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# QUALITY INTERACTIONS STUDY (QIS) FINAL REPORT

## WORKING WITH DoE PRE-SCHOOLS TO STRENGTHEN THE QUALITY OF INTENTIONAL AND RELATIONAL PEDAGOGY

FUNDED BY NSW DEPARTMENT OF EDUCATION 2015-2016

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# 1.1. Introduction

The QIS Study was commissioned by the New South Wales Department of Education to study the impact of evidence-based professional development (PD) designed to strengthen the relational and intentional pedagogy within pre-school classrooms located in areas of disadvantage. Twenty-nine pre-schools located in primary schools were chosen from 100 located in a designated area in NSW; 16 preschool classrooms received the PD which were matched to 18 other preschool classrooms who served as controls. All of the pre-school classrooms within the 29 schools were observed both before and after the PD, using Environment Rating Scales (ERS), Early Childhood Environment Rating Scale – Extension (ECERS-E) and the Sustained Shared Thinking and Emotional Wellbeing (SSTEW) Scale, so that any changes in pedagogy and practice could be captured. The PD was delivered to the 16 schools starting with two full days on 7 and 8 May 2015 followed by five weekly sessions starting on 14 May until 11 June 2015. The control group schools have also received the PD in 2016 with two initial days in February followed by fortnightly sessions from 16 March until 25 May 2016. Fortnightly sessions allowed for more effective implementation of strategies.

The design and delivery of the QIS Study was evidence-based and informed by a range of studies within and beyond Australia that showed the significance of the quality of experiences young children receive for their short and long term learning, development and prospects. The evidence-based PD was informed by:

1. research considering quality and effective practice with children – specifically practice with young children that was found to enhance their socio-emotional and cognitive development
2. effective practice with regards to the content, delivery and processes of PD. The PD incorporated specific processes and content that were found to support changes in practice which were associated with enhanced children outcomes, and
3. information on the existing skills, knowledge and attitudes of the educators who participated in, and their ongoing responses to the PD.

# 2.1. The effects of quality on Early Childhood Education and Care (ECEC) on children's outcomes

The imperative of ensuring high quality early experiences for children, including within ECEC provision, is supported by strong, international evidence (OECD, 2011). Key international large-scale longitudinal studies including the Effective Pre-school, Primary and Secondary Education (EPPSE) project (Sylva et al., 2014) and the Families, Children and Child Care (FCCC) study (Sylva et al., 2007) in the UK, the US NICHD Study of Early Child Care (NICHD 1999) suggested attendance at and the quality of ECEC mattered. Children who attended pre-schools had higher cognitive and socio-behavioural outcomes at primary school entry than those who did not (Sylva et al., 2004). Longer term effects were apparent at the end of primary school (Sylva et al., 2008) and at age 14 years and 16 years, where attendance at higher quality pre-schools predicted higher achievements in mathematics, science and socio-behavioural outcomes (Sylva et al., 2012) and improved GCSE results (Sylva et al., 2014).

To date there have been few longitudinal studies undertaken in Australia. However, Australian studies – for example, Longitudinal Study of Australian Children (LSAC) (Australian Government Department of Social Services, 2013) and the Child Care Choices (CCC) Extension Study (Bowes et al., 2009) – typically reported similar findings to those conducted in the UK and USA. They reported both short and long term effects on children's adjustment and school engagement. The quality of early relationships with carers and teachers was predictive of greater task attentiveness and emotional regulation in kindergarten (Bowes at al., 2009) and the early years of formal schooling (Gialamas et al., 2014).

The benefits of ECEC are most marked for children who come from poorer and disadvantaged backgrounds (Ruhm and Waldfogel, 2012). Typically, such children, enter ECEC with lower scores on measures of socio-emotional and cognitive development in comparison to children from higher socio-economic backgrounds. This difference tends to persist and grow throughout their education (Stipek and Ryan, 1997). A number of high profile USA studies, including the Abecedarian project (Campbell et al., 2002; Karoly et al., 2005), the Perry Pre-school Project (Barnett, 2008; Pianta et al., 2009), the Early Training Project (Anderson, 2008; Karoly et al., 2005) and the numerous Head Start projects (Barnett, 2008; Bloom and Weiland, 2015) as well as the EPPSE project in the UK (Sylva et al., 2004; 2010; 2014), have confirmed the benefits of attendance at high quality ECEC provision for children at risk. Gains include: higher cognitive functioning, academic skills and educational attainment; and better social adjustment. As the children grow older and into adulthood, gains include: greater likelihood of employment and social integration; and, reduced criminality.

Many studies have also demonstrated that the early home learning environment (HLE) is a powerful predictor of future educational and career success. Effective ECEC settings were found to offer children from disadvantaged backgrounds added advantages in two ways. First, while they were in the setting through direct support for the children's development; and, second, through partnership work with parents to enhance the early HLE (Sylva et al., 2004; Siraj and Mayo, 2014). Although family characteristics have been shown to have a greater impact on children's outcomes than ECEC factors; the effect of attending quality ECEC may have a greater impact than social disadvantage (Geddes et al., 2010). Unfortunately, the quality of ECEC provision is still a major concern across many countries in the developed world (Melhuish et al., 2015). Concerns over the quality of ECEC provision, and the potential to narrow the 'achievement gap' between children from advantaged to those from disadvantaged home backgrounds has been a focus in many national and international studies. Quality has been identified as fundamental if the gap is to be narrowed (Sylva et al., 2014; Pianta et al., 2009; Leseman, 2009). Improving the quality of ECEC is therefore of major importance if more equitable child outcomes are desired.

## 2.2. Quality and Effective Practice

The quality of ECEC is a multidimensional construct encompassing the physical environment, the educational curriculum, staff training and qualifications, child-staff ratios, group sizes, staff turnover and interpersonal relationships. Many studies have considered different aspects and their impact on children's outcomes. Melhuish et al. (2015) and Siraj and Kingston (2015) summarised

evidence from numerous international studies and concluded that the following characteristics were 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 and sanitary and accessible to parents
8. Working with families, sharing educational goals and supporting the early Home Learning Environment (HLE)

This list, which outlined the aspects of ECEC quality which supported effective practice, like many others, found a strong correlation between higher quality care and a well-trained and qualified workforce. Many studies have recognised that the quality of ECEC does not depend on physical resources, such as buildings and schools, but that the most important ingredient for quality provision is the quality of the educators who work with the children and families (Abbott and Rodger, 1994).

Cooke and Lawson (2008) 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. Increasingly, research has shown that significant predictors, in terms of impact on child outcomes, related to the educators' role: 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, were seen as determining what the children learnt and how they felt about learning (Driscoll et al., 2011; Epstein, 2014; National Research Council, 2001; Pianta, 2012).

According to Fukkink and Lont (2007) there was ample evidence that providing sector specific qualifications and professional development (PD) for educators improved children's learning and wellbeing. They said: "*the training of caregivers is a cornerstone for quality in early care. Caregivers with high educational levels provide better personal care…are more sensitive…are more involved with children…and have more knowledge of developmentally appropriate practice…Furthermore, more educated early educators offer richer learning experiences…provide more language stimulation… and stimulate the social and physical skills of children more often than other educators.*" (p294).

# 3.1. Measuring Quality in ECEC provision

Measurement of quality in ECEC provision typically involves (a) global measures of structural program features (e.g., ratings of program environmental features such as child-adult ratios and group size) and (b) measures of dynamic processes or process quality (e.g., educators' interaction behaviours). The proper assessment of quality ECEC involves both specifying the goals of education and care and understanding the specific indicators of quality. The Early Childhood Environment Rating Scales (ERS) were designed to be objective, they are internationally used measurement tools designed to capture specific indicators of quality. Many large studies including the original EPPSE research have shown them to be reliable, valid and related to child outcomes (Burchinal et al., 2002; Phillipsen et al., 1997; Sylva et al., 2004; 2014; Whitebook, Howes & Phillips, 1989).

There are ERS that are suitable for use in the different types of ECEC provisions including centre-based, family daycare and afterschool care with the age range birth to 5 years. However, Table A below, only includes those ERS which are relevant to the schools and the age of the children included in the QIS Study.

### 3.2. Table A. ERS designed for use in centre-based provision for children aged 3 to 5 years

| Quality Measurement Tool | Brief description of aspects of quality covered | Provision in which it is designed to be |
|---|---|---|
| Early Childhood Environment Rating Scales-Revised (ECERS-R) (Harms, Clifford & Cryer, 2004) | Considers structural and some process quality with an emphasis on global aspects: space and furnishings; personal care routines; language-reasoning; activities; interaction; program structure; parents and staff. | ECEC centre-based provision for children aged 2½ to 5 years |
| Early Childhood Environment Rating Scales-Extended (ECERS-E) (Sylva, Siraj-Blatchford & Taggart, 2010) | Considers the curriculum and educational pedagogy. In the following areas: Language and Literacy; Maths and number; Science and the environment; Diversity (meeting and planning for the needs of individuals and groups). | ECEC centre-based provision for children aged 3 to 5 years |
| Sustained Shared Thinking and Emotional Wellbeing (SSTEW) Scale (Siraj, Kingston & Melhuish, 2015) | Considers aspects of process quality including:<br>1) Building trust, confidence and independence<br>2) Social and emotional well-being<br>3) Supporting and extending language and communication<br>4) Supporting learning and critical thinking<br>5) Assessing learning and language | ECEC for children aged 2 to 5 years |

Two of the above Environment Rating Scales (ERS) were chosen as the main measurement tools of quality in the QIS Study: the ECERS-E and the SSTEW Scale. ECERS-R (a more global measure of quality which focusses mainly on the physical and emotional environment) was not chosen, as recent research suggested that the ECERS-E and the SSTEW Scale were more likely to capture the important components of effective practice. ECERS-E measures aspects of the curriculum and pedagogical processes associated with these (concentrating on emergent literacy, mathematics and science and exploration as well as support for diversity). While the SSTEW Scale considers the educator's role within the setting in supporting and scaffolding children's learning and development: their relational and intentional pedagogy. Increasingly, evidence suggests that educators' understanding of effective early years pedagogy and curriculum knowledge are most strongly linked to high quality practice and improved children's outcomes (e.g. National Research Council, 2001; Zaslow & Martinez-Beck, 2006; Pianta, 2012). Interestingly, the NQS (DEEWR) (2009b) appears to cover similar aspects of practice to ECERS-R.

ECERS-E has been used extensively in research; however, the SSTEW Scale is relatively new.

It was developed in 2015 when research suggested important indicators of quality were missing from the existing ERS (Dickinson et al., 2014; Gordon, et al. 2013). ECERS-E was found to be strongly associated with children's socio-emotional and cognitive development in the aforementioned EPPSE study (Sylva et al., 2004). The SSTEW Scale has been used in a number of new studies including the Study of Early Education and Development (SEED), a longitudinal study in England funded by the Department of Education (1000 settings), and several projects in Australia (involving approximately 300 settings). Further details of ECERS-E and the SSTEW Scale can be found in Appendix A and an example of an item from each scale in Appendix B and C.

The term Sustained Shared Thinking (SST) was originally coined following research considering and identifying components of excellent practice in the Effective Provision of Pre-school Education (EPPE) study (Siraj-Blatchford et al., 2002). Since then it has been widely used in many Early Years Frameworks across the world. It influenced the development of the Australian Early Years Learning Framework (EYLF) (DEEWR & CAG, 2009) as well as the English Early Years Foundation Stage (EYFS) (DfE, 2012). However, the practices associated with SST have been found lacking in many ECEC settings (Siraj-Blatchford et al, 2002; Sylva et al., 2004; Pianta, 2012; Epstein, 2014). The SSTEW Scale was designed to clarify the term SST and to provide examples of practice which would support both assessment (and measurement) and improvement. SST requires the adult to successfully support children's thinking and learning and this undoubtedly requires a highly skilled and knowledgeable educator. The educator is required to be skilled in assessing, monitoring and supporting children's socio-emotional, linguistic and cognitive development while ensuring that the child feels safe, comfortable, interested and stimulated so they are ready to learn and think deeply.

# 4.1. The QIS Study Design

Department of Education (DoE) in New South Wales, like many policy makers in developed countries, has considered the growing body of evidence which suggests targeting support for young children's learning and wellbeing can serve as a foundation for lifelong learning; as well as support a reduction in poverty, increase intergenerational social mobility, and enhance social and economic development for society as a whole (OECD, 2012; Melhuish et al., 2015). NSW DoE funded this QIS Study to ensure: first, that existing levels of quality (specifically, the educators' content/curricula knowledge and early years pedagogy) in 29 selected DoE pre-schools situated in areas of disadvantage could be captured; and second, to determine whether a short, bespoke professional development (PD) package could successfully improve practice within 16 of those classrooms, that were randomly chosen.

## 4.2. QIS Study Research Questions:

- What is the quality of the environment and pedagogy, as measured by the ECERS-E and SSTEW quality rating Scales in 29 DoE pre-school classrooms, in disadvantaged areas?
- Can a PD around Leadership for Learning enhance educator skills and DoE pre-school classroom environments, creating more effective environments for disadvantaged children?
- What were the processes that enhanced educator skills (given successful outcomes) and what were the obstacles?

## 4.3. Aims of the QIS Study

The QIS Study was designed:

- First, to capture existing levels of quality (specifically, the educators' content/curricula knowledge and early years pedagogy as measured by ECERS-E and the SSTEW Scale) in 29 selected DoE pre-schools with 34 pre-school learning environments, situated in areas of disadvantage.
- Second, to determine whether a short, bespoke professional development (PD) package (of 6 weeks in duration) could successfully improve practice within 16 of those classrooms (the intervention group), that were randomly chosen.
- Third, to add to existing understandings regarding effective PD in ECEC. In particular, to capture the processes involved in any changes/enhancements in practice; that is, to note how educators created more effective environments for the children in their care and to note any obstacles which mitigated against such improvements.

# 5.1. Method

This section details the participating centres, the PD attendees, pertinent ethics issues and a timeline for the study.

## 5.2. Participating Centres and PD attendees

The ECEC centres were the pre-school learning environments or classrooms (Note: learning environment and classroom are used interchangeably and include both the inside and outside provision) within 29 DoE primary schools situated in areas of disadvantage in a designated area of New South Wales. Of the 29 identified schools most had one pre-school learning environment but four had two, which made the total number of pre-school learning environments involved in the QIS Study 34. Each pre-school class typically included 20 children aged 4-5 years, following the regulated ratio of one adult for every 10 children. Under the Education and Care Services National Regulations (2014), the principals of the schools were both the Nominated Supervisors and Educational Leaders of the pre-school classrooms. Each pre-school class was led by a university qualified Early Childhood Teacher along with a vocationally qualified School Learning Support Officer (SLSO). In some cases, where there were children with additional needs in attendance, a further support was provided for these children.

The PD sessions were attended by educators (including the class teacher and one SLSO from each classroom). These pre-schools were randomly assigned to the intervention group. For some schools the principals and executive staff also attended the first two days of PD and some attended further sessions too.

As two, three or even four educators attended the PD from each school, the participant numbers attending the sessions was high (49 people attended Phase One Day One, for example). While fewer principals and executive staff attended the phase 2 sessions (see section 4.6. Procedure), attendance by teachers and SLSO's remained high throughout the project. The remaining 18 pre-schools served as the control group, and they were offered the PD in 2016.

