Evaluation of the Early Childhood Education Information and Communication Technology Professional Learning Programme

FINAL REPORT
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Glossary of Terms

Word	Abbreviation	Explanation
Assessment		The process of obtaining and interpreting information on children's learning and development by observing, recording, and documenting what children do and how they do it.
Community of learners		A community made up of children, families, whānau, teachers and others who have common learning goals.
Cluster group		A number of centres in one geographical area clustered together for joint workshops/ seminars with facilitator support back in their centres.
Cyber safety		Refers to the safe and responsible use of the Internet and ICT equipment.
Digital divide		Differences in ICT access and capabilities in society.
Early childhood education	ECE	Sector description
Facilitator		A person employed to facilitate the professional learning programme.
Hui		A gathering together of people for discussion, or to socialise
Information and communication technologies	ICT	The items of equipment (hardware) and computer programmes (software) that allow us to access, retrieve, store, organise, manipulate, share and present information electronically.
Lead teacher		Key people within each service responsible for maintaining the ongoing momentum of the ICT programme.
Milestones		Reports on the work planned and undertaken during a specific time period. It identifies possible barriers to success.
Pedagogy		The strategies and approaches teachers can use to engage students in learning.
Philosophies		Shared understanding and beliefs to which the ECE service is aspiring.
Portfolios		(Also called a profile) a collection of observations that form a profile documenting a child's learning over time.

Word	Abbreviation	Explanation
Professional development	PD	Post qualification ‘training’ opportunities
Reflection		Making sense of past experiences in order to understand future experiences.
Self review		Review is the deliberate process of gathering data to inform future improvements.
Teacher		Title of person working with children in ECE setting, used interchangeably with educator or practitioners.
ULearn		A conference facilitated by CORE that focuses on integrating new technologies to empower learning and inform leadership.
Visual literacy		The ability to interpret and make meaning form information presented in the form of an image.
Workshop		Maybe on-site or off-site. Generally they consist of interactive experiences to engage teachers in exploring learning.

Several of these definitions have been sourced from the references below as they are what are currently used in ECE.

Cherrington, S., & Wansbrough, D. (2007). *An evaluation of Ministry of Education funded early childhood education professional development programmes*. Wellington: Victoria University of Wellington.

Ministry of Education. (2005). *Foundations for discovery ICT: Supporting learning in early childhood education through information and communication technologies: A framework for development*. Wellington: Learning Media.

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Executive Summary

The Early Childhood Education Information and Communication Technology Professional Learning Programme (ECE ICT PLP) is a three-year pilot professional development programme established in 2006. The overarching goal of the ECE ICT PL Programme is increased teacher capability (with particular emphasis on ICT capability) that leads to transformation and the development of a community of practice; which, in turn, contributes to enhanced learning outcomes for children.

The goal leads to three outcomes for the ECE ICT PL Programme:

i. increased ICT capability
ii. transformation of pedagogical practice (linked to ICT) that leads to an enhanced community of practice
iii. enhanced learning outcomes for children.

The purpose of the evaluation was to assess whether and how the design and implementation of the ECE ICT PL Programme was meeting the intended outcomes of the programme, mid-way through the pilot.

The evaluation focused on the following questions:

1. Does the ECE ICT PL Programme design, content and implementation by services achieve the intended outcomes of the programme?
    a. How successful are clusters in achieving the programme outcomes?
    b. How useful is action research as a tool to accomplish the intended outcomes of the programme?
    c. Will the programme lead to sustainable and sound ICT pedagogy?

2. To what extent are the ECE ICT PL Programme's design, content and implementation by the services useful across all types of ECE services?

3. What are the emerging barriers and enablers that may make the difference between successful and unsuccessful implementation and outcomes?

The evaluation methodology included a review of the literature; development of an evaluation matrix; document analysis of milestone reports; internet survey of participating teachers; telephone interviews with the provider national coordinator and facilitators; and development of a case study involving six participating services.

Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?

The ECE ICT PL programme is a complex mix of delivery components which the National Coordinator and facilitators deliver in a highly individualised and flexible manner. Participants in the programme have increased capability in terms of using ICT. Teachers are using ICT for a range of purposes. Teachers' confidence in using ICT, both for personal use and for teaching and learning, has increased over the first half of the programme. There has been a substantial increase in teachers' technological pedagogical content knowledge and significant shifts in teachers' use of ICT "with or by children" across a range of indicators. Changes in teacher attitudes towards the use of ICT in early childhood education, and about the level of access that children should have to ICT equipment are apparent.

Almost all participants have gained knowledge about cyber-safety as a result of participating in the programme. Progress in adopting cyber-safe practices has been variable, with management involvement in establishing and implementing cyber-safety policies and practices a key factor in whether progress is made.

Teachers appear to avoid working with children on computers with pre-loaded educational software despite their presence in ECE centres indicating that teachers believe such software has a role to play in the ECE programme. It is important teachers develop the ICT skills and pedagogy necessary for the successful integration of these resources into the programme of learning and we suggest that the ECE ICT PL programme support teachers to be able to critique such software packages and to consider pedagogical practices that will support children where these are available in the service.

Participants are using ICTs to engage in reflective practice and to form links and collaborate with the community (both within and beyond the ECE service community. The use of ICT is supporting continuity for children between home and ECE service.

Teachers have increased the range of ICT that they are using or have started to use these in innovative ways to support their pedagogical practices. There is some evidence of evaluation and critique of the use of ICT within the programme but much of this occurs in an informal manner. There is room for further development of teachers' abilities to engage in critique of ICTs over the final year of the programme.

The data around teachers' perceptions of children's equitable use of ICT equipment showed concerning patterns. This issue needs to be explored with participants during the remainder of the programme, and support given to services on how they might more actively gather data to identify trends and then develop effective strategies for responding to these trends.

The evaluation collected significant, rich examples that clearly demonstrate that children are highly capable and competent in using ICT equipment to support their learning and to communicate with others. Similarly, there were numerous examples of where children are actively taking on the role of expert with other children and with adults. These results show very positive trends (e.g., just how competent children can be in using a range of ICTs and the potential that ICTs have for fostering complexity in learning).

Children's transitions into, within, and from the early childhood services have been strengthened through the use of ICT. Teachers in the programme are starting to advocate on ICT matters with their local schools and involve them with their ICT activities. Teachers report an increase in parental involvement in their children's learning.

How successful are clusters in achieving the programme outcomes?

The clusters are an effective professional development model, *in some contexts*. Where services are able to easily come together for components such as workshops and hui, where facilitators are able to conduct the visit component flexibly to meet the service's needs, and where there is a reasonable degree of homogeneity between the participating services, then the cluster model is effective in broadening teachers' perspectives, providing support and networking opportunities, and developing communities of practice. However, where factors such as the geographical spread of services exist then the model is severely compromised and participant teachers do not enjoy the full benefits of an effective cluster group.

How useful is action research as a tool to accomplish the intended outcomes of the programme?

A mixed picture emerged from the data about the usefulness of action research as a tool to achieve the intended outcomes for the programme, at this stage of the programme's implementation. A complex set of factors impact on the ability of teams to engage in and utilise action research in a meaningful and effective way. It is not the quality of professional development that is impacting on the rate of progress. Rather, the complexity of both the ECE ICT PL programme and its interface with factors external to the programme impacts on the degree to which action research is able to be a useful tool. Both services and teachers need to be robust in order to manage the demands of the programme within the current early childhood context of policy changes and sectoral development.

Will the programme lead to sustainable and sound ICT pedagogy?

The high staff turnover in services indicated through the provider surveys suggest that it will be challenging for individual services to sustain sound ICT pedagogical practices without robust strategic planning and induction processes in place. Lead Teachers are confident that their services will be able to maintain sound ICT practices after the completion of the programme but also identified the need for on-going professional support to assist their service to sustain the progress that they make through the programme.

The development of service strategic plans has been a useful accountability device that has demanded commitment from both management and from teaching staff. However, issues around inadequate equipment; developing on-going funding streams; and insurance costs for equipment will continue to impact on the sustainability of ICT pedagogy.

To what extent are the ECE ICT PL programme's design, content and implementation by the services useful across all types of ECE services?

Aspects that impact on the usefulness of the ECE ICT PL programme across all ECE service types were identified. Most critically, being able to sustain momentum within this complex, intense programme requires a robust service and team committed to the programme and strong enough to cope with the intensity of the programme alongside the array of external factors that may potentially impact on the programme's implementation in their service.

What are the emerging barriers and enablers that may make the difference between successful and unsuccessful implementation and outcomes?

The barriers most frequently identified by participants and facilitators are time, staff workloads, staffing changes, difficulties in accessing qualified relievers, and inadequate management support. The extremely high rate of staff turnover in participating services is very concerning. Several barriers reflect the specific nature of the programme – difficulties with old or unavailable equipment; accessing funding for equipment; lack of ICT skills and knowledge; the accountability requirements of the programme; no or limited internet access; lack of technical support; and, the environmental set up in the ECE services.

The governance and resourcing demands of services effectively using ICTs for both administrative and teaching purposes requires that management are "on board" in terms of developing and implementing policies and strategic planning, and that they are committed to the on-going financial resourcing.

Overwhelmingly, the key programme enabler identified by participants was the assistance and motivation provided by their facilitator. The mix of other programme components enabled participants to find a match with their own preferred delivery modes. The higher level, and flexible use, of funding available for this programme was an important enabler.

A number of internal factors are also highlighted as enablers, highlighting the importance of robust, reflective teams who can sustain their own motivation. The identification of these enablers supports the suggestion that, if the programme were to be rolled out, that the model is an effective one for services with strong internal factors.

