analysis (based on the unit of analysis for this outcome)? N=

2. How many study groups are identified in the evaluation?

3a. What is the total sample size of the study group 1? N=

3b. What is the total sample size of the study group 2? N=

3c. What is the total sample size of the study group 3? N=

3d. What is the total sample size of the study group 4? N=

4. What is the total sample size of the comparison group? N=

5. Raw difference favours (i.e. shows more success for): Study group 1 (Options include: Study group 1, Study group 2, Study group 3, Study group4, Comparison group, Neither (equal), Cannot tell (statistically insignificant report))

6. Did a test of statistical significance indicate statistically significant differences between either study or comparison groups or the pre and post tested study group? Yes (Options include: Yes, No, Cannot tell, and N/A (no testing completed))

7a. Was a standardised effect size reported? Yes (Options include: Yes and No)

7b. If yes, what was the effect size?

7c. If yes, what page was the effect size found on?

7d. If no, is there data available to calculate an effect size? Yes

7e. Type of data effect size can be calculated from: mean and standard deviations (Options include: Mean and SD, t-value, F-value, Point biserial correlation coefficient, Pearson correlation coefficient, and Other (specify))

7f. Other (specify):

8. Did the evaluation control for validity by using multivariate methods (i.e. regression) to assess the impact of an intervention/program on a given outcome? Yes (Options include: Yes and No)

9. If yes, did the analysis find that the intervention/program reduced the outcome at a statistically significant level (p=.05)? Yes (Options include: Yes and No)

10. What significance level was used? <0.001 (Options include: <0.001, <0.01, <0.05, and <0.1)

X: Data

<u>Means and Standard Deviations</u>

1a. Study group 1 N=

1b. Study group 2 N=

1c. Study group 3 N=

1d. Study group 4 N=

2. Comparison group N=

3a. Study Group 1 mean

3b. Study Group 2 mean

3c. Study Group 3 mean

3d. Study Group 4 mean

4. Comparison group mean

5a. Study group 1 standard deviation

5b. Study group 2 standard deviation

5c. Study group 3 standard deviation

5d. Study group 4 standard deviation

6. Comparison group standard deviation

Significance tests

1. *t*-value

2. *F*-value

3. Chi-square value

4. Calculated effect size

XI: Conclusions by authors

Note: This section provides detail by authors regarding the effectiveness of the intervention with respect to the outcome/problem being addressed on this coding sheet.

1. Conclusion about the impact of the intervention

Study group 1: Authors conclude effect is confirmed (Options include: Authors conclude effect is confirmed, Authors conclude effect is not confirmed, and Unknown/No conclusion provided)

Study group 2: Authors conclude effect is confirmed (Options include: Authors conclude effect is confirmed, Authors conclude effect is not confirmed, Unknown/No conclusion provided, and N/A)

Study group 3: Authors conclude effect is confirmed (Options include: Authors conclude effect is confirmed, Authors conclude effect is not confirmed, Unknown/No conclusion provided, and N/A)

Study group 4: Authors conclude effect is confirmed (Options include: Authors conclude effect is confirmed, Authors conclude effect is not confirmed, Unknown/No conclusion provided, and N/A)

2. Did the authors conclude that the intervention was beneficial? Yes (Options include: Yes, No, and Cannot tell)

3a. Did the authors conclude that a relationship existed between the intervention and the quality of the early childhood learning environment? Yes (Options include: Yes, No, and Cannot tell)

3b. If yes, add notes about conclusions made by authors

REVIEW AUTHORS

Lead review author:

Name:	Matthew Manning
Title:	Dr
Affiliation:	Australian National University
Address:	Centre for Aboriginal and Economic Policy Research
City, State, Province or County:	Canberra, A.C.T
Postal Code:	4122
Country:	Australia
Phone:	+61(0) 7 3735 5617
Email:	Matthew.Manning@anu.edu.au

Co-author(s): (There should be at least one co-author)

Name:	Susanne Garvis
Title:	Dr
Affiliation:	Monash University
Address:	Faculty of Education
City, State, Province or County:	Melbourne, Victoria
Country:	Australia
Phone:	
Email:	Susie.Garvis@monash.edu

Co-author(s): (There should be at least one co-author)