## 5.3. Ethics Approval

Ethics approval was received from the University of Wollongong's Human Research Ethics Committee for the QIS Study.

Two issues relating to ensuring child protection and the ethics of an RCT designed Study, which included a control group, were raised. As the ERS observations were conducted by existing DoE staff the necessary checks for staff who came into contact with children were already in place. The Observation Team were the P-2 Initiatives Officers – a peripatetic team of support and advisory consultants – and other qualified early childhood consultants who work as support and advisory staff in the Early Learning directorate in the NSW Department of Education. Before the Study started, it was agreed that the control group would be given access to the QIS PD, if successful, on completion of the Study in March/April 2016.

## 5.4. Procedure

The QIS PD was delivered in two phases: phase one consisted of two full consecutive days of training and phase two consisted of five 3 hour sessions delivered once a week. ECERS-E and the SSTEW Scale observations were conducted by the Observation Team before (pre-test) and after (post-test) the PD. The pre-test or baseline observations were made in February – March 2015, the PD was delivered from May to June 2015 and the post-test observations were conducted in November – December 2015. Following the PD each participant was invited to complete a questionnaire (See Appendix D for an example). In March 2016, following the completion of the QIS study the participants were invited to attend a half-day session to report on the findings and participate in focus groups seeking feedback on what they found had worked, including successes and challenges they had faced. Table B below gives the timeline and outlines the QIS Study process.

### 5.6. Table B. Time-line for the QIS Study

| November – January 2014 | February – March 2015 | May 2015 – June 2015 (6 weeks) | November – December 2015 | March 2016 |
|---|---|---|---|---|
| **1.** Training of the Observation Team: P-2 Initiatives Officers and State Office Staff on ECERS-E and the SSTEW Scale<br>**2.** Interrater reliability ensured through 'Gold Standard' process. | **1.** Pre-test or baseline established in control and intervention classrooms. (The Observation Team rated classrooms that they did not normally work with i.e. the P-2 Initiatives officers made observations in schools in different areas from their usual work. 34 pre-school classrooms in 29 schools were rated using ECERS-E and the SSTEW Scale.) | **1.** PD delivered:<br>PD Phase One: Two consecutive days face-to-face training<br>PD Phase Two: 5 weekly half days face-to-face training.<br>**2.** End of PD questionnaire completed. | **1.** Post-test established in control and intervention classrooms.<br>(The Observation Team rated classrooms that they did not normally work with i.e. the P-2 Initiatives officers made observations in schools in different areas from their usual work.) | **1.** Focus group discussions of PD impact, including successes and challenges<br>**2.** Summary of ECERS-E and the SSTEW Scale results shared with all participants. |

# 6.1. Professional Development and Effective Practice

Recent federal and state governments in Australia have introduced strong policy initiatives within ECEC designed to support and enhance quality and effective practice. The National Quality Framework includes, a National Quality Standard and an Assessment and Rating process: and a curriculum framework: the Early Years Learning Framework (EYLF) (DEEWR & COAG, 2009a). The Assessment and Rating process has been rolled out over the last 5 years with a small number of metropolitan services yet to undergo this process. The QIS study was designed to support and extend knowledge of the practice in the workforce within DoE schools serving areas of disadvantage. More specifically it was designed to monitor the impact of the QIS PD, developed for the QIS Study and delivered as an intervention for educators around pedagogy and practice.

The EYLF (DEEWR & COAG, 2009), developed by the Council of Australian Governments, was designed to support educators in extending and enriching children's early learning. It includes many aspects of practice and pedagogy seen as fundamental to young children's learning. It has a specific emphasis on play-based learning and recognises the importance of communication and language (including early literacy and numeracy) and social and emotional development. The EYLF has a strong focus on child-centred pedagogy, it's approach supports inclusion, children's independence and voice. It also recognises the importance of intentional teaching and thoughtful curriculum decision-making.

The QIS PD was evidence-based and designed to complement and extend the EYLF. It incorporated aspects of theory and practice, and followed a process of delivery, which research had shown to be positively associated with effective practice in the early years; that is, it was linked to the enhancement of children's socio-emotional and cognitive outcomes (Timperley et al., 2007; Desimone, 2011; Hamre et al., 2012). While some aspects of the QIS PD were similar to aspects found within the EYLF, including an emphasis on relational and intentional pedagogy and play-based learning, it also included extensions to and clarifications of aspects of pedagogy and practice. It reflected and extended upon elements of practice and pedagogy found within the chosen Environment Rating Scales (ERS): ECERS-E (Sylva et al., 2010) and the SSTEW Scale (Siraj et al., 2015). It had a strong focus on supporting educators to engage in SST and to develop learning orientated classrooms and communities. In addition, the educators were encouraged to work in collaboration with each other and with the teams in their schools and to embrace and enact change and improvements within their classrooms.

During the QIS PD, the educators were introduced to new understandings and approaches to teaching and learning, including specific practices designed

to enhance all of the educators' abilities to extend children's thinking, through high quality interactions (SST) between adults and children and children themselves [see the SSTEW Scale (Siraj et al., 2015)]. Theoretical and practical applications of child development were incorporated to support deeper understanding of and empathy for young children's learning. Recent understandings regarding appropriate content knowledge or curriculum in relation to language development, self-regulation, metacognition, and emergent literacy, mathematics and science and exploration were also covered (see, for example, Epstein, 2014). These were designed to augment educators' intentionality and ability to plan for meaningful experiences for all children in their classrooms, as well as support their knowledge and confidence. While it was not possible to cover all aspects of content/curricula relevant to young children's learning during the sessions, the educators were signposted to additional materials, books, websites and resources so that they could extend their knowledge further. The teaching and learning cycle of assessment, planning and evaluation was introduced (adapted from Kolb, 1984), and the importance of assessment at all levels (child, adult, classroom and school) was demonstrated. Assessment and planning were seen as fundamental to supporting and enhancing children's outcomes, as well as ensuring that the learning experiences and opportunities on offer, including the instructional activities, were sequential and built upon the children's (and educators') existing skills, knowledge and interests.

The QIS PD sessions were based on a program of work developed from evidence-based understandings of how young children learn best, including the notions of holistic learning and extending children's active engagement and participation in activities. It was also developed based specifically on the strengths and weaknesses documented during a baseline assessment of quality [using ECERS-E (Sylva et al., 2010) and the SSTEW Scale (Siraj et al., 2015)] within the DoE pre-school classrooms involved in the QIS Study, together with feedback from the sessions as they evolved. The QIS PD offered key experiences to staff but also recognised that the educators involved in the study had varied qualifications and experiences ranging from Certificate III to Early Childhood Teaching qualifications. As a consequence, care was given to ensure that the information, on supporting and extending children's learning, was comprehensive and accessible to all. In addition, throughout the QIS PD, team work and collaboration was encouraged so that those with greater experience and knowledge could support the others. While much of the information presented reflected recent understandings, it was inevitable that some of the aspects of theory and practice would be completely new to some participants and revisions of previous learning for others.

### 6.2. The QIS Study Model: Evidence-based PD

Figure A below: The QIS Study Model: Evidence-based PD provides a summary of the process of learning that the educators were required to engage with during the QIS PD. It incorporated two PD phases: phase one consisted of two days of intensive face-to-face training, while phase two consisted of five weekly 3 hr face to face sessions over a period of five weeks which incorporated guided evaluation and reflection on what had been trialled in the classrooms as well as further content and preparation for further in-class trials.

Each QIS PD session included examples of practice and discussions of the underlying theoretical models and concepts together with recent research to enable critical reflection and to support possible future improvements. According to Schulman and Schulman (2004) staff need to both know and be able 'to do' while being reflective (learning from experience). The QIS PD combined curriculum and child development knowledge with practice, allowing time for the educators to use newly learnt knowledge, understandings, approaches etc. within their classrooms and to critically analyse and reflect upon their impact (Hamre et al., 2012). The educators, in classroom teams, were encouraged to choose aspects of practice that they would trial and to develop their own plans for change and improvement. The rationale enabled educators to make their own choices/plans including adaptations. This process supported ownership, confidence and sustainability over time. Finally, time was given to evaluate and reflect upon their improvement plans and any changes to practice.

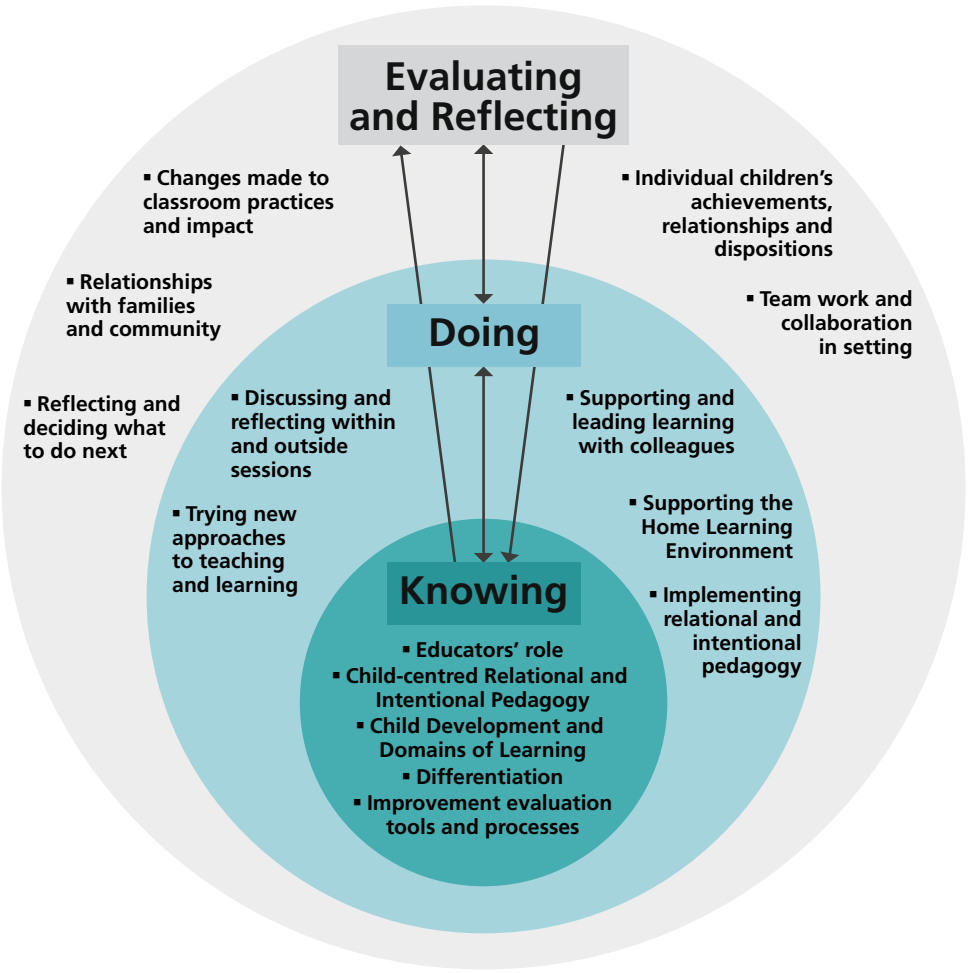
The use of concentric circles in the QIS Study Model (see Figure A) demonstrate the inter-related nature of the process of delivery, much like Bronfenbrenner's model of bio-ecological development which showed the inter-related micro-systems that he suggested impacted on children's development (Bronfenbrenner and Morris, 2006). The QIS Study Model represents the inter-related nature of the various aspects of the PD and the processes of learning and reflection that educators were supported in following: Knowing, Doing and Evaluating and Reflecting. In the QIS Study Model,

the Knowing aspect, which included the content and support for learning, provided both the starting point for the PD – the base of the model – as well as an ongoing feature throughout phases one and two. The concentric circles illustrate how the Knowing aspect was responsive to the Doing and Evaluating and Reflecting aspects and vice versa. So, for instance, following phase one, day two – part of the delivery of the Knowing aspect of the PD – it became apparent that some content (relating to the use of assessment for learning and planning) required more support if it was to be effectively transferred into the Doing aspect, and so this was revisited and built upon in phase two of the study.

During the Doing aspect of the model, the educators, who had attended the face-to-face sessions, were required to try new approaches to teaching and learning and, most importantly, to bring all educators in the classroom together to work collaboratively on their quality improvement plans. In order to develop team approaches to change, they were encouraged to share new knowledge, research and approaches from the Knowing aspect of the PD. Following this they were asked to Evaluate and Reflect on how it went. During the Evaluating and Reflecting aspect of the project the educators were guided and supported in evaluating and reflecting upon progress, including successes and challenges, and deciding on next steps, which often included the identification of new opportunities for learning (Knowing) and new approaches to teaching and learning (Doing). Ultimately, the aim was that the cycle of quality improvement, established through the use of the QIS Study Model, would become embedded in practice and continue beyond the life of the project.

The QIS Study Model (Figure A) below provides both a summary of the process of learning that the educators were required to engage with during the QIS PD and also outlines the knowledge and skills needed for effective teaching (see Knowing aspect). Table C, below the QIS Study Model, elaborates on and outlines the knowledge and skills, content and delivery linked to the teaching in each phase of the QIS Study PD. Further, it makes links to the evidence base.