Chapter One: Introduction

Background to this evaluation

The Early Childhood Education Information and Communication Technology Professional Learning Programme (ECE ICT PLP) is a three-year pilot professional development programme established in 2006 and delivered by CORE Education Ltd. Entry into the programme was open to licensed and chartered early childhood education services, and at the time of the evaluation fifty-nine services in six regional clusters were enrolled in the programme. The ECE services comprise thirty-three kindergartens, twenty-three education and care centres, one hospital-based service and one playcentre.

Underpinning the ECE ICT PLP is the Ministry of Education's (MOE) ICT framework, *Foundations for Discovery* (2005), which outlines the principles for the implementation and strategic focus areas for the use of ICT within early childhood education for government, educators, parents, families and communities. Four focus areas for the implementation of Foundations for Discovery have been identified by the MOE, including increasing the professional capability of teachers. The ECE ICT PLP is designed to address this focus area.

The overarching goal of the ECE ICT PL Programme is increased teacher capability (with particular emphasis on ICT capability) that leads to transformation and the development of a community of practice; which, in turn, contributes to enhanced learning outcomes for children.

The goal leads to three outcomes for the ECE ICT PL Programme:

i. increased ICT capability
ii. transformation of pedagogical practice (linked to ICT) that leads to an enhanced community of practice
iii. enhanced learning outcomes for children.

Evaluation focus and questions

The purpose of the evaluation was to assess whether and how the design and implementation of the ECE ICT PL Programme was meeting the intended outcomes of the programme, mid-way through the pilot. It is intended that the evaluation will inform decisions on the ECE ICT PL Programme post-2009.

The evaluation focused on the following questions:

1. Does the ECE ICT PL Programme design, content and implementation by services achieve the intended outcomes of the programme?
    a. How successful are clusters in achieving the programme outcomes?
    b. How useful is action research as a tool to accomplish the intended outcomes of the programme?
    c. Will the programme lead to sustainable and sound ICT pedagogy?

2. To what extent are the ECE ICT PL Programme's design, content and implementation by the services useful across all types of ECE services?

3. What are the emerging barriers and enablers that may make the difference between successful and unsuccessful implementation and outcomes?

Organisation of the report

A multi-method approach to the evaluation allowed for different data sources to be employed. This allowed for triangulation to increase the likely validity and reliability of the findings. An on-line survey of the participants in the ECE ICT PLP, telephone interviews with the National Coordinator and facilitators of the programme, and a case study involving one centre from each of the six cluster groups were undertaken. In addition, a comprehensive analysis was undertaken of the provider milestone reports and the baseline and midpoint surveys of teacher capability and service capacity completed by the provider.

Chapter Two provides an extensive review of the literature undertaken to inform the design of the evaluation and the data analysis and discussion. Chapter Three describes the evaluation methodology used for this project. The document analysis is presented in Chapter Four. The results of the internet survey and telephone interviews are presented in Chapter Five, whilst the case study, involving six services enrolled in the programme is presented in Chapter Six. The final chapter discusses the key findings and draws together key themes and conclusions arising from the data analysis.

Chapter Two: Literature Review

> Technology is a creative, purposeful activity aimed at meeting needs and opportunities through the development of products, systems, or environments**.**
>
> (Technology in New Zealand curriculum document, 1995, p. 5)

The implications of information and communication technology (ICT) for early childhood pedagogy started to raise discussion in scholarly early childhood literature during the 1980s (e.g., Donahue, Borgh & Dickson, 1987; Fein, 1986; Hill, 1985). A key debate of this decade was the desirability or otherwise of introducing computers in early childhood settings. Variable opinions on this debate continued to be expressed throughout the 1990s (e.g., Elkind, 1996; Gerzog & Haugland, 1999; Shade, 1996) alongside a call for professional development (PD) initiatives focused on ICT (e.g., Dockett, Perry & Nanlohy, 1999; Shade, 1996; Visser, 2000; Wright, 1998). More recently, a consensus has emerged around the potential of ICT to enhance children's development and learning (e.g., Anderson et al., 2007; Brown, 2006; Clements, 1999; deWacht, 2004; Edwards, 2005a, 2005b) with Edwards (2005b) noting that the debate around the use of computers in early childhood settings has been replaced by the realisation that computers play a significant role in children's everyday life, a point acknowledged also in Bolstad's (2004) literature review on the role and potential of ICT in early childhood education. Zevenbergen (2007) has gone a step further referring to young children as "digital natives" (p.19) whose worlds are heavily influenced by technologies. She argues that children now live in a "digital habitus" that has its own "particular ways of seeing and acting in the world" (p. 20) and that this has implications for early childhood practice.

This chapter provides an overview of literature relevant to the questions addressed in this evaluation. In particular it seeks to provide research-based answers to the following questions:

1. What factors increase teacher capability in ICT?
2. What organisational support do teachers need to increase, and sustain, increased ICT capability and sound ICT pedagogy?
3. How useful is an action research model in PD?
4. What creates a community of practice generally, and around ICT specifically?
5. What transforms pedagogical practice in ICT? What works from the learners' perspective? What sustains the transformation?
6. What are the perceived outcomes for children of enhanced teacher capability in ICT?
7. What are the barriers and enablers for different services? What varies across services?

These questions were formulated from the focus of each of the four levels of the evaluation framework used in this project and adapted from Guskey's model (2000, 2002), namely:

Level one: focus on participant learning, and in particular, increased ICT capability (Literature review question 1)

Level two: focus on organisational support for change, in particular, the process and implementation of the PD programme (Literature review question 2, 3 and 4)

Level three: focus on participants' use of new knowledge and skills, in particular the transformation of their professional pedagogical practice and the sustainability of the transformed practice/new learning (Literature review question 5)

Level four: focus on student learning outcomes, in particular outcomes for children including parental perspectives, and on any unexpected negative outcomes (Literature review questions 6 and 7).

This literature review is structured around the four levels of this evaluation and the questions relevant to each level.

Level One: Focus on participant learning and increased ICT capability

Literature Review Question 1: What factors increase teacher capability in ICT?

Studies that throw light on how early childhood teachers' learning and capability in ICT may be increased emphasise that the use of ICT is embedded within an educational and philosophical context (e.g., Bailey & Weippert, 1991; Dockett, Perry & Nanlohy, 1999; Patterson, 2004). It is impacted by assumptions about the effectiveness and possibilities of ICT, as well as by teachers' knowledge and skills (e.g., Anderson, Rooney & Vincent, 2007; Fleer, 1993; McLeod, 1999; Moss & Pence, 1994; Visser, 2000).

This argument is sometimes framed in the terminology of discourse theory, with the state of ICT pedagogy being attributed to dominant discourses within a given context, including cultural practices. One example of an early childhood study within this framework is Anderson, Rooney and Vincent's (2007) small collaborative action research project, conducted by the first author with two student teachers in two New Zealand infant and toddler centres. The project investigated how and whether ICT could be used with very young children; it concluded that the use of ICT was "shaped by the discourses that develop in educational settings" (p. 12) and reflected the assumptions held by the teachers about what they could achieve with ICT when working with very young children. By 'discourse', the authors mean all "the saying/doing/thinking that takes place each day in our conversations and relationships" which contribute to "our understandings of how the 'world' functions and should function" (p. 12). In this study, the two student teachers started out with different attitudes towards the use of ICT in their centres: One was initially very sceptical and the other was very positive about ICT as a resource. The study reported that for both students and centres, a change occurred through the student teachers' actual *engagement* with the ICT equipment. For example, the use of a laptop for presentations led to the teachers wanting to engage more with the equipment.

Reporting on research and intervention with 14 New Zealand primary school teachers over a three-year period, Moreland, Jones and Chambers (2001) similarly noted that it was important for teachers to engage with the technology, and its knowledge base, if they were to promote technological literacy and to teach it effectively. Moreland et al. aimed to enhance primary school teachers' ability to provide formative feedback on students' technological practices; they elaborated in detail on the nature of the necessary knowledge base explaining that it relates to conceptual understanding of relevant technological concepts and procedures; procedural knowledge that enables one to know how to do something, what to do and when to do it; societal knowledge or knowledge about how technology relates to groups of people; and technical skills that relate to practical techniques (see also Jones, 1997, cited in Moreland et al. on p. 16). The authors concluded that in order to enhance and sustain learning in technology, there needs to be a focus on teacher knowledge of specific and detailed technological learning outcomes, alongside appropriate pedagogical approaches.

Researching in the Australian state of Victoria, Edwards (2005b) used pre-piloted interviews to examine the views of twelve early childhood teachers on what influences computer use in early years settings. Edwards reported that the teachers identified nine factors as important with the four most important factors being:

1. the need for educators to have operational knowledge of the computer
2. the need to select software appropriate to the children's learning and developmental needs
3. the need for children and educators to have access to current and reliable technology
4. the need to actively consider where (and why) the computer would be located in the classroom.

The other five factors that teachers discussed were:

5. the need to teach children how to use the computer and its associated peripherals (e.g., scanners and /or digital cameras)
6. supporting children to work collaboratively when using the computer
7. considering the educational or intended purpose in using the computer in the context of the broader curriculum
8. assisting children to share and/or take turns in using the computer
9. ensuring that children have the necessary fine motor skills to operate the computer effectively.

Edwards (2005b) concluded that her findings, with their particular focus on teachers' own perceptions of their use of ICT in early childhood settings, were in line with those of other international ones (e.g., Filipenko & Rolfsen, 1999; Judge, Puckett & Cabuk, 2004; Sandberg, 2002 cited in Edwards, p. 12) where the effective use of ICT in early years settings was found to depend on a range of factors and the way those factors interacted in any one setting.