Name:	Christopher Fleming
Title:	Dr
Affiliation:	Griffith University
Address:	Social and Economic Research Program
City, State, Province or County:	Brisbane, Queensland
Postal Code:	4122
Country:	Australia
Phone:	+61(0) 7 373 57061
Email:	Chris.Fleming@griffith.edu.au

Co-author(s): (There should be at least one co-author)

Name:	Gabriel T.W. Wong
Title:	Mr
Affiliation:	Griffith University
Address:	School of Criminology and Criminal Justice, Mt Gravatt Campus
City, State, Province or County:	Brisbane, Queensland
Postal Code:	4122
Country:	Australia
Phone:	+61(0) 7 3735 1153
Email:	Gabriel.Wong2@griffithuni.edu.au

ROLES AND RESPONSIBLIITIES

Content: Dr. Matthew Manning has taught and published extensively in the developmental prevention area focusing explicitly on the early years, which includes preschool education. Dr. Susanne Garvis has taught and published extensively in the early childhood education area. She has extensive experience working with educators in the early childhood education sector and is fully trained in the use of environmental rating tools in preschool environments.

Systematic review methods: Dr. Matthew Manning has conducted and published several meta-analyses in high-ranking peer-reviewed journals including the Campbell Collaboration.

Statistical analysis: Dr. Matthew Manning, Dr. Christopher Fleming and Mr. Gabriel Wong have extensive training in applied statistics and also those statistical procedures that are applied in meta-analysis.

Information retrieval: Dr. Matthew Manning, Dr. Chris Fleming and Mr. Gabriel Wong have been involved in developing search strategies using the Campbell and Cochrane technique.

SOURCES OF SUPPORT

Drs. Matthew Manning and Susanne Garvis received internal funding from Griffith University to conduct this research. It is anticipated that the draft review will be completed by October 2014.

DECLARATIONS OF INTEREST

No

PRELIMINARY TIMEFRAME

- Date you plan to submit a draft protocol: May 2014.
- Date you plan to submit a draft review: October 2014.

PLANS FOR UPDATING THE REVIEW

Dr. Matthew Manning and Dr. Susie Garvis will be responsible for updating this review. We anticipate that this review will be updated as new evidence is collected and subsequent empirical papers written.

AUTHOR DECLARATION

Authors' responsibilities

By completing this form, you accept responsibility for preparing, maintaining and updating the review in accordance with Campbell Collaboration policy. The Campbell Collaboration will provide as much support as possible to assist with the preparation of the review.

A draft review must be submitted to the relevant Coordinating Group within two years of protocol publication. If drafts are not submitted before the agreed deadlines, or if we are unable to contact you for an extended period, the relevant Coordinating Group has the right to de-register the title or transfer the title to alternative authors. The Coordinating Group also has the right to de-register or transfer the title if it does not meet the standards of the Coordinating Group and/or the Campbell Collaboration.

You accept responsibility for maintaining the review in light of new evidence, comments and criticisms, and other developments, and updating the review at least once every five years, or, if requested, transferring responsibility for maintaining the review to others as agreed with the Coordinating Group.

Publication in the Campbell Library

The support of the Coordinating Group in preparing your review is conditional upon your agreement to publish the protocol, finished review, and subsequent updates in the Campbell Library. The Campbell Collaboration places no restrictions on publication of the findings of a Campbell systematic review in a more abbreviated form as a journal article either before or after the publication of the monograph version in *Campbell Systematic Reviews*. Some journals, however, have restrictions that preclude publication of findings that have been, or will be, reported elsewhere and authors considering publication in such a journal should be aware of possible conflict with publication of the monograph version in *Campbell Systematic Reviews*. Publication in a journal after publication or in press status in *Campbell Systematic Reviews* should acknowledge the Campbell version and include a citation to it. Note that systematic reviews published in *Campbell Systematic Reviews* and co-registered with the Cochrane Collaboration may have additional requirements or restrictions for co-publication. Review authors accept responsibility for meeting any co-publication requirements.

I understand the commitment required to undertake a Campbell review, and agree to publish in the Campbell Library. Signed on behalf of the authors:

Form completed by: 

Date: 21 May, 2014