### 6.3. Figure A: The QIS Study Model: Evidence-based PD



## 6.4. Table C. Explanation of the content and processes included in the QIS Study Model

| Aspect | Description of effective PD | Expected Outcomes of PD for participants (primary) and their colleagues in the classroom (secondary). They will show: | Phase |
|---|---|---|---|
| KNOWING | Educator's Role | • An increased understanding of the evidence-base for effective practice, quality and quality improvement within ECEC, including a clear understanding of the possible impact of their role on children's outcomes in the short and long term [providing direction and motivation for change] (Bell et al., 2010; Cooke and Lawton, 2008; Stephen, 2012).<br>• An ability to identify and promote effective educator-child and child-child interactions (both in self and others) which support children's thinking and extend learning (Siraj et al., 2002).<br>• Recognition of their role as a leader of learning: including working collaboratively with all stakeholders in a learning orientated classroom and community. Also, collaborating with all educators in their classrooms as a team, growing and developing their understanding of what constitutes effective practice together (Cordingly et al., 2015; Siraj and Hallet, 2014).<br>• Greater confidence and understanding of the early Home Learning Environment (HLE) and working in partnership with parents/carers (Siraj et al., 2002).<br>• An awareness of new approaches to the education and care of young children, each other and the people with whom they work (Gusky, 2014). | All outcomes should be ongoing but the information/discussions supporting these were predominantly situated in Phase One. |
| | Child-centred Relational and Intentional Pedagogy | • An increased awareness of evidence based learning and knowledge of recent understandings of effective practice with young children including the importance of relational and intentional pedagogy (Epstein, 2014; Pianta et al., 2014). Relational pedagogy is founded on a strong child-centred approach in which the educators are respectful and responsive to the children, using their interests, knowledge and understanding to inform their playful intentional pedagogy.<br>• Greater recognition of and support for children's natural curiosity and exploration through the provision of exciting, active and meaningful experiences and opportunities. Extending children's thinking through the encouragement of and support for rich interactions between the adults and children and the children themselves [NB. Interactions in which the educators purposefully challenge, scaffold, and extend children's skills require knowledge of child development and content knowledge i.e. expected outcomes of the teaching see below] (Epstein, 2014; Pianta et al.,2014). | Both of the outcomes in this section should be ongoing. The information was presented and discussed in Phases One and Two. |
| | Child Development and Domains of Learning | • An increased knowledge of and understandings of child development, content knowledge and curricula in the areas of personal, social, emotional and self-regulation development and emergent language, literacy, mathematics, science and exploration (Hamre et al., 2012; Kingston and Siraj (forthcoming); Siraj et al., 2015). | This outcome should be ongoing. Initial information and signposting was discussed in Phases One and Two. |
| | Differentiation | • Better understanding of and respectful support for individual children and their specific needs so that all children's outcomes are enhanced, with particular attention given to supporting children deemed 'at risk' (Kyriakides et al., 2009; Sylva et al., 2014).<br>• Greater use of their knowledge of child development and content knowledge to assess and plan for individuals and groups of children, build empathy and understanding and evaluate the impact of their practice (OECD, 2012; Daniels and Clarkson, 2010). | These outcomes should be ongoing. Initial information and signposting was discussed in Phases One and Two. |

## 6.4. Table C. Explanation of the content and processes included in the QIS Study Model

| Aspect | Description of effective PD | Expected Outcomes of PD for participants (primary) and their colleagues in the classroom (secondary). They will show: | Phase |
|---|---|---|---|
| KNOWING | Improvement, Evaluation tools and processes | • A clear understanding of their role as leaders of learning in their classrooms, as well as members of a community of learners throughout the PD (Timperley et al., 2007; Zaslow et al., 2010).<br>• Greater support for and involvement in quality improvement processes in the classroom, including understanding of the teaching and learning cycle of assessment, planning and evaluation, the benefits of collaboration, the use of plans and assessments (at the individual and classroom levels), the use of planning for change proformas and some evidence of understanding and using frameworks to support self-assessment of practice e.g. ECERS-E and the SSTEW scale (Cordingly, 2013; Kingston (in prep);Timperley et al., 2007; QUINCE research team, 2009) | These outcomes should be ongoing. Initial information and signposting was discussed in Phases One and Two. |
| DOING | Supporting and leading learning with colleagues<br>Supporting the HLE | • Implementation of their roles as leaders of learning: developing and supporting team work and collaboration in the classrooms and a shared understanding of the learning orientated classroom (Rodd, 2012).<br>• Support for each other (within the sessions with all participants of the PD and within the classrooms with all educators) in making changes to support quality improvement (Downer et al., 2009; Mashburn et al., 2010).<br>• Recognition and realisation of the power of the early Home Learning Environment (HLE) (Siraj et al., 2002).<br>• Development of strong connections and partnerships with parents/carers and how they make every effort to support the HLE (Whalley 2007). | These outcomes should be ongoing. Changes made to pedagogy and practice were discussed and developed in Phase Two. |
| | Implementing relational and intentional pedagogy | • How they trial, practise and refine all classroom educators' knowledge and implementation of relational and intentional pedagogy, supporting high quality interactions between the adults and children and children themselves (Epstein, 2014). | An ongoing outcome discussed in Phase Two. |
| | Trying new approaches to teaching and learning | • Confidence in problem solving, planning for change, trying new approaches and recording results (Dunst, 2015). | An ongoing outcome discussed in Phase Two. |
| | Discussing and reflecting within and outside sessions | • Confidence when discussing and reflecting upon current practice, any new approaches trialled and when deciding on next steps, both within the sessions with other PD participants and within their own classrooms with other educators and administrators etc. who may or may not have attended the sessions (Dunst, 2015).<br>• Confidence in identifying teaching and learning approaches and practices, and identifying how they impact on children's outcomes (Gusky, 2002; Dunst, 2015). | These outcomes should be ongoing. Initial information and signposting was discussed in Phases One and Two. |

### 6.4. Table C. Explanation of the content and processes included in the QIS Study Model

| Aspect | Description of effective PD | Expected Outcomes of PD for participants (primary) and their colleagues in the classroom (secondary). They will show: | Phase |
|---|---|---|---|
| EVALUATING AND REFLECTING | Team work and collaboration in setting | • How they evaluate the effectiveness of the team and how they work together in the classroom to support children's outcomes. Identifying strengths and areas for improvement at the individual, group and systems levels, so that next steps can be planned for (Rodd, 2012).<br>• How they evaluate and support a shared vision for the school team (Gill, 2006) | These outcomes should be ongoing. Information, discussions and reflections in Phases One and Two |
| | Changes made to classroom practices and impact | • Ongoing evaluations of classroom practices in relation to supporting children's socio-emotional and cognitive outcomes, including reflecting upon and evaluating any changes made to practice (this could possibly include the use of video to support and analyse interactions) (Hamre et al., 2012; Dunst, 2015).<br>• The ability to modify plans to support children's thinking while interacting with the children (reflection in action) as well as following activities/ interactions (reflection on action) (Schon, 1983) | These outcomes should be ongoing. Information, discussions and reflections in Phase Two |
| | Individual children's achievements, relationships and dispositions | • Regular assessments of children's achievements, relationships and dispositions and consideration of how the children engage with and relate to what is on offer within the classroom (opportunities, experiences, structured activities etc), using the information to plot children's progress and plan for next steps (Guddemi and Case, 2004). | This outcome should be ongoing. Information, discussions and reflections in Phase Two |
| | Relationships with families and community | • Evaluation and refinements made to connections and partnerships with parents/carers and with local communities (Whalley, 2007). | This outcome should be ongoing. Discussion and reflection in Phase Two |
| | Reflecting and deciding what to do next | • Ensuring that next steps/plans for the future are both evidence-based and linked to research as well as linked to evidence, observed practices and impacts within the classroom (Colwell et al., 2015). | This outcome should be ongoing. Information, discussions and reflections in Phases One and Two |

### 6.5. Summary of the QIS Study PD

As the Figure A and Table C show, the PD was designed to support the educators (primary participants). This was initially to develop their own knowledge and to support them in acting with purpose to ensure that the young children in their care acquired the knowledge, skills and dispositions they needed to be successful in education. In addition to this, educators were supported to work collaboratively with others in their classrooms (secondary participants), sharing their new knowledge and understandings and planning for change together. All of the educators were supported to engage in relational and intentional teaching; developing warm trusting relationships and being intentional, thoughtful and purposeful.

In particular, the QIS PD was designed to extend participants' knowledge of how children learn and develop, their repertoire of different teaching and learning strategies and their specific content knowledge about what the children are learning. It also supported them in understanding the importance of this work and the importance of supporting the early HLE. They were supported through a process of knowing, doing and evaluating and reflecting.

# 7.1. Outline of the PD

In this section the two phases of the study are described.

## 7.2. Phase One

### 7.2.i. Day One (49 Participants):

**Session 1: Effective Relational and Intentional Pedagogy; Evidence from research**. Participants were introduced to international research on quality and effectiveness. Examples of pedagogy and practice that were found to best support children's socio-emotional and cognitive development were shared and discussed. The importance of relational and intentional pedagogy leading to sustained shared thinking was illustrated. Video clips were presented and analysed to show new approaches within the classroom and support understanding.

**Session 2: How ECERS-E and the SSTEW Scale support high quality.** International research using ERS (including ECERS-E and the SSTEW Scales) were discussed. The ECERS-E and the SSTEW Scale's content and use, including their use as tools to support self-assessment and quality improvement, were presented. Video clips were presented and analysed showing new approaches within the classroom and to support understanding.

**Session 3: Developing Leadership for Learning.** Research on effective leadership, including the attributes of leaders of learning, was presented. The process promoted leadership within teams, where support leaders were encouraged to share a focus on learning orientated classrooms. Approaches to engaging in quality improvements were shared and discussed.

**Session 4: Change plans.** A process for change and planning for improvement was introduced. Participants were invited to complete a change plan proforma on the topic of light, in preparation for the next day's session on science.

### 7.2.ii. Day Two (42 Participants)

**Session 1 and 2: Social, emotional and self-regulation development.** Definitions of social, emotional and self-regulation development, together with theories of how they develop, were discussed and analysed. Participants were asked to consider some of the major concepts and challenges they meet when considering this domain of development. Research on effective practice, how educators can support and enhance development, why some children challenge or find making relationships and self-regulation difficult were analysed. Video clips were presented and analysed to support understanding and show new approaches within the classroom. Additional materials were provided, including a self-regulation assessment tool for use in an early childhood setting.

**Session 3: Science in the Early Years.** Discussions around science, its importance and children's natural interests in science were explored. Aspects of science and how they could be supported appropriately in the early years were discussed. There was a particular focus on sharing experiences with children to support the confidence of educators. Additional information was provided in articles given to each participant, with sign-posting, to provide information for future reference.

**Session 4: Quality Improvement, assessment and planning for change.** The assessment planning and evaluation cycle of teaching and learning was introduced. Planning for individuals as well as for groups and the whole class, together with planning for change collaboratively with all educators in the classroom, were discussed. The participants were invited to begin planning for change, including how they would ensure that all educators (including those who had not attended the PD: secondary participants) would occur. They were invited to complete a change plan proforma and to bring it with them for further discussion to the next session: Phase two session 1.

## 7.3. Phase Two

Each three hour half day session included the following: time to reflect on and share progress on change plans and what had been trialled in class; input on a specific domain of learning including support for and enhancement of content knowledge and assessment; an introduction to practical ideas for and time to try out activities, resources and materials related to that domain of learning; links made to relevant items from ECERS-E and the SSTEW Scale; and, finally, reflection time to support joint planning and discussions

around possible applications of new learning and approaches. Each session also included additional information, including appropriate readings for each participant and sign-posting to websites, materials, books and other resources. The ECERS-E and SSTEW scales were referred to in each session as a guide to what was understood to constitute low, medium and high quality practice in each area of the PD content. The last half an hour of session 5 was devoted to completing an evaluative questionnaire (see Appendix D).

Domains of learning and aspects of practice focused on:

**Session 1: Science as a curriculum opportunity (43 participants).** Participants investigated the potential for experiences with science to contribute to higher-order thinking and theorising. The notion of children's interests as the foundation of curriculum was critically discussed with a deeper engagement in children's inquiry processes considered as a way to expand on children's ideas and interests. Pedagogies that supported dispositions of curiosity, confidence and enthusiasm for learning were discussed with a focus on educator talk and questioning. The EYLF Outcomes 4 and 5 were examined for science content and guidance. Participants planned, implemented and evaluated the effectiveness of a science experience for their group of children as a take home task.

**Session 2: Integrating science, maths and literacy (41 participants).** The integrated nature of EC curriculum was discussed using video examples of holistic learning. The importance of language as a tool for communication and thinking was explored with a focus on educator's models of vocabulary and meaningful questions that contribute to sustained shared thinking (SST). This session aimed to develop a consciousness about educator intentionality and the potential of play based learning experiences. Participants planned, implemented and evaluated the effectiveness of an integrated small group experience as the take home task.

**Session 3: Mathematics as a curriculum opportunity (37 participants).** Mathematics was used as a content area to explore pedagogies that support progression of learning and increasing complexity of thinking and theorising. Planning formats that support detailed and intentional teaching strategies were introduced to identify opportunities for scaffolding thinking and learning. The take home task for this week required participants to plan a sequence of play based experiences for a small group of children that provided opportunity for progression of learning using mathematical concepts as the focus.

**Session 4: Supporting and extending language development (36 participants).** Hanen's techniques of Observe, Wait and Listen (OWL) and 3A's - Allow, Adapt and Add were introduced as strategies for promoting sustained shared engagement in play. The potential of high quality picture story books to extend children's conceptual language was examined, particularly in relation to planning for group time language experiences. Each setting critically examined their daily schedule to assess the potential for rich learning opportunities involving a balance of child-led and adult-led experiences. The take home task required participants to plan, implement and evaluate the effectiveness of a group time based on a picture book that identified the potential concepts, vocabulary and links to other areas of the learning environment.

**Session 5: Assessment and documenting learning. Supporting diversity (40 participants).** The final session consolidated learning in each of the PD sessions and responded to participants requests for further input relating to record keeping and assessment. Examination of the requirements of the NQS underpinned this discussion with participants creating draft proformas. Aspects of diversity were examined for their potential to contribute to a culturally relevant and anti-bias curriculum. Participants completed an evaluative PD questionnaire reflecting on their learning and participation in the QIS project.

Care was given to ensure that the QIS PD sessions were standardised and 'captured' by the production of power points with accompanying teaching notes. This was to ensure that the PD could be reliably reproduced in the future. The design of the QIS Study included an intervention and control group and if found to be successful it was considered important that the control group could receive reliable PD of the same content and standard.

# 8.1. Results

The results included three different sets of data and analysis:

First, the inter-rater reliability data which related to the 'gold standard' process that the Observation Team entered into before and during the QIS Study.

Second, the quantitative data gathered during the pre- and post-test. These were developed from observations of the ECERS-E and the SSTEW Scale in the 34 learning environments involved in the QIS Study.

Third, the qualitative data collected via an evaluative questionnaire completed by all participants in the intervention group. This occurred in the last session of Phase Two face-to-face training, together with the information gathered during focus groups completed approximately one year after the beginning of the QIS Study. The focus groups included the intervention group participants and members of the Observation Team.

## 8.2. Inter-rater reliability Data

Establishing a high level of inter-rater or inter-observer reliability is a pre-requisite for research associated with the effective use of observational rating scales such as ECERS-E and the SSTEW Scale. Good levels of agreement rely on a sound training programme for observers with a focus on the detail of the scales and a clear understanding of the rationale for determining ratings and engaging with a standardisation process.

A 'gold standard' process was undertaken, where the observers visited settings other than those in the QIS Study in small groups with someone acting as the 'gold standard'. Percentage agreements on item scores between all of the members of the Observation Team and the 'gold standard' were recorded. Each observer's item scores were considered to be in agreement as long as they were either exactly the same or plus or minus one point of the score given by the 'gold standard'. Intra-Class Correlation (ICC) values were also computed. ICC is a measure that provides an estimate of inter-rater reliability on quantitative data. Percentage agreement was high, with all small groups agreement within the range of 86% to 100%. ICC values varied between 0.787 and 0.996, also indicating a high level of reliability. Appendix E shows the exact scores and percentages and gives further details of the process of reliability followed.

## 8.3. ECERS-E and the SSTEW Scale Results: quantitative data

The quantitative results consisted of the scores the pre-schools achieved on the ERS (ECERS-E and the SSTEW Scale) both pre- and post- test; that is, before and after the delivery of the QIS PD sessions and across the intervention and control groups. The post- observations were made four and a half to five months after the last face-to-face PD session, allowing a short time for the changes to take effect and embed (see Table B: Time-line for the QIS Study).

Below, the results of the ERS (ECERS-E and the SSTEW Scale) are displayed and analysed at whole group, classroom and subscale levels. Further these are linked to the qualitative data in the following section. However, the data needs to be interpreted with caution and the conclusions seen as possibilities for discussion and further analysis rather than conclusive facts. This is because: the sample size was small, with only 16 learning environments included in the intervention group; the time allowed for the PD to take effect was relatively short; there may have been some bias within the Observation Team and, the information gathered about the additional support available to the control group (which may explain their improvements during the QIS Study period) was anecdotal. Finally, it is important to note that further analyses in relation to both the quantitative and qualitative data would be possible but this would be beyond the remit of the QIS study.