Patterson (2004) too emphasized that teachers' capability with ICT is impacted by multiple factors. This New Zealand study involved observations of sixty-four children and six teachers over a five-day period in one early childhood centre, interviews with the teachers and a record of software and hardware used in the centre, including teachers' perceptions of the impact of ICT on learning. Of interest was the finding that despite working through a model designed to enhance the teachers' use of ICT and the development of the children's information literacy skills, the six teachers in this centre were unable to articulate what children were learning in ICT. Patterson commented:

> the most revealing aspect of this research is the need for teachers in early childhood education to understand the teaching and learning environment they are operating within… They need a better understanding about the world young children are exposed to daily and they must recognise that children are already able to engage with these distinctly different modes with apparent ease. (p. 29)

Patterson (2004) further commented that teachers' practice needed to be informed by contemporary learning theories and to make links between these and the use of ICT as there are many "complex connections between literacy, technology and learning" (p. 30). This argument is consistent with that put forward by Cullen (1999) since the late 1990s (eg: see also Hedges & Cullen, 2005a; 2005b) that teachers require explicit content knowledge if they are to extend children's learning in early years settings in any area of the curriculum.

Summary points re level one question

In summary, the studies reviewed in this section point to the important impact of contextual features on teachers' capability in ICT. In particular, they made the point that teachers' assumptions re ICT, their understanding of the children's learning context, and their attitudes to children's competence are all implicated in teachers' ICT capability. Specific factors related to increased teacher capability in ICT were also identified as follows:

- the teachers' knowledge base about ICT, including specific and detailed technological knowledge and knowledge of appropriate pedagogical approaches,
- teachers' access to current and reliable technology, and
- teachers' engagement with ICT equipment.

Level Two: Focus on organisational support for change, in particular, the process and implementation of the PD programme

Three of the literature review questions are relevant to this level of the evaluation framework. These are:

Question 2: What organisational support do teachers need to increase and sustain increased ICT capability and sound ICT pedagogy?

Question 3: How useful is an action research model in PD?

Question 4: What creates a community of practice generally, and around ICT specifically?

These questions will be dealt with individually and insights on all three questions will be combined in a summary at the end of this section.

Literature Review Question 2: What organisational support do teachers need to increase and sustain increased ICT capability and sound ICT pedagogy?

A number of studies highlight that PD is essential to both the type and extent of ICT usage in early years settings. At the same time, as identified by Anderson et al. (2007), the time that is needed for PD around the use of ICT, and the implementation of sound ICT pedagogy, is a practical issue that must be taken into account.

Drawing on her practical experience in New Zealand early childhood centres, Visser (2000) argued that "an ICT culture supportive of children's learning" (p. 11) does not necessarily flow on from the mere provision of ICT resources. Instead, she suggested that systematic strategies are needed in the area of curriculum planning, implementation and evaluation; at the level of the teachers' facilitation of the curriculum; in the management of the learning environment; and at the level of policy. Elaborating on the desirable components of a policy on the use of ICT, Visser advocated a policy to cover:

- ongoing PD to increase adults' awareness of their role in implementing a rich ICT environment
- an holistic approach to ICT, so that learning outcomes are truly integrated across the curriculum with the computer treated as another multimedia tool
- a wide variety of teaching strategies
- attention to the learning environment
- resources that are open-ended. (p.16)

One example of how the different components identified by Visser (2000) can work together to provide organisational support for change was that reported by deWacht (2004). The study, based in Australia, involved teachers and school leaders from primary and secondary schools who started collaborating in clusters of schools with the aim of improving literacy, numeracy and ICT outcomes for students. According to deWacht, the key to the success of the project was the involvement of school leaders and representative teachers from each school in a project leadership team. deWacht also argued that sustained *in situ* PD within the cluster groups, both through online and face-to-face meetings, created important support structures that produced a detailed and targeted PD programme that provided participants with all the knowledge and skills needed to produce desired pedagogical and curriculum changes.

Cluster group arrangements in PD initiatives have also been favourably reported when used in areas beyond ICT. For example, school principal Margaret Grevett, who in 2003 chaired a school cluster in the Bundaberg district of Queensland, wrote with great enthusiasm about the impact of bringing principals of schools together in a cluster group and noted the effect of this on the principals' leadership of curriculum change. The article by Grevett (undated), published in a practitioner magazine, noted also the effects on the school staff when the principals in turn provided PD to all their teachers either personally or through outside facilitators. Grevett argued that a learning community was established that "ultimately

resulted in staff taking on leadership positions within their respective schools" (p. 26). Grevett summarized the major outcomes from the cluster model of PD as:

- the sharing of professional expertise
- productive professional discussion that ensures ongoing development and refinement of the approach
- networking of staff across the cluster leading to building of a strong learning community using productive pedagogies
- the development of a particular type of pedagogy
- more ownership of the curriculum.

Within New Zealand, general PD literature provides further useful insights into the organisational factors that promote and sustain successful change. Hampton (2002), for example, concluded from her literature search and her analysis of interview and focus group data with twelve teachers, that the ability of PD processes to produce change depended on individual factors such as the teachers' assumption of personal responsibility for their participation in the PD opportunities; their ability to be reflective about their practice; and their engagement in self-assessment. At the same time, Hampton recommended that PD be structured in a way that allowed for ongoing contact with facilitators and time for reflection and feedback, factors which require organisational support.

The importance of both personal commitment to PD and organisational support was also highlighted by Lovett (1995) who, reflecting on PD as a career-long quest, concluded that "the success of PD rests with the individual" (p. 24) but equally emphasised the importance of collegiality and reflective practice in making PD an effective "life line for quality work environments" (p. 21), a view echoed also in Gilmore's (2000) report on the PD associated with the National Education Monitoring Project (NEMP). Lovett used a definition of collegiality derived from the work of Barth (1991, cited in Lovett, p. 21) who sees collegiality as consisting of four behaviours that need to be planned for within the organisation of an educational setting. Barth's four behaviours are:

(i) school adults frequently talking about practice in a continuous and precise way

(ii) school adults observing each other's practice and reflecting and talking about this

(iii) school adults working together in planning, designing, researching and evaluating the curriculum

(iv) school adults teaching each other what they know about teaching and learning so that they reveal, articulate and share their knowledge of their craft.

This emphasis on collegiality is reported also by Andy Begg (1991) who interviewed New Zealand high school teachers about PD needs and their views on how best those needs could be met. The teachers identified that time and resources were essential alongside support from their colleagues, both during the PD courses and on their return to school.

Working within a Kaupapa Māori framework, Rau (2000) used narrative ethnography data from six Māori women early childhood educators who attended *Ngahihi* PD programmes to illuminate another dimension of organisational support. Rau argued that Māori women educators need to be able to enhance their development within a *Kaupapa Māori* perspective; she concluded that the educators in her study believed that PD needs to be "for Māori, by Māori and with Māori" (p. 4).

In an article entitled *Kaupapa Māori messages for the mainstream*, Bishop and Glynn (2000) argued that central to *Kaupapa Māori* theory is a focus on an analysis of power and that *Kaupapa Māori* practices are based on power-sharing relationships, and on experiences that are holistic and interactional. Listing principles of *Kaupapa Māori* practice identified by Smith (1992, 1997 cited in Bishop & Glynn, 2000, p. 4) in Māori medium primary schools, Bishop

and Glynn argued that *Kaupapa Māori* practices can be extended into mainstream educational settings. Elsewhere Glynn (1999) further argued that all educators need to develop a culturally relevant pedagogy; in other words, educators do not have to be Māori to work on this. This suggests that while the educators in Rau's study believed that PD needs to be "for Māori, by Māori and with Māori", an acceptable alternative organisational support measure might be a culturally relevant model of PD based on power-sharing relationships and interactions.

Literature Review Question 3: How useful is an action research model in PD?

Literature Review Question 4: What creates a community of practice generally and around ICT?

Overall, studies that have used an action research model of PD, report a number of significant changes in practice as a result of the action research process. In most cases, the creation of a community of practice was one of the reported changes (e.g., Anderson et al., 2007; Depree & Hayward, 2001, 2004; Kember et al., 1997; McLeod, 1999) and thus literature in this section is used to answer both question 3 and question 4 above.

One of the earliest New Zealand-based articles to promote the use of an action research model for PD in early childhood settings was by McLeod (1999). Also in the late 1990s, the Ministry of Education's (1999) Quality Journey resource was published, advocating a version of the action research cycle popularised by Kemmis and McTaggart (1988, p. 7) as the process through which early childhood staff could engage in reviewing specific areas of practice. At about the same time, PD contracts using action research approaches became popular (e.g., Gaffney, 2003).

McLeod (1999) pointed out that one advantage of the action research approach is that it concentrates on the types of collegial and collaborative practices that have been claimed as typical in early childhood work settings. McLeod added that action research provides a process for careful and setting-specific planning and that it maximises opportunities for teachers to develop their reflective practice, something which she argued "enhances organisational and individual performance" (p. 43). McLeod also argued that action research can have important spin-offs through creating a "framework of team leadership" (p. 43) at centre or team level.