### 8.3.i. Consideration at the whole group level:

An overall or total mean score of the ECERS-E and the SSTEW Scale was calculated for each observed learning environment in the intervention and control groups pre- and post- the intervention period, using the following equation:

$$\text{Overall or Total Mean score} = \frac{\text{Sum of scores for each (applicable) item in the scale}}{\text{Number of items scored}}$$

Note: For all scales and subscales, a score of 1 can be interpreted as inadequate, 3 as adequate, 5 as good and 7 as excellent.

Overall scores are presented (below) by control and intervention for the learning environments in Table D.

### 8.3.ii. Table D Means of Total Scores of intervention and control groups of ECERS-E and the SSTEW Scale

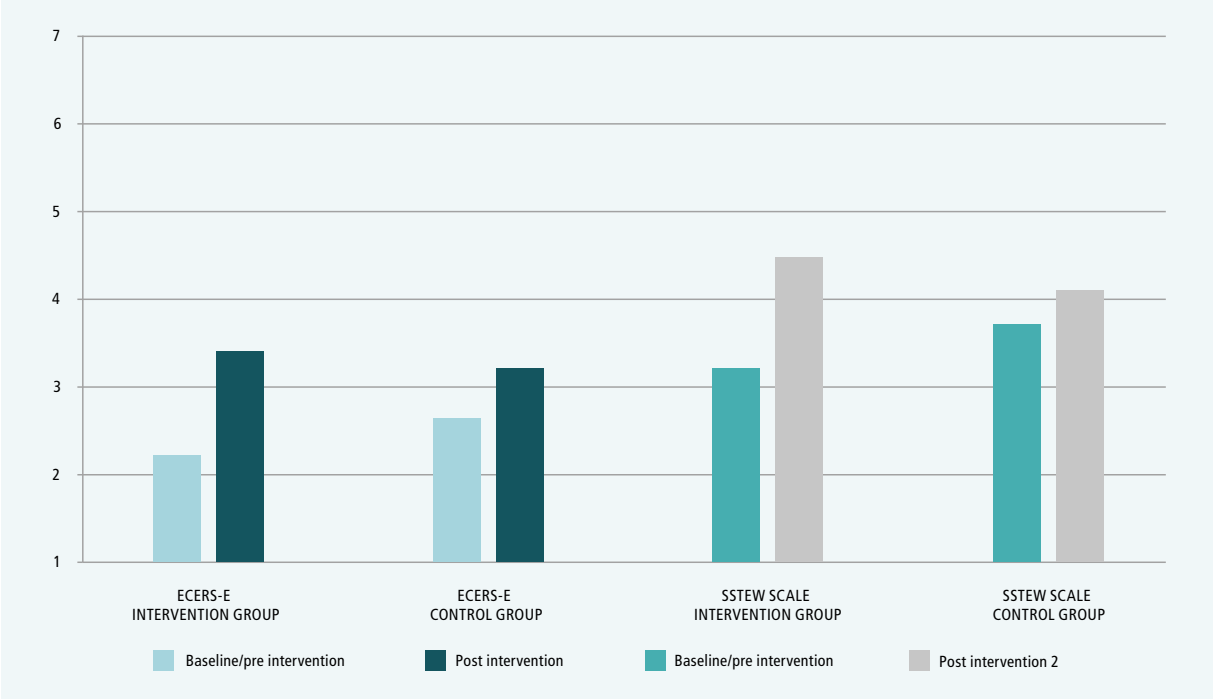
| Scale | Group | Pre-test overall mean | Post-test overall mean | *P* Score = | Significance Level |
|---|---|---|---|---|---|
| ECERS-E | Intervention | 2.2144 | 3.3763 | 0.000 | 0.01 |
| ECERS-E | Control | 2.6483 | 3.2422 | 0.027 | 0.05 |
| SSTEW | Intervention | 3.2187 | 4.5194 | 0.000 | 0.01 |
| SSTEW | Control | 3.6656 | 4.1139 | 0.090 | Not significant |

Table D above shows the overall pre- and post-test means or average scores for the intervention and control groups on ECERS-E and SSTEW Scale. The improvement following the intervention appears to be evident, with the intervention means improving by more than one point on each scale. It is likely that the size of the change is indicative of improvement and real change rather than mere variability of scores occurring over time by chance. However, in order to determine this in a more rigorous and scientific way statistical analyses (related T-Tests) were applied. Such tests look at the differences between the scores achieved in the groups mathematically and calculate the probability of such variations occurring merely due to chance. The resulting probability scores (P score =) can be found on Table D. Traditionally, probabilities of 0.05 or less are considered significant (at the 5% level) and are reported as such in scientific reports. That is, differences significant at p=0.05 or 5% level are likely to occur in only five out of every hundred times by chance. It is important to note that the 5 % level relates to the likelihood of the difference not being a true difference, so that the smaller the p scores the greater the significance and the less the likelihood that differences found are due to chance. So significance at the 1% level suggests that differences, such as those found in the intervention group, are likely to occur in only one out of a hundred times by chance. Some people are confused by the term 'significance' as it is not used in its typical way in statistics; it does not refer to importance but the likelihood of something occurring by chance. When a probability of p=0.01 (at the 1% level) is found it can be described as highly significant. The changes in mean scores on ECERS-E and the SSTEW scale in the intervention group were highly significant, suggesting that the PD had a positive impact on practice in the learning environments.

The picture with the control groups was different. While there was significant improvement in ECERS-E (with the significance at the 5% level rather than the 1% level as with the intervention group) there was no significant change in mean scores on the SSTEW Scale. So while improvement was evident in ECERS-E it was not as large an improvement as in the intervention group suggesting that the PD did support improvement more than the improvement processes that were ongoing (and outside the QIS PD) for the pre-schools. It is interesting to note that many of the control group settings that did improve ECERS-E scores also underwent NQS rating and assessment, receiving intensive and targeted support from the P-2 Initiative Officers involved in the QIS Study. There was no significant improvement in the SSTEW Scale scores in the control group suggesting that the existing quality improvement processes did not significantly support improvement here. These changes are shown graphically in Figure B below. Note an alternative version of this graph can be found in Appendix F.

The SSTEW scale was designed specifically to capture the intentional and relational pedagogy found in learning environments which led to sustained shared thinking. ECERS-E was designed to capture engagement with and opportunities for children and teachers to participate in activities supporting emergent literature, numeracy and science and exploration as well as planning to support individual children's needs.

### 8.3.iii. Figure B: Comparison of Overall Total means/averages of ECERS-E and the SSTEW Scale intervention and control groups

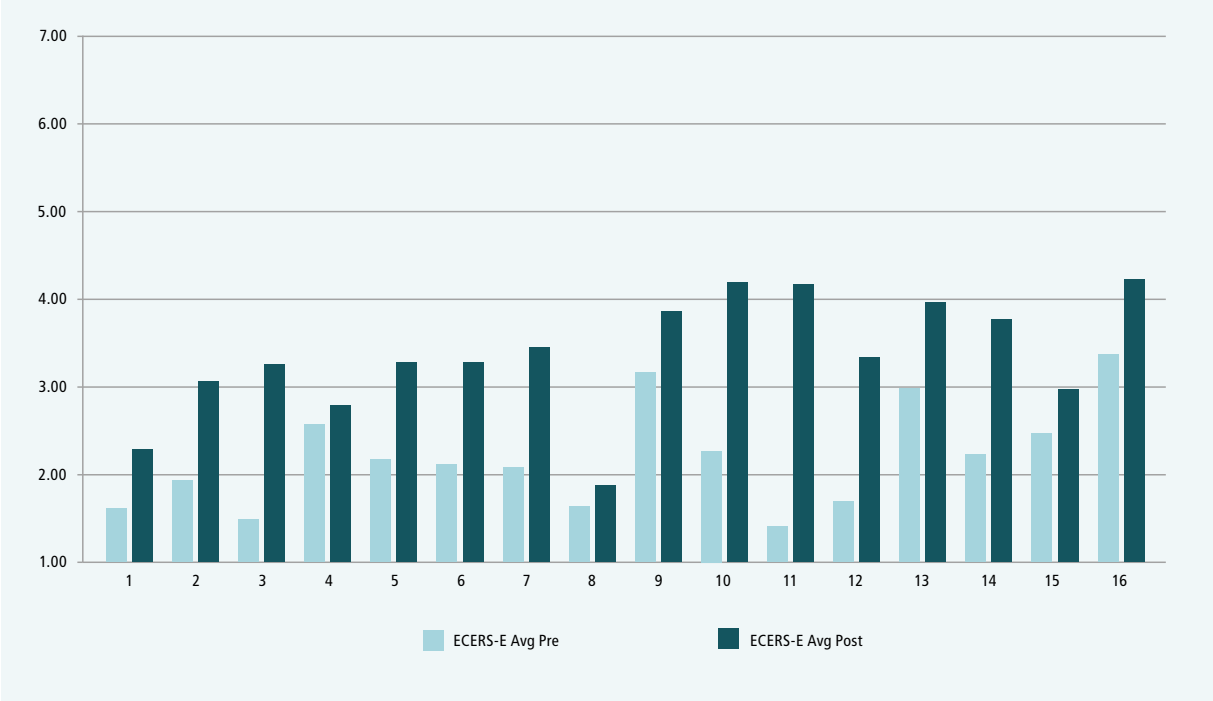



One additional point worth noting was that the intervention and control groups showed different levels of quality at the start of the intervention as well as at the end. At the start of the QIS PD the control group scored significantly higher on ECERS-E (unrelated T-Test significant at the 5% level) which suggested that there might have been some hidden, unintentional bias in the selection of groups.

### 8.3.iv. Consideration at the Individual classrooms level:

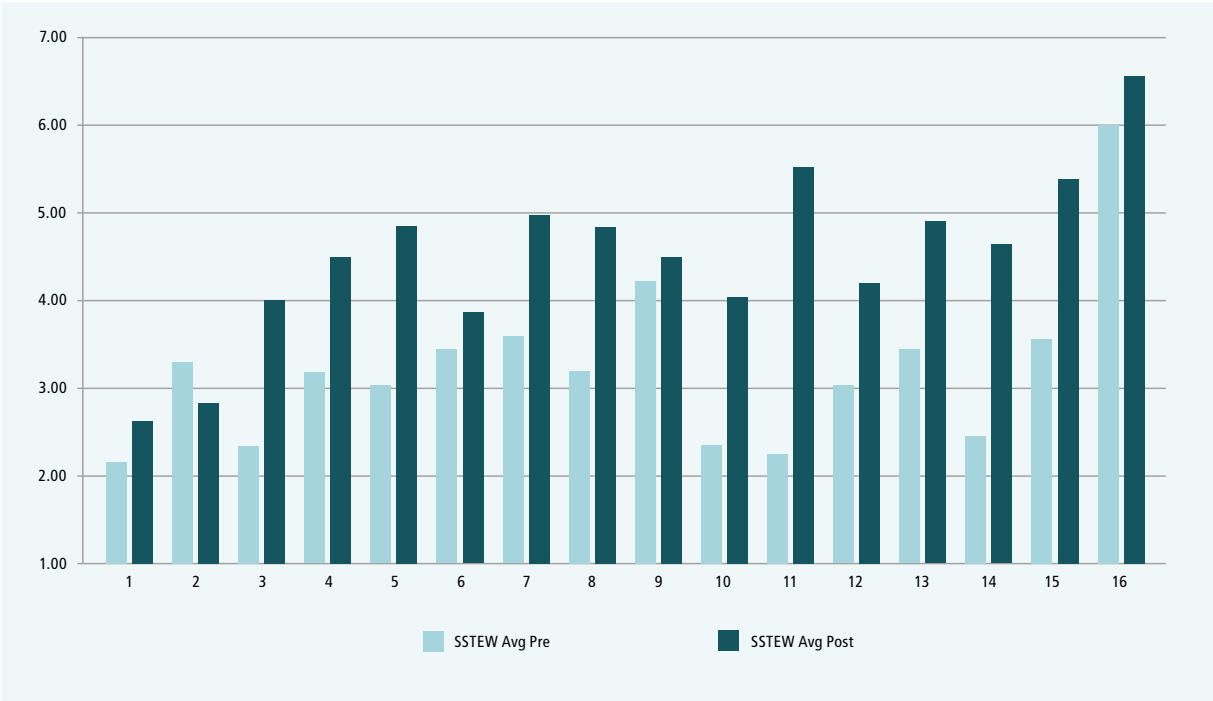
There was a range in quality scores on ECERS-E and the SSTEW Scale across the 16 classrooms who received the QIS PD. Generally, however, prior to the QIS PD the levels were lower than after it, as table D and figures C and D illustrate. Figures C and D below show the differences in total mean/average scores pre- and post- the intervention for each of the 16 intervention classrooms for ECERS-E and the SSTEW Scale consecutively. The pattern of improvement is consistent at the individual classroom level and regardless of starting points.

### 8.3.v. Figure C: Intervention Centres ECERS-E




Only three out of the total of 16 learning environments mean/average scores approached minimal (a score of three) prior to the PD, while 13 scored three or more and six approached or exceeded a score of four following the QIS PD. All classrooms showed increases in scoring.

### 8.3.vi. Figure D: Intervention Centres SSTEW



The total mean/average scores for the intervention learning environments for the SSTEW Scale were slightly higher than for the ECERS-E scores prior to and following the QIS PD. Ten classrooms scored at or above the minimal level of three prior to the intervention. This may reflect the focus on supporting socio-emotional development found within both the SSTEW Scale and the EYLF.

Following the QIS PD, all classrooms except one scored higher on their mean/average score on the SSTEW Scale and 11 scored above four and were approaching a score of good at five. Three learning environments scored above five and one scored above six.

### 8.3.vii. Consideration at the Subscale Level:

A subscale mean/average score of the ECERS-E and the SSTEW Scale was calculated for each observed classroom in the intervention and control classrooms pre- and post- the intervention period, using the following equation:

$$\text{Subscale Mean score for each classroom} = \frac{\text{Sum of scores for each (applicable) item in the subscale}}{\text{Number of items scored}}$$

Subscales (see Appendix A for an outline of the subscales each scale included) mean/average scores of pre- and post- intervention ECERS-E and SSTEW Scale for the intervention group are displayed graphically below (See Figures E, F, G and H).

### 8.3.viii. Figure E: Intervention Classrooms ECERS-E Pre- intervention subscale mean scores

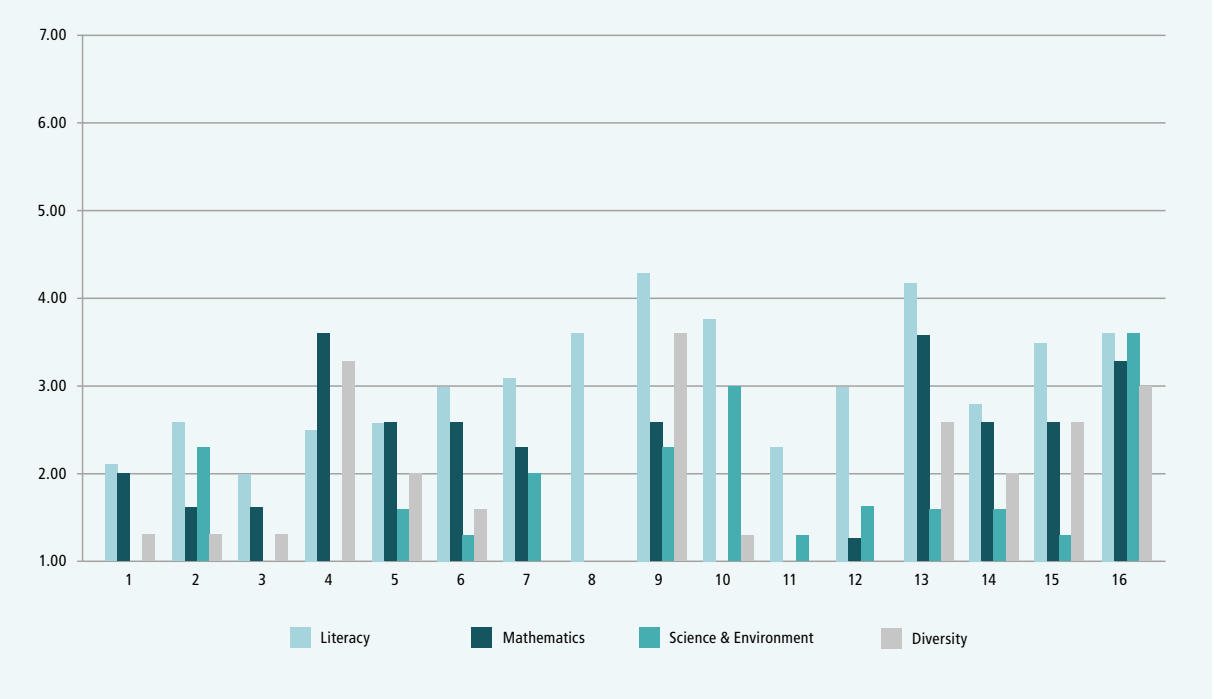
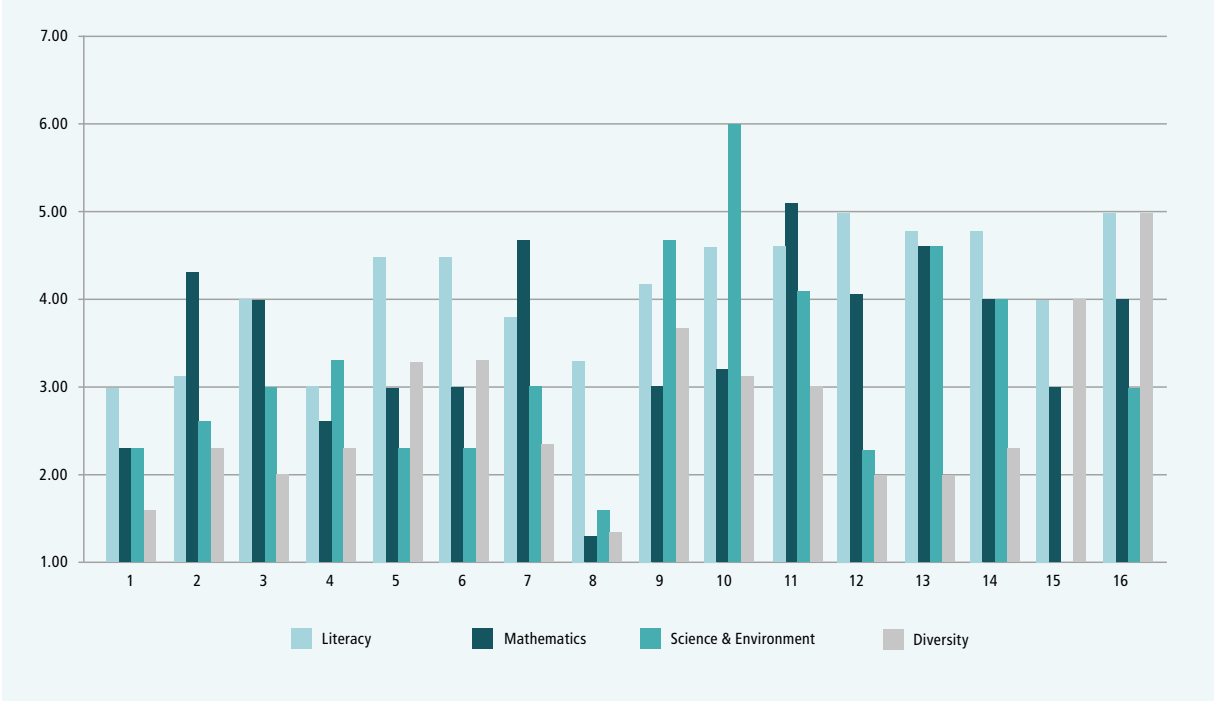



Figure E above shows mean/average scores on the subscales on ECERS-E in the intervention group. They showed similar patterns to those found in other research (e.g. Sylva et al., 2004; Pianta, 2012). Generally, the classrooms' pedagogy and practice was better in relation to literacy than mathematics, science and exploration and diversity. Nine classrooms scored at or above minimal (three) in literacy with none scoring at the inadequate level (one); three classrooms scored at or above minimal in mathematics with three at the inadequate level; two classrooms scored at or above minimal in science and exploration with four scoring at the inadequate level; and three classrooms scored at or above minimal in diversity with four at the inadequate level.

### 8.3.ix. Figure F: Intervention Classrooms ECERS-E Post intervention subscale mean scores




Following the QIS PD generally, the classrooms practice appeared to be more even across literacy, mathematics, science and exploration and diversity. All 16 of the classrooms scored at or above minimal in literacy, with 11 scoring at or above four; eight classrooms scored at or above four in mathematics and none at the inadequate level; nine classrooms scored at or above minimal in science and exploration with one scoring inadequate; and seven classrooms scored at or above minimal in diversity with none at the inadequate level.

### 8.3.x. Figure G: Intervention Classrooms SSTEW Pre intervention subscale mean scores

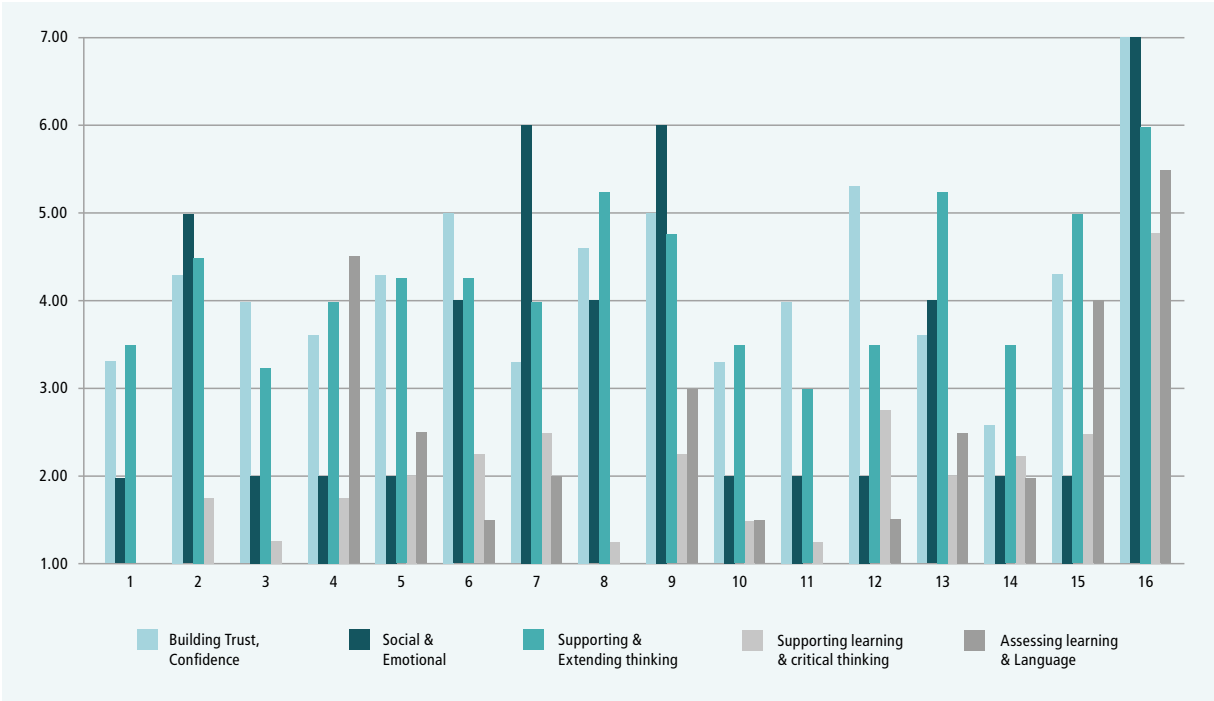


Figure G above shows the scores on the SSTEW Scale for the 16 intervention classrooms prior to having received the intervention: QIS PD. While the SSTEW Scale subscale mean/average scores were generally higher than the ECERS-E scores, the patterns of scores followed similar findings to other research (Siraj-Blatchford et al., 2002; Pianta, 2012). Generally, scores were higher in subscales 1 and 2: Building trust and confidence and Social emotional development and lower in subscales 4 and 5: Supporting learning and critical thinking and Assessing learning and language. In Subscale 4, only one classroom scored above minimal with nine scoring at or below two in supporting learning and critical thinking and four classrooms scored three or above in Assessing learning and language while five scored at the inadequate level.

### 8.3.xi. Figure H: Intervention Classrooms SSTEW Post intervention subscale mean scores

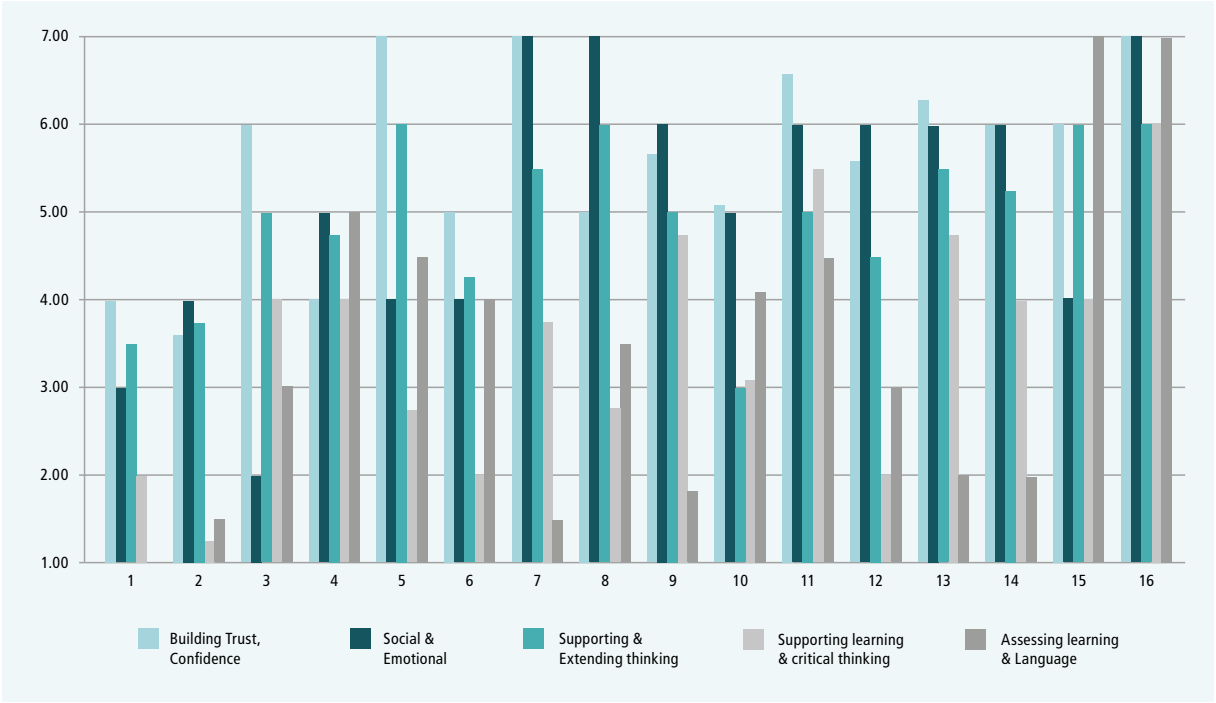



Figure H above shows the mean subscale scores on the SSTEW Scale for the intervention classrooms following the intervention: QIS PD. Improvement was detected across all of the subscales. Thirteen classrooms scored at or above the good level on subscale 1. Ten classrooms scored at or above the good level on subscale 2. While there was improvement in subscale 3 and ten classrooms' practice were at or above the good level (scoring five or more) there were still two classrooms who were supporting and extending language at around the minimal level (three). With regards to Subscale 4, four classrooms showed practice approaching or above good (five) however four classrooms also scored at or below two. Scores for subscale 5 suggested that practice here was still a challenge for many settings with five settings scoring at or below two, however change in practice on this subscale was evident as most classrooms showed improvement and it was also possible to find excellent practice, as two classrooms scored seven.

### 8.3. xii. Average or mean scores of all intervention classrooms at subscale level:

Average or mean scores for each of the subscales of the ECERS-E and the SSTEW Scale were calculated:

$$\frac{\text{Subscale Mean score for each classroom} = \text{Sum of subscale scores for each classroom}}{\text{Number of classrooms}}$$

### 8.3.xiii Table E: Mean or average subscale scores for the intervention group post intervention

| ERS | Subscale | Mean/average subscale score for intervention group |
|---|---|---|
| ECERS-E | 1.Literacy | 4.14 |
| | 2. Mathematics | 3.51 |
| | 3. Science and Exploration | 3.13 |
| | 4. Diversity | 2.72 |
| SSTEW Scale | 1. Building trust, confidence and independence | 5.62 |
| | 2. Social and emotional well-being | 5.12 |
| | 3. Supporting and extending language and communication | 4.90 |
| | 4. Supporting learning and critical thinking | 3.54 |
| | 5. Assessing learning and language | 3.41 |

The mean or average scores of the subscales in the total number of classrooms following the PD showed improvement, and also showed where lower scores occurred. With ECERS-E mean subscale scores, there was still a pattern of reduced scores in mathematics, science and exploration and diversity in comparison to literacy, and none of the means of the subscales achieved good (a score of five). With the SSTEW Scale the scores were generally higher, especially in relation to subscale 1 and 2. However, the mean subscale scores of subscale 3, 4 and 5 were lower and did not meet the good level.

## 8.4. Questionnaire and focus groups: Qualitative Data

The qualitative data included 1) an analysis of an evaluative questionnaire completed by the participants in pre-school groupings at the end of phase two i.e. completed during the last face-to-face session and 2) focus group conversations almost a year after the study began following a debrief session which included a presentation of the findings. These focus groups discussed the impact of the PD on their practice considering both successes and challenges.

There is an example of a questionnaire in Appendix D.

### 8.4.i. Analysis of Questionnaire

A total of 36 questionnaires were completed by 40 educators. Some educators shared their thoughts and gave joint responses. The analysis included a number of iterations in order to select recurrent themes; it explored the more common responses to the questions.

At the personal learning and changes stage of analysis the aspects under discussion were illustrated with extracts from the questionnaire together with approximate numbers of similar comments. This first extract is taken to illustrate the general responses received regarding the PD, which were, on the whole, very positive.

**SLSO:** *this PD has brought to the surface a lot of ideas that I can use in my daily practice… gave me a better perspective and understanding of what my practice should look like and tied a lot of my knowledge together as well as gave me a lot of new knowledge…I understand much better how to relate to children and be a lot more intentional…I have become more aware of my interactions… and have been keeping 'an eye' on myself much more, evaluating and reflecting on activities…making the most of the opportunities, trying to incorporate more language, maths, science into activities intentionally, asking more questions than before to find out what the children know then extending their knowledge individually.*

The data is analysed in relation to

1. personal learning and changes for educators,
2. changes for children,
3. changes for parents/carers/families, and finally
4. an analysis of suggested changes and improvements to the PD.