In a pilot study in which Depree and Hayward (2001) used the action research cycle of 'plan, study, do, act' recommended in the *Quality Journey* resource (Ministry of Education, 1999) to review specific areas of practice in ten early childhood centres, the authors reported that there had been verbal, visual and behavioural changes of practice in each of the three centres they reported on. The reported changes affected all aspects of the centre's life and the overall culture of each centre. Furthermore, a follow-up study carried out in 2002 using questionnaires and group interviews with staff of the nine centres that had completed one action research cycle, found that the action plans had been maintained in all nine centres (Depree & Hayward, 2004). The staff in the nine centres attributed this result to (i) the inclusion of parents, children and teachers throughout the review and change process; and (ii) the development of systems to support the successful maintenance of change. Below are some specific outcomes of the action research process reported by centre staff:

In relation to parents, changes reported were:

- an increased sense of partnership with parents at centres including increased involvement by parents in the centres
- increased understanding by parents of bicultural practices
- strengthening of behaviour management strategies between home and centre
- broadening of parent education opportunities
- improved feedback between parents and teachers on children's learning.

In relation to children, improved learning outcomes were reported as follows:

- bicultural and bilingual learning
- self-correcting behaviour
- emerging literacy skills
- involvement in documenting learning.

In relation to teachers, changes reported included:

- improved teamwork
- reflection on practice with the support of colleagues
- support in applying behaviour management strategies
- fostering biculturalism and Māori language
- reflective thinking about literacy.

Depree and Hayward (2004) also reported that the interview data highlighted the importance of organisational support and curriculum management systems for implementing assessment, planning, and evaluation. Also important were systems for time management, and for budgeting to meet planned goals, including the purchase of equipment, and for hiring high quality staff. This study further identified factors that enabled or hindered the maintenance of the changes; these will be reported as part of the level 3 discussion in this review.

Evidence of the usefulness of an action research model in PD can be found also in the study reported earlier in this chapter by Anderson, Rooney and Vincent (2007). This small New Zealand study focused directly on the use of ICT in an early childhood setting and reported that the ICT practice of the two student teachers was transformed through the use of a collaborative action research model that incorporated processes based on the concept of *Ako*. Anderson et al. define *Ako* as "a traditional Māori conception of teaching and learning in which teacher and learner share both roles" (p. 12); this concept is also listed as one of the six *Kaupapa Māori* principles in the work of Bishop and Glynn (2000; Glynn, 1999) referred to in the level one section of this review. Gaffney (2008) also refers to the reciprocal nature of teaching and learning as an integral part of action research when discussing participatory action research as an experience of group problem solving in which participants learn from each other. Gaffney's overview article is the introductory article in a special edition of a journal with a focus on action research, and draws on reports of New Zealand action research studies as well as his own experience as an action researcher.

Also relevant to the questions in this section is the work of Kember et al. (1997) who, in reporting the results of a PD project that used an action research model with 50 different teacher-researcher teams in Hong Kong, noted that the action research model acted as the catalyst for the creation of a community of practice. The teacher-researcher teams worked with six associate co-ordinators from across the seven universities in Hong Kong. The role of the associate co-ordinators was to be a 'critical friend' and Kember et al. described the diverse aspects of this role in terms of the twelve metaphors of: financier; project design consultant; rapport builder; coffee maker; mirror; teaching consultant; evaluation advisor; research advisor; resource provider; writing consultant; match maker; and deadline enforcer.

Of interest to this literature review is the outcome reported by Kember et al. (1997) from the "match making" aspect of the "critical friend" role. The term "match maker" was used to talk about the way the "critical friend" was able to bring together different teacher-researcher teams with similar interests. Apart from enabling the teams to benefit from the sharing of expensive resources, the authors reported that "a community of academics interested in teaching research and development" (p. 477) developed which the project team sought to maintain beyond the duration of the project through electronic mailing lists and bulletin boards. One of the writers recounted his match-making experience as an associate co-ordinator thus:

> Match-making could be really useful. One of the team told us that they were trying to build a multimedia laboratory, we told them there was one in the same building now being used by another team. One team said they wanted to do 3-D simulation but lacked experience. We told them there was a team in another university using the same technology to build state-of-the art learning tools (p. 478).

This experience is one example of the way that a community of practice can be facilitated through action research. Bennett et al.'s (1997) work provides other examples from the context of seven part-time MEd students who met regularly with their MEd tutor outside the formal teaching sessions to support each other through their study. The paper provides evidence of the facilitative nature of self-managing learning groups and the contribution that the role of critical friendship can make to continuing PD.

Summary points re level two questions
Studies reviewed in this section have highlighted that beyond the personal commitment of staff to make their PD experiences result in change, there are some important organisational factors that impact the process and implementation of PD (PD) courses.

In particular, studies have indicated the following practical factors as necessary components of organisational support for change:

- enough time set aside for the necessary PD
- planned time for reflection and feedback activities
- a policy to cover the necessary structural arrangements to enable the PD
- PD that is delivered on site
- use of cluster groups whether face-to-face or online
- ongoing contact with PD facilitators
- the involvement of management in active support for the PD and specifically for ICT PD
- a model of PD based on *Kaupapa Māori* principles of power-sharing and reciprocal learning.

In relation to the usefulness of action research as a model for PD, the studies reviewed indicated that action research has been shown to result in positive changes that are able to be maintained. Other specific positive outcomes of an action research approach included:

- the development of a culture of collegiality
- maximising of reflective practice
- creation of a framework of team leadership
- improved teamwork.

Additionally, an action research approach to PD has also been shown to be an effective way of creating a community of practice around an area of focus that can also impact more broadly on the culture of the overall setting. The use of a "critical friend" as part of the action research process has been reported as useful to the creation of a sense of community.

Level Three: Focus on participants' use of new knowledge and skills, in particular the transformation of their professional pedagogical practice and the sustainability of the transformed practice/new learning

Literature Review Question 5: What transforms pedagogical practice in ICT? What works from the learners' perspective? What sustains the transformation?

Literature discussed in earlier sections has already thrown light on the question at the centre of this third level of the evaluation framework focusing on participants' use of new knowledge and skills, in particular the transformation of their professional pedagogical practice and the sustainability of the transformed practice or new learning.

For example, in discussing literature on factors which increase teacher capability in ICT (the focus of level one of the evaluation framework), reference was made to studies that have highlighted the critical role of context, or dominant discourses, including teachers' assumptions about ICT, in the enhancement of teachers' ICT capacity. Additionally, literature relevant to the second level of the evaluation framework, with its focus on organisational support for change, identified a list of practical factors that support change, including desirable features of PD models using action research.

In this section the focus is narrowed onto a small subset of studies that have investigated teachers' own perspectives of what makes a difference to their practice, with the aim of elaborating specifically on the participants' perceptions of their use of their new knowledge and skills.

Useful to this focus are the findings reported by Peter deWacht (2004) from two major PD projects in primary and secondary schools where teachers worked in cluster groups. According to deWacht, who facilitated one of the clusters, teachers perceived *in situ* PD as highly effective in producing desired pedagogical and curriculum changes. In deWacht's project, the PD included both online and face-to-face cluster group meetings; bringing in experts to upskill participants on ICT; and bringing teachers together online with partner groups for specific projects. deWacht argued that the teachers put great value on the fact that all the activities they engaged in during their PD were purposeful and aimed at implementation in a later stage. deWacht reported the following two statements by school principals as capturing the impact that the participants perceived the project as having:

> There has been an incredible improvement in ICT skills right across the schools, especially in the area of videoconferencing and the use of ICT to assist learning.
>
> It has allowed people to experiment and try out things in a supportive environment. (The benefit) flows on to students, because …what we are hoping (is) that students will stretch their boundaries. (p. 11, brackets in the original)

The importance, identified above, of having an opportunity to experiment and engage with ICT equipment hands-on also emerged as a critical transformative factor for the teachers in Anderson et al's (2007) project, and likewise those in Moreland et al's (2001) project. For example, Anderson et al. reported that two of them (Rooney and Vincent, who were both student teachers working with Anderson as their supervisor), found that taking photos of the children when they had settled into their childcare centre, and re-playing a slideshow of the photos, enabled them to help the children to 'revisit' their early experiences at the centre. The authors argued that this created opportunities for the children to develop cognitively, emotionally, linguistically and socially (p. 14). At the same time, seeing the impact that the use of the digital technology had had on the way children settled in was a powerful transforming factor for the student teachers themselves - it "converted" the initial resistance of one of them to using the technology, and confirmed the other's belief in its potential. This effect applied also to the authors' use of the laptop: After using the laptop for presentations, the student teachers felt they wanted to engage more with the equipment (see level one section earlier in this chapter). In this way, presenting and discussing their findings was a transformative process for the student teachers and made them reflect on their assumptions about the use of ICT with young children. Furthermore, the authors argued that the transformation may not have occurred if the student teachers had simply discussed the relevance and possible importance of ICT with their supervisor. In other words, it was the intense exploration of the potential of ICT that had worked. Jordan's (2006) article describing how teachers in one Centre of Innovation project used ICT in their planning and documentation of learning of under-two-year olds, similarly makes the case that intense use of ICT equipment transformed teachers' practice. According to Jordan, the teachers in her centre "learned to use their new ICT equipment in the immersion of their current work in the centre" (p. 25). She argued:

> Such immediate and ongoing application of new skills leads to ready understanding of their value in both teachers' and children's repertoires of knowledge – an example of what Rogoff (1988) has termed a 'transformation of participation' (p. 25)

Interestingly, this reported effect for the student teachers mirrors Clark's (2005) finding for children who, when enabled to take their own photos to record their experiences, felt empowered in their use of ICT.

The experience of teachers who took part in the PD associated with their participation in the National Education Monitoring Project (NEMP) further provides support for hands-on experiences with new pedagogical practices (Gilmore, 2000), even when these are not ICT-related practices. Using data gathered via weekly diaries, questionnaires, visits, and interviews from 200 participants in the NEMP PD in the period from 1995 to 1997, Gilmore reported that teachers identified numerous factors that led 96% of them to give a rating of 4 or 5 (5 being the highest on 1–5 scale) to the PD. Reasons for this high rating included the provision made in the PD for time for reflection; the ability to immediately apply learnings; the enjoyment of the experience; the greater self-confidence they gained through the PD; the hands-on experiences; and comprehensive training which allowed them to sustain the new practices.

Summary points re level three question
This small group of studies indicates that, from teachers' perspective, to make a difference PD needs to be:

- on site
- sustained over time
- relevant to the desired curriculum change
- provided by people who are expert in the relevant area.

Additionally, from teachers' perspective, PD in ICT is transformative when:

- PD ICT activities are purposeful
- participants are enabled to engage with ICT in a hands-on way.

For one study included in this section (Jordan, 2006), immersion in ICT, and the associated transformation of practice, was not through a PD project per sé but rather within the supportive environment of a Centre of Innovation action research project. As the author herself noted, the CoI action research projects often serve as PD for the teacher-researcher teams.

Level Four: Focus on student learning outcomes, in particular outcomes for children including parental perspectives, and on any unexpected negative outcomes

Literature review questions 6 and 7 are linked to level four of the evaluation framework; this section addresses each question separately with relevant points collated in a concluding summary under each question.

Literature Review Question 6: What are the perceived outcomes for children of enhanced teacher capability in ICT?

In a short research note on introducing computers to under-five-year-olds, Fletcher-Flinn (1997) argued that not all children take to computers "naturally" (p. 14) and that it is worth taking time to introduce computers to preschoolers. Almost a decade later, this observation was supported by Patterson's (2004) study in one Auckland centre (see level one discussion). Patterson reported that when teachers sat with the students and became involved in their learning for some time, children accessed more informative and open-ended programmes than when they were on their own; she also reported that the teachers were able to support the children in problem-solving and in building on their existing knowledge.

Recently Jordan (2006) argued that learning in New Zealand early childhood centres is being transformed through a combination of a credit-based model of planning and assessment based on principles from sociocultural theories, and through teachers' increasing use of ICT

with children, and particularly in planning and documenting learning. Reporting on an interview with the manager of the older section of the CoI centre, Jordan noted that the manager saw teachers' use of digital images as enabling children's thinking and learning to become more visible. The centre manager also noted that enhanced use of ICT meant that children had easy access to wireless internet and this enabled them to find answers to their own questions and to pursue their own interests. Examples provided by the manager illustrated children reflecting on how to improve their acting after viewing video footage of their play. Jordan concluded that ICT enabled children to engage in re-visiting, and thereby extending, previous thinking, including through accessing their learning portfolios of digital images. Jordon further argued that the CoI project she was involved in was only one of six which had similarly used digital images for collaborative analysis of children's learning. She suggested that early childhood centres in New Zealand have much to offer as leaders in the pedagogical use of ICT.

Anderson et al.'s (2007) results in one under-twos centre in New Zealand similarly point to beneficial outcomes for children, particularly in the way that ICT can be used to break down the communication barriers in early childhood settings. This study demonstrated that ICT became the 'voice' to bridge communication gaps between teachers and children, as well as a way of communicating with parents; Anderson et al. noted:

> by placing the laptop on a low table and seats around the table for the children to come and go as they pleased…Parents were amazed that we used this type of technology with the children at this young age, letting the children use the laptop to show their parents [the slideshows] (p. 14).

The authors concluded that ICT enhanced communication, socialization and learning experiences for the children at the same time as it facilitated their emerging ICT literacy. Similar results were reported by Clements and Sarama (2002) in the domain of mathematical learning.

These findings resonate with the conclusions drawn also by Yelland (2006) who, having reviewed a wide range of empirical literature on the use of ICT in the curriculum areas of literacy, numeracy and communication, critical thinking and creativity, concluded that the teacher had a critical role to play in the effective use of ICT to enhance learning and expression with young children.

In summary, these studies suggest that:

- teacher involvement with children using ICT enhances children's problem-solving and their existing knowledge
- enhanced use of ICT by teachers enables children to engage in re-visiting and extending their learning especially through the use of digital images
- ICT breaks down communication barriers between teachers, children and parents.

Literature Review Question 7. What works for different services? What varies across services? Barriers and enablers for different services?

As noted in the discussion of the literature review questions linked to level one and level two of the evaluation framework, there is acknowledgement in numerous papers that contextual factors have a considerable impact on ICT capability in early childhood services and pedagogical change generally. For example, Clements (1999) noted that populations can be very diverse and that the design of the ICT curriculum needs to be appropriate for the social setting, an argument strongly supported by Edwards (2005b) in Australia, Sandberg (2002) in Sweden, and Begg (1991), Moreland et al (2001), Patterson (2004), and Raymond, Butt and Townsend (2001) in New Zealand. Rau (2000) further noted that in Kaupapa Māori contexts, PD needs to be "for Māori, by Māori and with Māori" (p. 4).

Overall, however, studies accessed for this review are limited in the light they are able to shed on any differences between service types in relation to barriers and enablers of ICT capability and of pedagogical change more generally. Rather, the studies reviewed reveal commonalities in what works and what doesn't. A summary of enablers and barriers identified across the studies follows.

Enablers of change:

1. Engagement with ICT equipment (Anderson et al.**,** 2007**)** and hands-on experiences generally rather than just lectures (Begg, 1991; Edwards, 2005b; Jordan, 2006; Moreland et al., 2001). These studies emphasised the powerful effect of gaining knowledge and skills in theory and in practice
2. Teachers who are informed about contemporary learning theory and explicit content knowledge about ICT (Patterson, 2004; Hedges & Cullen, 2005a; 2005b)
3. Teacher who have access to resources, including support and knowledge about what to do when problems arise with computers or other technology (Sandberg, 2002; Visser, 2000)
4. Access to PD for teachers (Cherrington & Wansbrough, 2007; Depree & Hayward, 2004)
5. Adequate time to spend on PD on the use of ICT (Anderson et al, 2007; Begg, 1999)
6. Centre leadership and management systems that support the planning, implementation and evaluation of the change (Depree & Hayward, 2004; Visser, 2000)
7. Children having free access to computers so that they can build confidence with it (Sandberg, 2002)
8. Having a 'critical mass' of a centre's staff attend PD to ensure changes are carried out with support from all staff in a centre. Sharing interests and experiences supports change and development, as do relationships with peers. (Begg, 1991; Cherrington & Wansbrough, 2007; deWacht, 2004; Lovett, 2000; Patterson & Fleet, 2001; Raymond, Butt & Townsend, 1992)
9. PD based on the specific needs of the educational setting, the people within the setting and also curricular needs (Begg, 1991; Cherrington & Wansbrough, 2007)
10. Understanding how PD has happened before for teachers. This requires opportunities for teachers to be able to examine and make explicit the roots of their personal commitments, histories, and teaching styles (Raymond, Butt & Townsend, 1992)
11. Friendly and inviting atmosphere in PD courses geared to adults; facilitator skill in matching content and level to participants' needs (Begg, 1991; Cherrington & Wansbrough, 2007)
12. Opportunity for ongoing professional relationship with PD facilitators and opportunities to practise, reflect, discuss, and get feedback on the change from colleagues (deWacht, 2004
13. Intrinsic motivation to attend PD rather than a requirement (Begg, 1991) and personal commitment to change and self-evaluation (Gilmore, 2002; Hampton, 2002; Lovett, 1995)
14. Culturally relevant models of PD based on power-sharing relationships and interactions in Kaupapa Māori settings (Bishop & Glynn, 2000).

Barriers to change:

1. High teacher turnover (Depree & Hayward, 2004)
2. Lack of time to undertake PD and to implement and maintain changes (Begg, 1991; Cherrington & Wansbrough, 2007; Depree & Hayward ,2004; Sandberg, 2002)

3. Limited teacher access to appropriate resources (e.g., money to pay for professional development, leave opportunities, availability of relievers, travel and accommodation to distant courses, lack of texts etc) (Begg, 1991; Cherrington & Wansbrough, 2007; Depree & Hayward ,2004) such as computers (Sandberg, 2002)
4. Limitations of space and buildings (Depree & Hayward, 2004)
5. Limited access to technology (Depree & Hayward, 2004)
6. Lack of teacher confidence (Depree & Hayward, 2004)
7. Differing philosophies within a teaching team (Depree & Hayward,2004)., including entrenched negative views of some older/more traditional teachers (Begg, 1991; Hampton, 2000)
8. Lack of support from management and colleagues (Begg, 1991; Hampton, 2000)
9. Being rural, living in isolated communities, and feeling isolated in one's practice (Begg, 1991; Cherrington & Wansbrough, 2007)
10. Lack of Ministry direction (Begg, 1991)
11. Workload issues (Cherrington & Wansbrough, 2007)

Conclusion

The primary focus of this review has been on identifying what works to increase and sustain teacher capability in ICT, and specifically within the context of a PD programme. Seven questions were used to interrogate relevant literature on this topic and summary statements to answer these questions have been provided in each section of this review.

This review makes clear that much is known about the components of effective PD programmes generally, and to a lesser extent, about PD programmes with an ICT focus. A key message was that increased teacher ICT capability was not solely dependent on the specific features of the PD programme but was also impacted by contextual features in the teaching and learning setting, including dominant attitudes to ICT usage.

The effectiveness of action research models for PD programmes was supported by the literature which also indicated that action research facilitates the creation of a community of practice and a culture of collegiality among participants.

Transformation of ICT practice works best when there is hands-on engagement and ongoing structural support to sustain the new practice in the context where it will be applied.

Teachers' increased use of ICT was found to enable teachers to engage more with children in ICT activities which in turn enabled children to enhance their knowledge and to use ICT to re-visit and extend their learning.