### 8.4.ii. Personal learning and changes for educators

Table F below illustrates the main themes in relation to personal learning and changes made to practice.

### 8.4.iii. Table F: personal learning and changes for educators together with some example responses extracted from the questionnaires.

**1. Almost 50% of the participants' responses to the Questionnaire when asked about gains made from the QIS PD noted elements of motivation, either for their work and/or for change.**

Example responses:

**SLSO:** These professional learning sessions have been inspiring and I feel more of an educator than a babysitter. Time has gone faster each day and I'm thinking of doing a Master of Teaching (birth to five) degree next year.

**SLSO:** I am more aware of what motivates me and am looking forward to learning more and extending my knowledge

**Teacher:** I have been more motivated to try new things and take more risks

**Teacher:** It has motivated me to challenge myself and my children and know we can extend ourselves every day.

**2. 82% of the responses to the Questionnaire included reference to planning for learning, assessing, evaluating and reflecting upon practice. All of the Principals who attended the training mentioned the value of this approach and 16 out of the 17 teachers discussed the changes they had made to their planning, assessment and evaluation processes. Many also noted the value of the proformas provided during the PD.**

Example responses:

**Assistant Principal:** It's encouraged my team to reflect on Practices… As a result we have developed a 'change plan' as a team to reflect on encouragement vs praise.

**Teacher:** I've changed my programming to more clearly show intent of learning and resources as well as having a bigger focus on open ended questions and reflecting on how to use these more in the classroom.

**Teacher:** Better thoughts for documenting learning has helped fill the gaps in the cycle for planning.

**Instructional Leader:** … this PL [professional learning] has changed the way staff program and is changing questioning techniques.

**SLSO:** The provision of example documentation is also helpful. Definitely an increased motivation to document more meaningful learning experiences…

**3. The majority of responses (over 65%) to the Questionnaire included mention of gains around the domain specific content knowledge (5 teachers and 1 SLSO mentioned improved knowledge in language and literacy; 12 teachers and 3 SLSOs noted improved knowledge in mathematics; and 12 teachers and 3 SLSOs mentioned improved knowledge in science; while 5 teachers and 4 SLSOs mentioned specific changes related to socio-emotional and self-regulation planning).**

Example responses:

**Teacher (re changes made):** …I document…always have intentional purpose …Provide Science, Maths and English learning experiences in the program… O.W.L. Observe. Wait and Listen time. Allowing children the time to answer, respond and test their theories.

**SLSO (re changes made):** the teacher and I have been sharing ideas and expanding on ideas in activities and group times [an example] we've introduced shapes [The teacher] started on street signs and I suggested the feeling box…

**SLSO (re changes made):** …setting small group times for patterns, maths, science and extending language [Examples of questions asked] What's happened to the flower? What makes the colour change? What happens to the salt, sugar etc? What does salt taste like?

**Teacher (re changes made):** It has made me re-evaluate the way I work with the children in terms of planning for learning… I honestly didn't realise that there is so much more intentional teaching to be done in regards to science and maths.

**Teacher (re what made a difference to your practice):** learning about specific scientific and mathematical concepts myself in order to plan, question and enrich children's learning.

**Teacher (re what made a difference to your practice):** motivated to do more science and maths experiences that have greater meaning to the children.

**4. A large number of responses included mention of improved pedagogical knowledge and how to support children's learning and thinking, approximately 60% of responses noting their increased use of open ended questions, 74% mentioned an increase in intentional teaching and pedagogy, and 50% mentioned sustained shared thinking and scaffolding children's learning.**

Example responses:

**Teacher (re changes made):** programming restructure – planning intent in all areas. For example, having intention in book corner/sandpit and having it available for parents and families to see

**Teacher (re what made a difference to your practice):** It has made me more aware of the reasons behind my teaching. It has helped me understand how to make the most of interactions with children through sustained shared conversations.

**Teacher (re changes made):** I am thinking about possible ways to show more intent while writing my program and implementing it to achieve specific outcomes – group and individual…more open ended questioning ….more encouragement (rather than praise e.g. that's great) and specific language about what a child has done so they can get feedback in a more positive meaningful way.

**5. Other responses noted improved collaborative working within schools, between schools and with families (41%). The value of the collaborative learning that took place appeared to be particularly important for those in leadership positions e.g. principals.**

Example responses:

**Principal:** Our preschool team…are now working together as a team We sit down together to plan future learning goals. For the first time, we are reflecting on our teaching practices by discussing evidence collated and how that's impacting on student learning…

And they asked for more on: Planning and programming. Understanding what makes a good program. Looking at different ways/proformas other preschools use that are effective.

**Joint response from Teacher and SLSO:** I feel [names] are looking at the centre as a whole including families and children and incorporating the EYLF in and learning as we go.

And they asked for more on: More sharing of ideas and programming from other centres.

**6. All of the principals and two teachers and two SLSOs (17%) noted the value of their new knowledge about the use of ECERS-E and the SSTEW scale and the research showing the impact of and importance of early childhood education and care.**

Example responses:

**Teacher (responding to what was useful in the PD):** the provision of the ECERS and STTEW scale (SIC) (showing us where we can improve)

**Teacher (responding to what was useful in the PD):** Using the ECERS-E and SSTEW to evaluate my practice and use it to provide direction for improved practice

**Teacher and SLSO from one classroom:** I still feel a little unsure of how to use the SSTEW/ECERS-E for evaluation. Possibly recapping this at the end would be helpful.

**7. 40% of the educators' responses included discussion around changes made to the physical environment. During some of the practical activities provision of materials was discussed and materials and resources were included in the literacy, mathematics and science and exploration subscales of the ECERS-E. However, for many, the changes related to the whole physical environment that is, continuous provision and enhancements that could be made when planning for learning (approximately 30%). The quality of the continuous provision sits in a subscale (Activities) in a different ERS: ECERS-R.**

Example responses:

**SLSO (when asked to describe changes made):** We changed the physical environment so it was more intentional in teaching and learning and the children seem more settled as they had a say in the changes e.g. the literacy area was moved closer to the reading (quieter) area

**Teacher (when asked to describe changes made):** physical environment (indoors)…Changing the physical environment has encouraged the children to be more focussed on their learning and engaged in their experiences

**Teacher (when asked to describe changes made):** I have moved areas around in the environment to include maths and science areas. Added more natural materials.

### 8.4.iv. Changes seen within the children

80% of educators (all of the teachers, 12 SLSOs and one principal), noted changes in the children following their attendance at the QIS PD (See Table I in Appendix G for further details). The changes reported included the children appearing more engaged, asking and answering more questions, showing greater organisation and collaborative learning and showing greater autonomy and self-regulation. Others noted richer use of vocabulary and greater concept knowledge.

It is worth noting that some of the educators noticed that the changes may not be within the children themselves, but instead sit within changes in the educators; that is, changes in their understanding.

Teacher (recognised this possibility): I have noticed they are using more strategies in Math experiences but this may be that I am noticing more.

### 8.4.v. Changes identified for families/ parents/carers.

While 20% of the educators did mention impact on parents, carers and families the majority did not (See Table J in Appendix G for further details). This may reflect the format of the questionnaire rather than actual changes, as responses here were likely to be subdued as no specific place for comments was included in the questionnaire. Those who did share impact talked about greater sharing of children's learning and greater involvement in the classroom with parents/carers.

### 8.4.vi Suggested Changes/improvements to the PD and the Study

Twenty four out of the total 36 questionnaire responses (67%) included some suggestions for change. The remainder either omitted the section of the questionnaire related to this or added a positive comment suggestive of no changes needed (See Table G below for further details).

### 8.4.vii. Table G shows the suggestions for aspects that could be extended, added or changed within the QIS PD, together with the number and percentage of educators who suggested them.

| Aspects that could be extended or added to the PD | Educators who noted the changes: |
|---|---|
| Planning and programming – understanding what makes a good program. Looking at different ways/proformas other pre-schools use that are effective. More on the cycle of planning evaluating and assessment | Teachers four; SLSOs four; Assistant principal; Aboriginal ed officer (28%) |
| Space sessions further apart. Possibly fortnightly. | Teachers three; SLSOs two (14%) |
| Longer/more sessions | Teachers three (8.3%) |
| More on SSTEW and ECERS-E | Teachers three (8.3%) |
| Send info re email beforehand and also electronic versions of formats/proformas | Teachers three; instructional leader (11%) |
| More science and maths | Teachers three (8.3%) |
| More on language development | Teacher one; SLSOs two; Instructional leader (11%) |
| More on executive function-self-regulation and developing intrinsic motivation | SLSO one (2.7%) |
| Literacy based play and how this promotes learning prior to school and in early years of school | P-2 Initiatives Officer (2.7%) |
| More on open ended questions – looking at what makes a question open-ended? How can you form open ended questions | SLSO one; P-2 Initiatives Officer (5.5%) |
| More on intentional teaching | SLSO one (2.7%) |
| Research around children from non-english speaking background | Teacher one (2.7%) |
| Transition to school strategies to fully prepare children/families for school for 13 years is all about | Teachers two; SLSO one (8.3%) |
| Sometimes our professionalism was judged negatively and as long term teachers, felt we were being taught as first years students – lesson plan, group plan, change plan. More specific content on A & R and preparing us for this important task. What about the checklists they completed prior to transition? | Teacher one (2.7%) |

A small percentage of educators suggested that more time was needed to embed changes and others suggested that the PD should be offered to all pre-school classes and also to infant and kindergarten staff (see Table K Appendix G for further details)

## 8.5. Analysis of Focus Group discussions

During a meeting almost one year after the beginning of the QIS Study where the quantitative results of the Study were shared with the intervention group, the educators, in their classroom and service groups, were asked to reflect on their experiences during and following the PD. They were asked to consider what was important in the PD and also to itemise any changes they made as a result of the PD, including any challenges that occurred. They were also asked whether they were continuing to use/engage with any of the aspects of change they had initiated. Finally, they were asked to suggest changes or recommendations for policy makers and give tips to the control group who had just begun the QIS PD. They were divided into seven groups.

### 8.5.i. Aspects of practice reported as changed following the PD

8.5.ii. Table H below shows the most common themes discussed within the groups together with their percentage of occurrence.

### 8.5.ii. Table H

| Aspects of Practice | Percentage of occurrence in group discussions |
|---|---|
| Use of open ended questioning and focus on SST | 88% |
| Use of intentional teaching (some groups mentioned particular domains of focus: self-regulation 50%; mathematics 50%; science 38%; language and literacy 38%) | 88% |
| Use of the SSTEW Scale and ECERS-E (with a small number suggesting a greater focus here would have been useful) | 63% |
| Assessment/planning/programming; using action plans/change plans | 88% |
| The development of team work/collaboration: all staff attend PD; more time needed in centre to reflect i.e. regular staff meetings needed and more time between sessions; also need for individual as well as joint goals from planning as some individuals 'held others back' | 88% |
| Changes in the physical environment such as the development of centres of interest for mathematics, science and literacy. Also changes in routines to support learning including arrangements around adult breaks and patterns of children's attendance. | 75% |

Most responses also suggested that the changes that were made during and following the QIS PD were still on going and valued. In relation to policy development one group suggested that future PD should allow for teams of educators to attend together as this led to greater cohesion, team work and change. They also suggested that regular team meetings within the centres were invaluable to reflect upon and plan for change and improvement. Interestingly, the centres where the principals attended all of the QIS PD also made sure that time for staff meetings, discussion and reflection were timetabled for all educators.

The list of suggestions that the intervention group gave for the control group are included in Appendix G.

# 9.1. Conclusions

The QIS Study, although relatively small scale, incorporated a number of different elements into its PD design and delivery. It included a process of knowing, doing and evaluating and reflecting. This supported not only new knowledge (Knowing) (in content areas such as how to support SST and how to support and extend children's interests and knowledge in emergent mathematics and science) but the opportunity to practice new approaches and techniques (Doing) and then guided opportunities to evaluate and reflect on them in continuous cycles (Evaluating and Reflecting). It introduced the educators to knowledge that would support pedagogy and practice in the classroom but also to a quality improvement process which should allow for continued and sustainable growth and improvement over time. Increasingly, research in PD in ECEC is suggesting that both are necessary for improvement to occur (Sheriden et al., 2009; Arbour et al., 2015). The results (both quantitative and qualitative) suggested that the QIS PD impacted positively on the pedagogy and practice of the educators within the targeted classrooms. This was despite some recognised challenges, including a biased sample of classrooms chosen for the intervention group, a relatively short period of training and a very short time for new learning approaches and practices to embed before reassessment occurred.

The quantitative results at the whole group and classroom levels gave information about the size and directions of change together with impact relative to initial quality scores. The range of initial quality of the intervention classrooms, suggested that the PD supported improvements across the full range of quality. Classrooms with very low initial scores, as well as those with high scores, showed improvements. The improvements also straddled both the ECERS-E which considered curricula knowledge and pedagogy and practice supporting diversity and the SSTEW Scale which looked particularly at relational and intentional pedagogy, including the educators' involvement with and support for adult-child and child-child interactions leading to sustained shared thinking. These interesting findings suggest that the QIS Study Model worked well and supported improvement. The process of quality improvement including the choices of changes made, and adoption of new approaches and practices, was the result of collaborative discussions, reflections and evaluations made at the classroom level. The focus of the QIS Study Model, where the educators took ownership and led the learning for themselves and their colleagues, as well as for their children, appeared to be sufficiently flexible to support change and improvement across the range of quality found within the classrooms.

The quantitative results at subscale level (see Figures F and H and Table E) across both the ECERS-E and the SSTEW Scale were particularly useful when considering impact. They gave insight into where the improvements occurred and also some indication where further work, PD and support might be necessary. There is not a recognised level of practice, and associated score, that ECEC centres, including pre-schools as in the QIS Study, should achieve in relation to ERS to ensure support for children's outcomes. However, it seems appropriate that all centres should achieve a rating of good or more (scoring five or above) if they are to support children's learning and development, especially if they are attempting to reduce the 'achievement gap' with children who are deemed at risk. As the QIS Study classrooms were all sampled from areas of disadvantage, further improvement should be sought across most subscales. Interestingly, the qualitative feedback mirrored the quantitative feedback, suggesting that there was positive change but still further change was required and seen as desirable by the participants.

The average or mean subscale scores (see Table E) achieved on ECERS-E suggested the need for improvement across all of the curricular subscales as well as aspects of practice linked to supporting diversity, including planning for and supporting children with additional needs. With the SSTEW scale, generally the levels of achievement in subscales 1 and 2 were good; however, the pedagogy and practice captured in subscales 3, 4 and 5, in particular, appeared to warrant some further attention.