Literature that distinguishes between what works and what doesn't by service type is limited. However, two Kaupapa Māori-based studies highlighted the importance of models of PD that were culturally relevant and based on power-sharing principles.

Chapter Three: Evaluation Methodology

Evaluation Framework

According to Patton (1997, 2002) evaluations that are conducted while a programme is in progress enable its organisers to gauge the effectiveness of the programme as it is developing and to glean information from lessons learned in order to further refine the programme. Nowhere is this provision more important than in the evaluation of professional learning programmes in educational settings.

In the current ECE ICT PL programme, participants are in effect not only attempting to transform their pedagogy in order to enhance learning outcomes for children but are also being given the opportunity to work in partnership with other centres/services to build a new way of working together. These collaborative partnerships should in turn help to augment how ECE centres/services function as they seek to enhance their community of practice. In particular the ECE ICT PL programme was designed to:

- increase teacher capability (with a particular emphasis on ICT capability)
- transform pedagogical practice (linked to ICT) that in turn leads to an enhanced community of practice
- enhance learning outcomes for children.

The overall aim of this evaluation was to assess whether the design and implementation of the ECE ICT professional learning programme is meeting the intended outcomes of the programme. The specific evaluation questions were:

1. Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?
    - How successful are clusters in the ECE setting?
    - How useful is action research as a tool to accomplish the intended outcomes of the programme?
    - Will the programme lead to sustainable and sound ICT pedagogy?
2. To what extent are the ECE ICT PL programme's design, content and implementation by the services useful across all types of ECE services?
3. What are the emerging barriers and enablers that may make the difference between success and disappointing implementation and outcomes?

Although the evaluation questions identified in the Request for Proposal and reproduced above are presented as three key questions, the inclusion of three distinct sub-questions for Question One means that there are in effect six questions for this evaluation. This organisation of the evaluation questions is further complicated in that the first question refers to the achievement of the three intended outcomes for the programme. In order to manage this complexity, the remainder of this report will refer to six evaluation questions with the sub-questions for Question One being referred to as Question 1(A), 1(B) and 1(C) respectively.

In order to evaluate both the implementation of the programme and the extent to which the outcomes are being met mid-way through the programme, a multi-dimensional evaluation process was implemented (Guskey, 2000, 2002) that incorporated '*process, implementation and outcomes evaluation*' procedures (Davidson, 2005; Patton, 1997, 2002).

The framework for the evaluation process included four levels of investigation using an adapted version of Guskey's model (2000, 2002). The **first level** of the evaluation focused on *participant learning* and addressed this learning along two dimensions as proposed by Shaha, Lewis, O'Donnell, and Brown (2004). The first dimension was *'attitudinal impacts'*. That is whether the participants noted any changes in their knowledge and with regard to

their ICT skills. The second dimension is '*learning impacts'*. This dimension focused on the specific ICT skills that have been learned during the course of the professional learning programme. This first level of analysis sought to address the first goal of the programme, which was increased ICT capability amongst participants.

At the **second level** in the evaluation process, the focus shifted to *organizational support for change.* This evaluation level focuses on the *process and implementation* of a programme. According to Guskey (2002):

> *…a lack of organizational support and change can sabotage any professional development effort, even when all the individual aspects of professional development are done right…* (p. 47)

To achieve this part of the evaluation we focused on the ecological context within which the participants were using ICT. This was achieved by gathering information about the situational variables that may hinder or enable the embedding of ICT into pedagogical practice. In particular questions concerning the emerging barriers and enablers as well as usefulness of the cluster model and action research were asked.

At the **third level** of evaluation the focus was on the *participants' use of their new knowledge and skills.* This level of analysis was particularly relevant to the ECE ICT PL programme as it is in a mature stage of implementation. At this level of evaluation the focus shifted to outcomes for the participants, and sought to answer questions concerning the degree and quality of implementation, the transformation of their professional pedagogical practice, and the sustainability of sound ICT pedagogy.

At the **final level** of evaluation *student learning outcomes* provide the focus of investigation. This level of analysis provided preliminary information about enhanced learning outcomes for children, including parental perspectives. It was also important to ascertain whether there have been any unexpected negative impacts of the programme.

Evaluation Process

In order to access all levels of investigation a mixed-method approach (Greene, 1998) was utilized that included both qualitative and quantitative data gathering procedures and analyses.

PHASE ONE: Document Analysis

To enable the evaluators to get an overview of the ECE ICT PL programme the first phase in the evaluation process involved a document analysis of the ECE ICT professional learning provider (CORE) milestone reports. Milestones 3 – 8 (covering the period from December 2006 through to March 2008), together with the CORE Baseline Survey Analysis and Report (Ham, August 2007) were provided at the beginning of the evaluation period. Later, a MOE cross-analysis of Milestones 2, 3 and 4 (June 2008) and the CORE Midpoint Project Survey Analysis and Report (Ham, July 2008) were made available to the evaluation team. These reports were initially read by three of the team members and key themes were drawn out and discussed. A second more intensive reading of the documents was conducted by two of the team members. They independently and systematically interrogated the documents in order to refine and build upon the key themes. Once this had been completed the two evaluators compared their respective analysis and discussed any differences that emerged in their reading and analysis of the documents. These findings helped to inform the key directions to be taken for the following data collection phases.

PHASE TWO: Development of an Evaluation Matrix

Phase two of the evaluation process involved the development of an evaluation matrix. As a first step three members of the evaluation team met with five MOE personnel (from the then-Curriculum, Teaching and Learning Division and the Research Division) and two representatives from CORE for a 4-hour workshop. During the course of this workshop the Ministry gave a presentation about their understandings of evaluations and how they may differ from research. A key focus of the day was to establish a mutual understanding of the phrase "What does 'good' look like?" With these parameters in place the day involved a discussion of possible questions and indicators of success that should be addressed in the evaluation in order to accurately respond to the six key evaluation questions posed by the MOE (see p. 7 above).

The evaluation team then discussed the broad ideas and notes from the MOE workshop during a further one-day workshop. As a result the evaluation team developed an evaluation matrix (see Appendix A) in order to tabulate the evaluation questions, indicators of success, and proposed data collection methods.

An example of the types of success indicators and ideas that emerged from this process follows. For the first over-arching evaluation question:

> **Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?**

the following indicators emerged as areas of interest and investigation during the evaluation process.

- Teachers and the ECE service community demonstrate increased knowledge about Cyber-Safety.
- Teachers demonstrate increased capability in terms of skills, knowledge and confidence.
- Teachers are using an increased range of ICT appropriately.
- Teachers view children as competent and capable learners with ICT.
- Teachers trust children to use ICT equipment.
- Teachers are increasingly comfortable with allowing children to make decisions about the use of ICT equipment.
- Teachers are actively using ICT to support and enhance reflection on their practices.
- Teachers are taking a collaborative approach to using ICT with teachers, parents and children in collaborative projects.
- ICT are being used by teachers to strengthen their range of pedagogical practices.
- Teachers notice and recognise trends of ICT use amongst different children in their centre (gender, ethnicity, disability).
- Teachers develop strategies to respond to differences in trends of ICT use by children.
- Children are confident and capable with ICT, including using ICT as tools for learning and using ICT for communicating with people beyond the service.
- Children act as experts with adults and other children who are novices in using specific ICT.
- The use of ICT has strengthened processes for transitions of children and families into services, within the service, from the service to school or another service.
- Children's use of metacognitive strategies is supported by their engagement with ICT.
- Parents' perspectives on their children's learning are supported and enhanced through the use of ICT.

The evaluation matrix formed part of the first milestone report that was submitted to the MOE on 15th June, 2008. Once the evaluation team received approval to proceed with the evaluation plan, the team began the next phase of the process.

PHASE THREE: Internet Survey and Ethics Application

Rationale for the use of an internet survey

In order to obtain an accurate understanding of how the design, content and implementation of the ECE ICT PL programme had been perceived by all participants across the participating centres an on-line survey was conducted. Furthermore, in light of the fact that the focus of the evaluation was on professional learning around the use of ICT, an internet survey seemed very appropriate.

Survey development

From the document analysis and in consultation with the MOE and CORE it was evident that the survey should not replicate the Baseline and Midpoint surveys that had already been carried out as part of the CORE implementation of the ECE ICT PL programme. In order to address this, specific parameters regarding the survey content were established so that there was virtually no overlap between the surveys.

Three members of the evaluation team developed a draft version of the survey and sent this to the MOE for feedback. While this was being reviewed by the MOE, the survey was trialled by being sent to three colleagues in the School of Early Childhood Teacher Education and to the Manager and supervisors of the eight VUW early childhood centres. Eight of these colleagues returned the questionnaires with detailed feedback about the wording of items for clarity, avoiding repetition, and adding choices to some questions to better reflect possible occurrences in ECE centres (e.g., we added items to the list of ICT equipment that centres might use). Adaptations were made to the survey before a final review by the wider evaluation team was undertaken.

The final survey included 63 questions: 45 were quantitative, 18 were qualitative. The Lead Teachers in each service were asked to fill out an additional 13 questions, three of which were qualitative.

The survey was organised into seven sections, as described below:

1. **Information about this survey.** In this section respondents were given information about how to complete and exit the online survey.
2. **Background information.** In this section the participants were asked to provide their age, gender, any educational qualifications they were studying toward, the name of the service, type of service, their main role within the service, number of staff, number and age of children in the centre, and types of ICT equipment they have used. Individuals were not identifiable, however we sought information regarding the service in which they were working in order to gauge potential variations in professional learning that might exist within the service teams.
3. **Professional learning experiences/opportunities.** In this section the participants were asked to provide feedback about the various components of the ECE ICT PLP in order to investigate the usefulness of each programme component in terms of increasing participants' knowledge, skills and confidence with regard to ICT.
4. **Pedagogical practices.** In this section information was gained about each teacher's specific pedagogical practices with regard to the use of ICT with children.
5. **Children's use of ICT.** In this section specific information how ICT is used by children in the centre together with questions about parent involvement was obtained. Participants were also asked to indicate whether children's use of ICT differs as a function of gender, disability, ethnicity and age.

6. **The PL programme design and implementation.** In this section participants were asked about the broad aspects of the ECE ICT PLP, including their opinions about the cluster model (and its suitability for other ECE centres), and their experiences with the action research component.
7. **Lead Teachers Section.** Lead Teachers were also asked to complete questions about the ethnic backgrounds of the children in their centre, any impact of ICT usage on transitions, action research, strategic planning, and staff induction.

The full survey is presented as Appendix B.

Procedures

Once a final version of the survey had been developed, an application was made to the Victoria University of Wellington College of Education Ethics Committee. Approval was obtained on 4th July, 2008 (SECTE/2008/25).

In order to conduct the online survey the services of a commercial company were utilized. Survey Monkey is an online survey software company that allows users to create and distribute online surveys, and collect responses. Survey Monkey was established in 1999, and has policies in place to protect the anonymity and privacy of survey creators and respondents.

While the survey was being developed the evaluation team was provided with the names and email contact for each of the Lead Teachers in the 59 participating services. The currently participating services are predominately kindergartens (32) and education and care services (25), with one hospital based service and one playcentre also enrolled in the programme. Once the final version of the survey was online and ready to be released an initial email was sent to all 59 centres, which provided an information page about the survey and a link to the survey (for observation but not for use). Each centre was asked to provide the evaluation team with a list of staff names and email addresses so that individual emails could be sent to all participants inviting them to complete the survey.

The survey was launched on 7th July, 2008. Upon receiving the names and email addresses of potential participants each person was sent information sheets, which explained the evaluation process and included a link to the survey (see Appendix C for copies of information sheets and emails sent to the centres).

Participants whose services had responded immediately to the request for individual email addresses had a full 45 days within which to complete the survey. As the end date was fixed, those respondents whose services took longer to supply the email addresses had less time to complete the survey, which was closed on 22nd August. Reminders about the survey were sent to everyone on the email list every one to two weeks. Services who had not responded to requests were also sent reminders asking for staff email addresses every two weeks. Fifty-five of the 59 centres provided us with either individual email addresses or requested the use of a multi-link survey site.

Two types of survey collectors were used through Survey Monkey. People with individual email addresses were sent an invitation which allowed them to enter and exit the survey as many times as they wished; they were able to go back into their unfinished survey to complete it because the software kept track of their individual survey associated with their email address.

There were some individuals who did not have access to an individual email address. For these people an alternative method for responding was provided. Specifically, people without individual email addresses were sent a link through their service's email address; this link was enabled to allow multiple users to access the survey, though that meant each person had to complete the survey in one sitting. The invitation emails explained these differences, and respondents could choose which collector type they preferred to use to access the survey.

Qualitative data was exported into Word, then uploaded to NVivo for analysis. The quantitative data was downloaded into SPSS.

PHASE FOUR: Telephone Interviews

Rationale for the use of semi-structured interviews

The fourth phase of the evaluation process involved telephone semi-structured telephone interviews. Interviews were selected as an appropriate data gathering method, as they are a purposeful interaction in which one person tries to obtain information from another. As Kvale (1996, p. 2) suggests, "an interview is literally an inter view, an interchange of views between two persons conversing about a theme of mutual interest".

Pre-prepared questions were used to guide each interview; however there was also opportunity to follow-up on relevant comments made by the interviewee. This data gathering technique was chosen as an appropriate instrumentation method because it allowed for flexibility, the ability to probe the responses provided, and enabled detailed qualitative data to be collected.

Development of the interview protocol

The development of the interview protocol occurred alongside the development of the internet survey. An initial list of possible questions was developed by one member of the evaluation team. This list was sent to the remaining members for comments and feedback. Once finalized, the list of questions were included as part of the first milestone report and sent to the MOE for final approval.

The final interview schedule included ten questions seeking the respondents' views on the following themes:

- The effectiveness of the ECE ICT PLP components, including the cluster model and the use of action research
- Shifts in teacher attitudes towards, and practices around children's use of ICT
- Children's access to and use of ICT
- Engaging parents in their children's learning through ICT
- Evidence of services developing sustainable practices
- Enablers and barriers to services achieving the programme outcomes
- Issues identified from this pilot programme that might affect future programmes
- Summary of the foci and characteristics of each service within their cluster

A number of follow-up questions were identified to enable the interviewers to probe the initial responses and ensure that views were gathered on a wide range of issues. For example, the question relating to facilitators' views of the shifts in teacher attitudes and practices around children's use of ICT included probes around children's independent access to ICT, any observed power issues over the use of ICT, shifts in teachers' attitudes towards children both with ICT and as a "spill-over" into other aspects of the curriculum, and teachers using ICT to assist them to engage in reflection upon their practices. A full copy of the interview protocol can be found in Appendix D.

Procedures

One member of the evaluation team was provided with a list of names and contact details for the facilitators and national coordinator of the ECE ICT PLP. These individuals were sent information sheets which provided them with detailed information about the project and the proposed interview questions.

The interviews were conducted at a time suitable to each participant over a two-week time period. Five facilitators of the ECE ICT PL programme and the National Team Leader were interviewed by two members of the evaluation team (each interviewer interviewed three individuals). At the time of the interviews the sixth facilitator position was vacant - the National Team Leader was covering the work for this cluster and was asked to focus on that cluster in addition to the national picture when responding to the questions. The interviews lasted 65 minutes on average and ranged from 40 to 90 minutes. Hand written notes were taken during the course of the interview by the interviewer. These notes were typed up following the interview and sent to the interviewees to check for factual accuracy.

The purpose of these interviews was three-fold. First, the interviewees provided information about whether the design, content and implementation of the programme are enabling services in their individual cluster to meet the outcomes of the programme. Second, the interviewees were asked to clarify the focus of each Action Research project being conducted by the services in their cluster. Third, during the interview process the facilitators were asked to provide details about each service with regard to the type of service it provided, the structure of the service and the extent to which the programme had enabled the service to make progress in the use of ICT.

This information enabled the evaluation team to select a number of centres that represented a range of service types, different structural features, a range of action research projects, and geographical locations for the final phase of the evaluation, the Case Study investigation. In light of the geographic and demographic differences in the range of participating centres, and in the contextualized implementation of ICT, it was important to capture this diversity.

The responses to the semi-structured interviews were then coded using NVIVO 7 and analysed using grounded theory to identify key themes in relation to the evaluation questions (Charmaz, 2006; Strauss & Corbin, 1990).

PHASE FIVE: Case Studies

Rationale for the use of case studies

For the final phase of the evaluation project six individual case studies of participating ECE services were undertaken (one from each cluster group in the ECE ICT PL programme).

A qualitative case study approach was used in order to "concentrate attention on the way particular groups of people confront specific problems, taking a holistic view of the situation" (Shaw, 1978, p. 2 cited in Merriam, 1988, p. 11). Qualitative case studies can illuminate understanding of the focus of study by bringing about the discovery of new understandings or meanings, or extending experiences as well as by confirming what is known. Qualitative case studies also use an "inductive" mode of reasoning through which "generalisations, concepts, or hypotheses emerge from an examination of the data – data grounded in the context itself" (Merriam, 1988, p. 13). This approach is different from the deductive mode of reasoning characteristic of studies where the goal is the verification of clearly stated hypotheses articulated at the start of a project.

The main purpose of the Case Studies was to:

- obtain a visual perception (i.e., direct observation) of ICT use as it is happening in the early childhood environment, and to document best practice as evidenced by ICT use that supports effective ECE pedagogy. An observation schedule was specifically designed for this purpose in order to increase the reliability of data collection across observers and services
- conduct a document analysis of service reports and pedagogical documentation of children's learning (including videos, photos)

- gain the perspectives of the teachers and Lead Teachers about the use of ICT in their service through semi-structured interviews
- gain the perspectives of the recipients of the programme, including parents and children.

Our inclusion of children and parents as participants in the case studies is embedded in a construct of children as "confident and competent learners" (Ministry of Education, 1996, p. 9). As children were the ultimate recipients of the programme a set of specific strategies for engaging children in conversations and discussion about how they use ICT was employed in order to ensure that they felt at ease talking with the evaluators. In particular, props in the form of photographs of ICT equipment and examples of ICT evident in children's portfolios were used during these discussions with children.

Development of the case study protocol

The preliminary Case Study Protocol was developed alongside the survey and interview protocol. Two members of the evaluation team spent a day developing a detailed matrix of the protocol. This matrix was then sent to a third team member for feedback. Adaptations were made before it was sent to the remaining members of the evaluation team. The final version was sent to the MOE for approval.

The final protocol endeavoured to provide data on the programme's effectiveness in achieving two of the three goals, namely *transforming pedagogical practice* and *enhanced outcomes for children.* In order to gain information about these goals and respond to the evaluation questions the following qualitative and quantitative methods were adopted during the Case Study visits:

1. Written narratives based on observations (six per centre)
2. Semi-structured interviews with parents (three per centre)
3. Semi-structured interviews with children (three per centre)
4. Semi-structured interview with Lead Teacher (one per centre)
5. Checklists of possible innovative uses of ICT (three per centre)
6. Frequency counts of who accesses the technology (two per centre)
7. Environmental analysis
8. Document analysis
9. Reflective statements (three per centre)

The full protocol for the Case Study visits can be found in Appendix E.