The results from both ERS were complementary with each other. So, for example, the scores on subscale 3 suggested that the educators in some classrooms would benefit from a further focus on supporting knowledge, understanding and practice regarding language development. Language development is not only fundamental to learning within early childhood provision, it is also necessary and underpins literacy learning

(subscale one on ECERS-E). Scores on subscale 4 of the SSTEW Scale were also suggestive of the need for further support. This finding mirrored the lower scores found on the curricula aspects of the ECERS-E scale. In subscale 4 of the SSTEW Scale, two items looked specifically at how literacy and mathematics and investigation activities were used to support and extend thinking. The items within this subscale required the educators to have an in depth content knowledge (which was measured in ECERS-E) so that they could draw upon it to support and extend children's questioning and curiosity and ultimately their thinking. The scores for subscale 5 Assessing learning and language corroborated this finding. Assessment and planning require a good understanding of content knowledge including how to support and extend language, emergent literacy, mathematics and science and exploration. Further, it is interesting to note that the ECERS-E diversity subscale (which included planning to support different groups and individuals) and the SSTEW Scale Assessing learning and language both received the lowest mean subscale scores within their scale. This is a finding that is common in research considering effective practice (see Kyriakides et al., 2009).

The areas indicated that require further focus were also noted in the qualitative feedback from the educators. (see Table G), aspects that could be added/extended. Table G shows the suggestions the educators made for PD that would support them further in their quality improvement journeys. However, it is important to note that further improvement may occur even without additional PD over time, especially if the educators continue to develop their knowledge, understanding and practice. The QIS PD included links to further information and a large number of new materials, approaches and practices which may take time to trial and embed. If the educators continue to use the QIS Study Model as a guide, including some of the planning for change documents provided, these should support continued, collaborative planning for change and improvement. The educators themselves reported ongoing engagement with the changes they had initiated during the QIS Study during the focus group discussions and they also suggested that they required additional time for the practice to become embeded (see Table K Appendix G for these suggested changes to QIS Study).

Further analysis of the qualitative feedback suggested differences in the responses themselves and how they were written, many responses were articulate and well written, while a few were suggestive of educators with literacy difficulties. This is likely to be linked to the range of educators and their associated qualifications included in the QIS Study (qualified graduate teachers and SLSOs who may only have certificate III qualifications). Staffs with diverse qualifications, with some showing literacy difficulties, are unfortunately not uncommon in the ECEC sector (see Siraj and Kingston, 2015). This may warrant further discussion beyond the impact on future PD sessions such as this. Consideration needs to be given to whether the solution lies in simplifying this PD, ensuring there are some PD sessions which are staff level specific (supporting basic skills for example) and/or looking more closely at recruitment requirements for educators. This is particularly important, given the difference high quality ECEC settings (and well qualified educators) can make to young children's short and long term outcomes (see sections 2.1 and 2.2.).

It is also important to note the diversity in changes and improvements made during and following the QIS PD as these may reflect the range of quality within the group. While all centres made changes and the quantitative results suggested improvements, their starting points were very different. Where some settings made changes at the interactional and SST Level (aspects of the emotional and cognitive environments) others made more fundamental changes at the physical environment level. Some settings needed to make basic changes around routines and classroom layout while others reconsidered their roles in children's learning increasing interactions and becoming more intentional in supporting children's learning. While each classroom team was encouraged to make changes based on their own perceived needs of their classrooms, educators and children, the resulting differences may usefully inform future quality improvement strategies. It is suggestive that some of the pre-schools would have benefitted from some more basic support around the quality of their physical environments. For some settings, an introduction to Early Childhood Environment Rating Scale-Revised (ECERS-R), as well as ECERS-E and the SSTEW Scale, may have supported their goals better. ECERS-E and the SSTEW Scale are designed to build upon and extend on ECERS-R. ECERS-R is the oldest ERS and looks at global quality including continuous provision, accessibility and availability of resources and routines amongst other aspects. For those who made structural changes to their classrooms and timetables this may have been a useful framework (Note: it may be worth noting that ECERS-R has recently been revised and replaced by ECERS-3).

# 10.1. Future considerations for DoE pre-schools

The QIS Study results and conclusions were based on group data and analysis of short term changes in pedagogy and practice and the findings reflected this. They can be used to plan group responses such as planning for general approaches to improvement and for PD offered to groups of classrooms in the short term. Indeed, the educators themselves suggested in their responses to the questionnaire and during their focus group discussions what would be useful for them in the future (see table G). However, over time and possibly as a result of educators continuing to engage with the QIS Study Model of improvement priorities may change. Staff changes, knowledge fading over time and/or further new developments in understanding effective ECEC practice may also impact on priorities for DoE. Keeping up to date with the evidence base and with requirements as expressed by the educators would be important aspects of any future plan for improvement. It is possible, that the educators may identity further aspects of Knowing (see QIS Study Model) which could be supported through additional PD, especially if they continue to engage with the quality improvement process outlined in the QIS PD and use this to inform their Quality Improvement Plan (QIP) for the NQS. In the meantime, the ECERS-E and SSTEW Scale group results supply some tangible information on content knowledge requirements and where additional PD may focus initially: building on and extending the QIS PD in the curricula areas and diversity subscale included in the ECERS-E and in the intentional pedagogy included in subscales 3, 4 and 5 in the SSTEW Scale.

The scores on the ECERS-E and SSTEW Scale can be interpreted either for group purposes, as within this Study, or individually. Individual, direct feedback of scores within pre-school was beyond the remit of the QIS Study, as identification of individual classrooms was considered unethical. The research included the identification of patterns and themes across the group and improving group practice. However, similar data (ECERS-E and SSTEW Scale observational ratings) could be used as part of an audit process which includes individual feedback to individual pre-schools in the future (see Mathers et al., 2012). If used in this individual way analysis of the results and engagement with each group of educators in their individual classrooms would be likely to support greater refinement and relevance of next steps in each classroom's improvement process. It would also support greater objectivity in choice of areas for change and monitoring of improvement, as audits, like research, are typically conducted by personnel from outside the setting, who have undergone an inter-rater reliability process.

Support for development plans at the classroom level was initially thought to be part of the QIS Study. While no individual ERS scores were shared, it was thought that the P-2 Initiatives Officers may have been able to support educators in developing their improvement plans, working in their classrooms with them as coaches and mentors. The areas that the pre-schools concentrated on were self-chosen and the P-2 Initiatives Officers would have been able to support this process and also support and evaluate any changes in practice. However, their existing remits including the size and breadth of their roles was clearly at times prohibitive. This was a missed opportunity, as new research is showing how powerful coaching and observations within the classrooms can be, not only to support practice and change but also to check for the fidelity and dosage of any changes made (See Tout et al., 2015).

While working with individual classrooms using ERS as audit tools allows for specific and individual feedback to support planning, it is also time consuming and needs to be handled carefully to ensure ownership of the quality improvement process remains with the educators, there is a shared understanding of the scoring and confidentiality is guaranteed. It is also worth noting that if ERS are used solely as audit tools, followed by individual classroom feedback, the element of group participation and the possibility of collaboration and networking across centres and schools may be lost. Such cross school/centre working was one of the QIS Study's aims, as networks are associated with the sustainability of systemic quality improvement (see OECD, 2006; Cordingly and Temperley, 2005).

In summary, the group results suggested that the educators had developed their skills and practice across both relational and intentional aspects of pedagogy which was a focus of the QIS Study PD. In the intervention classrooms, both the quantitative and qualitative data suggested that the educators were providing enhanced physical and emotional environments and beginning to engage more with the cognitive environment. However, the cognitive aspects of pedagogy and practice (supporting children's thinking, learning

and concept development) still appeared to be the weakest and could be enhanced further in many of the classrooms. It is possible that intentionally supporting children's learning and thinking may develop over time with the enhanced relational and physical environments underpinning and supporting this.

The consistently lower scores on subscales which reflected the pedagogy and practice associated with supporting children's cognitive development may reflect the large shift in emphasis and practice, that many educators reported necessary, to engage with children's learning and development in the ways the QIS Study PD promoted. While the educators reported that they were convinced by the importance of high quality interactions designed to support children's thinking they recognised the complexity of this. They needed time to learn, practice and master the new approaches, and put their new content knowledge and assessment and evaluation skills to work. All of which were necessary if the goal was to intentionally support all children's learning and development (Hamre et al., 2012). They needed time to change the culture within the classroom, so that all educators and children expected, valued and respected questioning, persistence, curiosity, scaffolding of learning and sustained shared thinking across all of the domains of learning (including language, emergent literacy, mathematics, science and exploration, respect for diversity and social-emotional development and self-regulation). It could also be that they were used to emphasising the requirements of the EYLF which are often perceived as being dispositional and communication orientated and the shift in focus to cognition needed more time. The EYLF makes it clear that it is a framework and not the complete curriculum and pedagogical guide to ECEC.

It must be noted that some potential improvements resulting from the QIS Study may have been masked by the very short time between the QIS Study PD finishing and the final post-intervention observations. This may have limited the changes and improvements that were possible in the time given. Again this was noted by the educators themselves in their feedback (see Tables G and K). Recent research considering PD studies suggests that time is required for educators to embed and become familiar with new approaches and practices and to reach mastery (see Sheriden et al., 2009). If the QIS PD had been extended (and some studies are suggesting the need for one or even two years of input) bigger improvements may have been possible.

The evidence-based PD developed for the QIS Study and the potential for improvement when educators follow it appears to be promising. While the model was new to the DoE pre-schools, it reflected both our work and understandings as well as that of noted colleagues in the field of PD. The focus on intentional teaching and supporting high quality interactions together with the use of the unique QIS Study Model recognised both the need for the development of new knowledge yet also fully acknowledged that knowledge alone was unlikely to result in improvement. It suggested a move away from traditional more static, stand-alone informational sessions of PD and towards the acquisition of knowledge which is linked to practice and is experiential in nature. It highlighted the interconnected nature of knowing, doing and evaluating and reflecting as integral to change and introduced a set of tools (ERS) that can be used for self-assessment and become part of a continuous quality improvement process.

### 10.2. Policy Implications

1. There is potential to build on the existing requirement for the Quality Improvement Plan (QIP) under the NQF to include more specific detail relating to curriculum and pedagogic knowledge and skills. Teachers and school executive might be encouraged to include specific plans for improvements to content knowledge, pedagogies that support Sustained Shared Thinking (SST) and opportunities for children's higher-order thinking as part of their plans for Quality Areas 1 and 5. This would benefit from the use of ERS as audit and self-reflective tools.

2. The P-2 Initiatives Officers could provide more specific mentoring and coaching as part of their remit and responsibilities to the pre-schools. The opportunities for P-2 Initiatives Officers to build Communities of Practice (CoP) and provide networked, sustained focus on early childhood curriculum and pedagogies could be an invaluable and readily available strategy for ensuring the on-going benefits captured by this PD.

3. P-2 Initiatives Officers should continue to receive high-level professional development and support through the Early Learning Directorate to extend their current focus of support to pre-schools.

4. The P-2 Initiatives Officers would benefit from direction from the central office, locality differences mean pre-schools get differential support.

5. Regular use of ECERS-E and the SSTEW Scale in the QIS Study centres and beyond to see if improvements in practice continue over time. This will also assist in identifying areas of future PD need and provide point-in-time information as staff of the pre-schools turnover or take leave.

6. Based on the effectiveness of this study, consider extending the methodology and PD model to all DoE pre-schools. The significant gains made by the Intervention settings (even given the short time frame) suggest that there is benefit to all pre-school staff being exposed to this learning and consequently to children's learning.

7. As Authorised Officers and Educational Leaders there is a need for school principals to be up-to-date and informed about the findings of this study and the possibilities for future planning to support their pre-schools. An abridged version of the PD might be presented to school principals and executive staff responsible for the pre-schools to ensure that fundamental early childhood pedagogic practices underpin future plans and support for each pre-school. Feedback from principals and executive staff who attended the PD sessions suggests that opportunities for executive and pre-school staff to work together on agreed foundations for pre-school pedagogy are valuable.

8. Continue to offer educators support for using the EYLF to improve the focus of their curriculum, pedagogy and assessment. The responses of a number of participants indicate that they would benefit from more focussed work on planning and assessing children's learning and the related documentation of these curriculum decisions.

9. Findings from the study suggest potential for a re-visioning of the way that future PD is offered to DoE pre-school staff. The effects of educators deeply engaging in a cycle of knowledge, doing and reflecting suggests that sustained engagement in knowledge creation and time to practice and self-evaluate has resulted in significant improvement in teaching knowledge and practice. In addition, the attendance of both Teachers and SLSOs at the PD together, created opportunities for shared visions and sustained conversations about curriculum and pedagogy. The majority felt that the opportunity to work together on shared projects for change was beneficial and more likely to result in sustained improvement.

10. Given the feedback from participants that they benefited from learning from each other and the importance of networks of learning for sustaining improvements, The DoE might consider extending network possibilities outside of the Department's own pre-schools. Broader learning and exposure to a wider range of models of early childhood provision may enhance the learning for DoE pre-school educators. Combined sessions with other nearby licensed services may also offer the opportunity for more local collaborative projects and peer support.

11. Ensure that the enthusiasm and vibrancy that participants have expressed about their learning from this project is captured and maintained. Ensure that all educators have up to date information on new research and developments in ECEC.

12. Consider the basic learning needs of different individuals/groups of educators and offer appropriate support (e.g. with literacy)

13. Further micro-analysis of each element of the ECERS-E and SSTEW results may form a valuable source of information about more specific and intense focus for future PD. For example, a more fine-grained analysis of elements relating to assessment for learning and the provisions for curriculum addressing diversity will provide insight into two areas where the results indicate the pre-schools would likely benefit from further PD.

14. If the ERS become recognised DoE auditing tools, plan to ensure all centres are aware of this and inter-rater reliability is robust over time and also plan to extend their use to self-assessment by all DoE centres. Also ensure there are staff members who can work as mentors with the classrooms and give feedback on ERS results to individual classrooms and time to plan for change.

15. Support continued collaborative working within centre classroom/pre-school teams by giving guidance to schools on expectations for this, including the length, frequency and timing of staff meetings and by providing frameworks for planning for change and improvements.

16. When developing PD for centres consider inviting all educators (or at least a critical mass of educators) within the pre-school classrooms to support collaborative working and change back in the centre.

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# Appendix A

### Quality measures: the pre and post-test measures used: quantitative data

As discussed earlier, the instruments that were used to assess the quality of the pre-school classrooms were the widely used Early Childhood Environment Rating Scale (ERS) – Extension (ECERS-E) (Sylva et al., 2003) and the new Sustained Shared Thinking and Emotional Well-Being (SSTEW) Scale (Siraj, Kingston, & Melhuish, 2015). These ERS were chosen as they are known to support objectivity when assessing ECEC environments and practices.

Structure of the Environment Ratings Scales:

### Early Childhood Environment Rating Scale – Extension (ECERS-E) (Sylva, Siraj-Blatchford & Taggart, 2003).

In the UK, results of the Effective Provision of Pre-school Education (EPPSE) project generated this early childhood environment rating scale which was focused on the more educational aspects of provision and provision for diversity (Sylva, Siraj-Blatchford & Taggart, 2010). The ECERS-E was devised after wide consultation with experts and piloted extensively, and has been found to be predictive of child cognitive and social outcomes. The ECERS-E is based on a conceptual framework that takes account of pedagogical processes and curriculum.

The ECERS-E consists of 15 items, divided into 4 subscales (see Appendix A for a sample item):

1. Literacy (Items 1-6), which is comprised of print in the environment, book and literacy areas, adult reading with children, sounds in words, emergent writing/mark making and talking and listening;
2. Mathematics (Items 7-9), which is comprised of counting and the application of counting, reading and representing simple numbers, shape, as well as sorting, matching and comparing;
3. Science and Environment (Items 10-12), which is comprised of natural materials, areas featuring science/science materials, science activities (non-living), science activities (living) and science activities (food preparation); and,
4. Diversity (Items 13-15), which is comprised of planning for individual learning needs, gender equality and awareness and race equality and awareness.

### Sustained Shared Thinking and Emotional Well-being (SSTEW) Scale (Siraj, Kingston & Melhuish 2015).

Recent research indicated that the older ERS did not necessarily cover all the domains now recognised to be important for children's development. Therefore, during a qualitative study of outlier centres, which were highly effective in both quality and outcomes in the EPPSE study (Siraj-Blatchford et al., 2002; 2003), several other critical dimensions were identified, such as self-regulation and the importance of quality interactions, including sustained, shared thinking (Siraj & Asani, 2015). Hence, the SSTEW Scale was developed by Siraj, Kingston and Melhuish in 2015.

The SSTEW Scale brings together different dimensions of the early childhood education environment to consider practice that supports children aged 2 to 5 in developing skills in sustained shared thinking and emotional wellbeing (SSTEW). The scale consists of 14 items, divided into the following 5 subscales (see Appendix B for a sample item):

1. Building trust, confidence and independence (Items 1-3), which is comprised of self-regulation and social development, encouraging choices and independent play and planning for small group and individual interactions/adult deployment;
2. Social and emotional well-being (Item 4), which is comprised of supporting socio-emotional wellbeing;
3. Supporting and extending language and communication (Items 5-8), which is comprised of encouraging children to talk with others, staff actively listen to children and encourage children to listen, staff support children's language use and sensitive responsiveness;
4. Supporting learning and critical thinking (Items 9-12), which is comprised of supporting curiosity and problem solving, encouraging sustained, shared thinking during storytelling,

sharing books, singing and rhymes, encouraging sustained, shared thinking in investigation and exploration and supporting children's concept development and higher-order thinking.

5. Assessing learning and language (Items 13-14), which is comprised of using assessment to support and extend learning and critical thinking and assessing language development.

While there are important differences in development over the 2-5 years the scale covers, there are common pedagogical practices that will support and nurture them. Observers using the SSTEW Scale are supported to take account of individual, cultural and developmental differences across the age range through a series of illustrations and discussions of young children's potential levels of ability and responses across aspects of social-emotional and cognitive development. These are linked to children's play, examples, supplementary information, indicators outlining possible practice and discussions regarding how adults might support and extend children's learning and thinking.

### Scoring of the Environment Ratings Scales:

Both scales have been designed with a common scoring framework to facilitate ease of use and clarity of scoring across scales. Each item is rated on a 7-point scale (1 = inadequate, 3 = minimal/adequate, 5 = good, 7 = excellent). Then subscale scores are computed as the mean of item scores for that subscale. An overall score is similarly computed across subscales. The inter-rater reliability for these various environmental rating scales were in the

# Appendix B

### Sample items from ECERS-E

| Inadequate 1 | | 2 | Minimal 3 | 4 | Good 3 | 6 | Excellent 7 |
|---|---|---|---|---|---|---|---|
| **1. Natural Materials** | | | | | | | |
| Y N | 1.1 There is little access inside the centre to natural materials (ex. plants, rocks, pebbles, fir cones) | Y N | 3.1 Some natural materials are available and are accessible to the children indoors. | Y N | 5.1 Natural materials are used beyond decoration to illustrate specific concepts (ex. growth – planting seeds or bulbs) | Y N | 7.1 Children are encouraged to identify and explore a wide range of natural phenomena in their environment outside the centre and talk about/describe them. |
| | | Y N | 3.2 Natural materials are accessible outdoors e.g plants. | Y N | 5.2 Through regular activities children are encouraged to explore the characteristics of natural materials (ex. things that are smooth or rough) | Y N | 7.2 Children are encouraged to bring natural objects into the centre. |
| | | | | Y N | 5.3 Adults show appreciation, curiosity and respect for nature when with children (ex. curiosity and interest rather than fear and disgust about fungi, insects, worms etc) | Y N | 7.3 Children are encouraged to make close observations of natural objects and/or draw them. |

# Appendix C

## Sample item from the SSTEW Scale

### Sub-scale 3. Supporting and extending language and communication

| Item 6. Staff actively listen to children and encourage children to listen | | | | | | |
|---|---|---|---|---|---|---|
| **Inadequate 1** | **2** | **Minimal 3** | **4** | **Good 3** | **6** | **Excellent 7** |
| 1.1 Staff stifle communication by e.g. being judgemental or by humiliating, ignoring or belittling the children. | | 3.1 Children's verbal messages are understood | | 5.1 Staff position themselves at the children's height when talking or listening to them. | | 7.1 Staff allow long pauses, so the children have time to think and respond. They also show how they allow different lengths of pauses with different children. |
| 1.2 Requests for help are ignored (*whether the requests be direct or indirect e.g. crying, withdrawal, inactivity*) | | 3.2 Staff respond to verbal and non-verbal signs from children. | | 5.2 Rephrasing and/ or repeating is used to check that the children have been understood. | | 7.2 Staff encourage the children to talk and listen to each other by suggesting they tell another person. Or by inviting other children to come and listen to what another child has to say or show. |
| | | 3.3 Staff body language shows that they want to communicate (*open arms, inclined head, smiles, waiting and listening*) | | 5.3 Where meaning or speech is unclear, staff make an 'educated guess' rather than asking the child to constantly repeat her/himself. Then, if they have guessed wrongly, staff take the blame for it. | | |

## Examples and supplementary information

**5.3** If not seen, ask Questions: How do you manage children with unclear speech? What do you do if you really do not understand what they are saying?

**7.1** If not seen, ask Question: How do you and other staff ensure that children have enough time to think before responding to questions?

**7.2** Examples may be encouraging children to show and talk about models, paintings, resources, props, ideas, collaborate in play etc with each other. For younger children, the talk may be limited to labelling what they show while older children might explain processes and engage in positive evaluations.

# Appendix D

## Questionnaire given to educators at the end of Phase Two

| Evaluation of Professional Learning | |
|---|---|
| Name of school: | |
| Name of educators and designation/position in school: (please also indicate how many and which sessions were attended including the two days intensive training and the five half days) | |
| What aspects of the professional development have you found most valuable and why? Please give examples to illustrate your answers. | |
| What change(s) has the professional development made for you? Consider, for example, your learning, motivation, planning, knowledge. Please give examples. | |
| Describe any change(s) you have made to your practice since participating in the professional development. Please explain and give examples. | |
| Describe any impact of the changes you made to practice for you, other staff, the children and/or families. Please explain and give examples. | |
| Considering all educators separately, are the changes you have made/felt different and/or dependant on your designation/position within the classroom/school? Please explain and give examples. | |
| Are there any improvements to the professional development sessions that you would recommend? Please give examples. | |
| Are there areas of content that you would like more information about? Please explain. | |
| What aspects of the professional development have you found least useful and why? Please give examples. | |
| Describe any changes you have noticed in the children you work with since attending the professional development. Please give examples and explain what made these changes. | |
| Please provide feedback on the location and format of the sessions – i.e 2 full days followed by 5 x 3hr sessions in work time. | |
| How useful have you found the change plan format in contributing to making changes at your preschool? Please suggest any changes that would be useful. | |
| Please comment on how useful you feel these sessions would be for other educators working in DEC schools? | |
| Anything else you would like to share with us | |

# Appendix E

## Further Inter-rater reliability information

In the QIS Study, training was lead by Professor Iram Siraj (co-author of ECERS-E and SSTEW) and Ms Denise Kingston (co-author of SSTEW). The observers, all DoE P-2 Initiatives Officers, were trained on the two observational instruments at either one or another of two training programmes held at University of Wollongong (UOW): one in October 2014 and the other held in February 2015. Each programme provided intensive training on the observational instruments over the course of five days and included a reliability exercise.

A researcher for whom high levels of inter-rater reliability had already been established acted as the 'gold standard' for the reliability exercise. Four DoE pre-schools in the region, not included in the current research project, were selected for the exercise and two to three observers and the 'gold standard' observed and rated over the course of a whole day. At the end of the day the observers who had independently scored the ECERS-E and SSTEW compared their scores on the same observations with the 'gold standard'. Reliability was then established for the two instruments in the four pre-schools. This process was repeated before the pre and post intervention observations were made.

The reliability for each small group of observers was computed as follows:

a) Each rater/observer score was calculated as a percentage based on the number of items rated within plus or minus one of the 'gold standard' item scores (% agreement, plus or minus one).

b) An Intra-Class Correlation (ICC) value was computed. ICC is a measure that provides an estimate of inter-rater reliability on quantitative data.

The reliability figures broken down by ECERS-E and SSTEW for the four groups are presented below.

### ECERS-E reliability 1 (before first observation i.e. baseline/pre intervention)

| ERS | % agreement plus or minus one | ICC |
|---|---|---|
| Group 1 | 93.33% | 0.982 |
| Group 2 | 86.66% | 0.982 |
| Group 3 | 80% | 0.953 |
| Group 4 | 80% | 0.976 |

### SSTEW reliability 1 (before first observation i.e. baseline/pre intervention)

| | | |
|---|---|---|
| Group 1 | 100% | 0.994 |
| Group 2 | 100% | 0.996 |
| Group 3 | 92.85% | 0.966 |
| Group 4 | 100% | 0.992 |

### ECERS-E reliability 2 (before post intervention observations)

| | | |
|---|---|---|
| Group 1 | 100 | 0.968 |
| Group 2 | 100 | 0.787 |
| Group 3 | 100 | 0.950 |
| Group 4 | 92.3 | 0.914 |

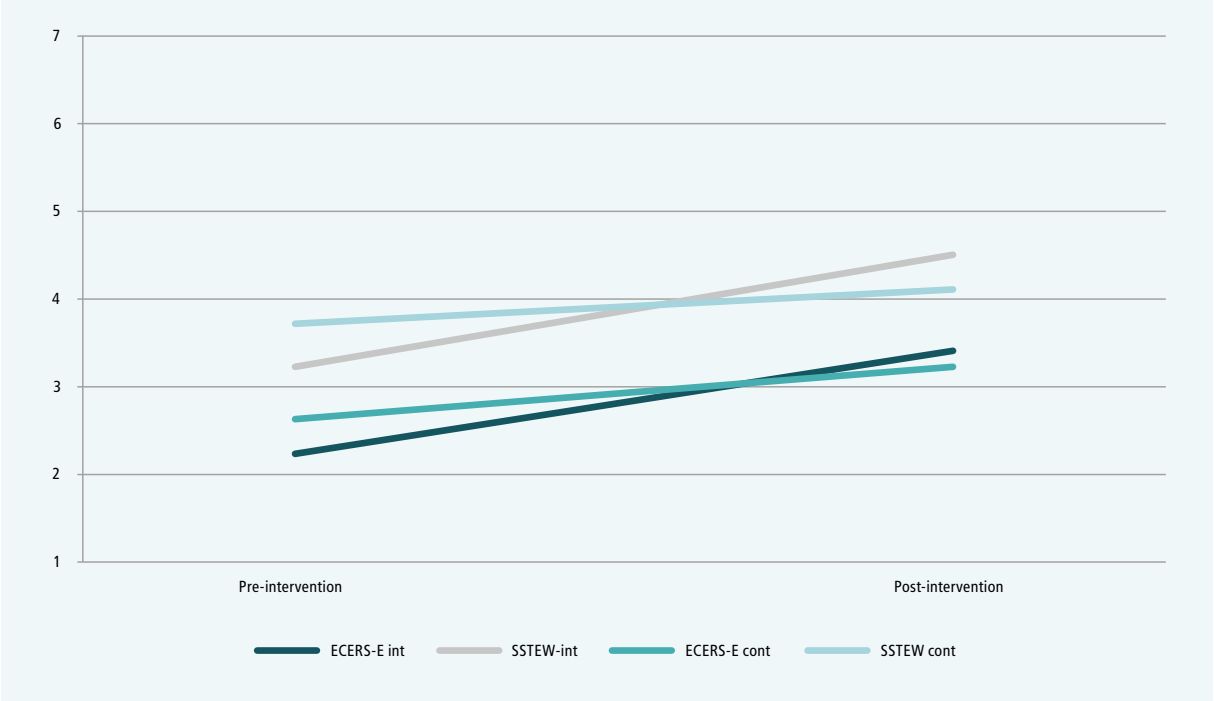
### SSTEW reliability 2 (before post intervention observations)

| | | |
|---|---|---|
| Group 1 | 97.6 | 0.971 |
| Group 2 | 85.7 | 0.879 |
| Group 3 | 89.3 | 0.793 |
| Group 4 | 100 | 0.990 |

ICC values varied between 0.787 and 0.996, indicating a high level of reliability.

# Appendix F

## Figure B: Comparison of Overall total means/averages of ECERS-E and the SSTEW Scale intervention and control groups



# Appendix G

## Further Qualitative data

### Table I below includes excerpts from responses to the Questionnaire relating to children's learning together with details of who and how many educators wrote something similar

| Changes noticed within the children | Educators who noted the changes: |
|---|---|
| Children appear more engaged | Teachers five; SLSO three; principal one |
| Children answer more questions, more thoughtfully. Conversations more sustained | Teachers four; SLSO one |
| Children taking more risks | SLSO one |
| Children organising their day and planning their experiences more | SLSO one |
| Children thinking deeper about their learning | Teachers five; SLSO one |
| Language richer. Eg: One child to another: 'Look at the pistil, leaves and buds' | Teachers three; SLSO one; principal one |
| Improved self-regulation and behaviour of children | Teachers two; SLSO two |
| Children involved in more inquiry based experiences where they find answers for themselves/develop theories for themselves | Teacher one; SLSO one |
| Children engage with and listen to each other more | Teacher one |
| Children more relaxed as there doesn't have to be a right answer; Children aware we are looking for different answers not necessarily the right ones | SLSOs three |
| Children were not used to being asked open ended questions and needed time and smaller groups in order to respond | Teacher one |
| Children appear to have more knowledge of concepts but could be due better focus here | Teachers two |

One teacher and SLSO noted negative effects on the group of children who consistently 'lost' their teacher and SLSO due to attendance at the half day sessions. They found that the children did not settle well or respond to the educators in the same way as the children who did not lose them. While this was a small minority of educators it could potentially inform future designs for the PD and so is added here.

### Table J: Impact/changes noted for parents/carers/families

| Impact/changes for parents/carers/families | Educators who noted the changes: |
|---|---|
| We share more amazing moments/children's learning with families/involve them further in the service | Teachers four |
| Having greater intentionality supports discussions with families/parents | Teacher One |
| Children and families see I am more comfortable with setting goals | SLSO one |
| We shared ideas from the PD with parents, especially those who felt it disrupted their children's days | Teacher one |

### Table K shows the suggested changes to the QIS Study itself, including reach

| Suggested Changes to the QIS Study | Educators who noted the changes: |
|---|---|
| Allow more time for the changes to embed | Teachers two; SLSO one; Principal (11%) |
| Extend the reach of the PD to all ECEC centres | SLSO one (2.7%) |
| Extend PD for infants and kindergarten staff | Teacher one (2.7%) |

# Appendix H

### List of suggestions for the control group as they begin the QIS PD

- Excellent to video ourselves, hard to do but worth it
- Use the SSTEW and ECERS-E
- Approach with an open mind, make sure whole team is involved
- Important to write it down – a protocol/policy
- Open to it, absorb it have fun for it
- Allow time for discussion and reflection.