Procedures

One member of the evaluation team created a matrix of the 59 centres in order to select the six services to be visited. The matrix enabled services within each of the six clusters to be sorted according to service type; size of city/town the service was located in; size of the teaching team; age range of children; service ownership; and the focus of the Action Research Project being undertaken. A preliminary selection of services that provided the greatest mix of these criteria was made. Two other evaluation team members verified this selection process, before the final six services were selected.

The six services were contacted by telephone and email requesting permission for an evaluator to visit to undertake a site visit. One of the services initially contacted declined to participate and was replaced by another service that most closely matched it on the criteria outlined above. Once each service had confirmed their participation, information letters and consent forms were sent to each service for distribution to the parents. Where services were

part of an umbrella organisation, consent was also gained from this organisation for the site visit to occur.
Once each selected service had agreed to participate in the case study component of the evaluation, a suitable time for the three-day site visit was negotiated by one member of the evaluation team. The six visits occurred over a six week time period. Two visits were conducted by one team member, with the remaining four visits were conducted by four different individuals.

In order to ensure a systematic approach to the conduct of the site visits and enable moderation of data collection process, all members were included in a three hour induction workshop, which was run by one of the evaluation team members. During the course of this workshop the evaluators were taken through the prescribed procedures and had an opportunity to clarify any issues. As the workshop facilitator had already conducted one site visit she was able to provide the remaining evaluators with important information about the process.

Prior to their arrival at the service, the evaluator would request assistance from the Lead Teacher and Supervisor/Head Teacher in setting up the interviews with parents. At an early point within each site visit the evaluator would confirm suitable times to meet with the Lead Teacher(s) and with parents, and collect the consent forms.

Each evaluator had a folder with detailed procedures. Upon completing the site visit they were responsible for ensuring that all material was available in an electronic format to enable the data to be uploaded into NVIVO for analysis.

Chapter Four: Document Analysis

The ECE ICT PLP Evaluation Team was provided with six provider milestone reports covering the period from December 2006 (Milestone 03/06) through to March 2008 (Milestone 03/31), together with the CORE Baseline Survey Analysis and Report, 2007 (Ham, 2007) at the start of the contract. Additional written documentation provided by the Ministry of Education included the *Cross-Analysis of Milestones 2, 3 and 4* (White, 2008) received at the end of June and the *Mid-Project Analysis and Report*, 2008 (Ham, 2008) received at the end of July, 2008. Access to the CORE Centre4 on-line learning community was received at the end of May.

The document analysis is organised around the evaluation questions for this project together with the three broad goals of the ECE ICT PL Programme, presented on page 7 of this report.

Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?

The ECE ICT PL programme is a complex mix of delivery components, including centre visits by a cluster facilitator; clusters of services who come together for workshops, regional hui and Lead Teacher hui organised by their cluster facilitator; an online ICT community for programme participants and facilitators; and opportunities for participation in national conferences such as ULearn. The actual content of the programme is focused on the three goals of developing teacher ICT capability, transforming pedagogy, and enhancing children's learning outcomes. Within the programme these goals are intended to be achieved through participation in the components outlined above and through engagement in an action research investigation into an ICT innovation for their service. A number of service accountabilities are built into the programme design including the provision of regular centre milestone reports, development of service strategic plans, and dissemination of their action research findings.

Each provider milestone report included comments on the above components and programme content, and these have been analysed and included below:

Programme components

Centre visits:
Comments within milestone reports suggest that the centre visits are characterised by a flexible, tailored approach with facilitators adapting the original model of full-day visits to suit the individual services' requirements, and responding to the content needs of participating teachers. Content covered in facilitator visits to services has included technical support with specific ICT; follow-up on cyber-safety workshops; supporting teachers to design their action research question and to begin to gather and analyse data as part of their AR cycle; support with preparing milestone reports and with dissemination activities; developing strategic plans; and connecting the self review guidelines to their action research investigations.

Cluster workshops and regional hui:
Initial workshops were around pre-set content areas of cyber-safety and understanding the action research methodology. As the programme has progressed, workshops have had a strong technical focus and are now starting to address pedagogical aspects. The development of full-day hui on Saturdays for all PLP participants has been successful with 80% - 100% attendance, and teams valuing the opportunity to participate together. Saturday regional hui have included a mix of guest speakers and break-out session, and Lead Teachers have reported that they are a useful device for increasing participation from teachers who have been on the periphery of the programme within the service.

Further analysis concerning the usefulness of the cluster model across the wider ECE sector is included in a later section of this document analysis.

Lead Teachers:
Lead Teachers are the key people within each service responsible for maintaining the ongoing momentum of the programme. To support Lead Teachers regular hui are held for them, and comments within milestone reports suggests that these are also characterised by flexibility and responsiveness to Lead Teachers' needs.

PLP Online:
This component of the programme was established prior to services and teachers entering the programme, and is presented in milestone reports as a valuable tool in developing a community of practice amongst the participating teachers. During the programme to date, there has been growing involvement by teachers in using PLP Online with teachers reporting that they use it to find answers to technical questions; to make contact with other teachers; to download information about writing milestones; to share successes and ideas; to look for ideas; to find information such as references and readings; and, to feel part of the community.

ULearn conferences:
Not all teachers participating in the ECE ICT PL programme have the opportunity to attend the ULearn annual conferences. Participants at ULearn come from across the wider education profession, and as such the conference is reported as being particularly useful in helping teachers to see broader issues and applications for ICT in education. Sponsorship to enable teachers to attend is likely to have increased the numbers of ECE teachers attending the conferences.

Programme content

Action research investigations:
Much of the material reported in the milestones focuses on the mechanics of getting services up and running with their action research investigations, rather than on the content and direction of their projects. Initial workshops thatfocused on action research methodology provided teachers with support to begin thinking about their research questions. From the evaluative comments within the milestone reports it appears that the complexity of identifying a worthwhile, yet manageable research question was challenging for many teams, especially when they were simultaneously exploring ICT possibilities. The reports suggest that those services that have made sufficient progress that they are now well underway with their action research cycle are reported to be 'over the hump' and reaping motivational rewards from their progress. Unfortunately, those services that are struggling to get underway with their investigation are not yet receiving the gains and are likely to continue to struggle with motivation.

More specific detail on the issues impacting on the progress of services in achieving their action research investigations is provided in a later section of this document analysis.

Achieving programme outcomes:
Analysis of the achievement to date of the three outcomes for the ECE ICT PL programme is provided in later sections of this document analysis.

Service accountabilities

Milestone reports:
The preparation of service milestone reports to CORE and the MOE as part of each service's accountability requirements has been a sources of considerable anxiety to many services, to the extent that some considered withdrawing from the programme. Provider milestone reports outline considerable support provided to teaching teams, including written guidelines available in PLP Online; workshops on preparing milestone reports; individual assistance from facilitators during centre visits or by phone and email; and, technical support with compressing files and photos attached as appendices to reports. The quality of centre milestone reports is noted in provider reports as having improved considerably over time (a view echoed by White (2008) in her centre milestone report cross-analysis).

Strategic planning:
The requirement for services to prepare strategic plans for the ongoing sustainability of their service's ICT capability and capacity revealed significant variability in the ability of services to develop worthwhile plans. In a similar manner as for the development of milestone reports, support through the PLP Online and facilitators has been ongoing to assist services. Facilitators report that, where strategic planning and purchasing decisions are made at an oganisational level higher than the centre it can be difficult for them to have an influence due to the centre-based (rather than organisational-based) nature of the PL programme.

Dissemination:
As part of the programme teachers are expected to disseminate the findings from their ICT action research investigations. Provider milestone reports indicate that many services have already begun to fulfil these responsibilities and are presenting to a wide range of audiences including their clusters; to other local services, schools and parents; at ULearn; and at other ECE conferences and seminars. The milestone reports also indicate the high levels of support provided by the programme (through facilitators working individually with teachers and services; through workshops on dissemination; and through virtual workshop Power Point presentations available on PLP Online) to enable teachers to confidently and successfully present their work. Also noted has been the heavy time demands on individual teachers which have outstripped the teacher release funding available.

Despite dissemination being a challenging and, at times, stressful requirement the provider milestone reports indicate that teachers gain tremendous motivation from having other ECE professionals interested in their ICT action research investigations. As the dissemination phase increases, teachers are receiving requests to present at other events, non-ECE ICT PLP teachers are asking to visit services, and facilitators and teachers are being asked to contribute to journal articles.

Other points

Several other points concerning the design and content of the ECE ICT PLP programme also emerge from an analysis of the provider milestone reports, including:

- the usefulness of various programme components, such as clusters and PLP Online for fostering a learning community
- the usefulness of being able to draw upon experts, both within and beyond ECE, to inspire teachers and support facilitators
- the ability to use the teacher release funding flexibly in order to offset the impact of some of the external barriers to progress (such as the shortage of qualified relievers)
- the unique nature of some of the administrative and contractual arrangements of this programme, particularly for services used to a less rigorous process when undertaking other MOE-funded professional development programmes
- the limited impact of *Nga arohaehae whai hua Self review guidelines* on services' action research investigations. The 04/07, 05/07 and 06/07 milestone reports include brief reference to the use of the guidelines by facilitators who have included the guidelines as a resource in the action research workshops and promoted their use with services. One milestone report specifically notes that "services are not generally using the document to support their ICT PL work once back in their services" (05/07, p. 20).

Does the ECE ICT programme design, content and implementation by services achieve the intended outcome of *increasing teacher capability*?

Both the milestone reports and the two surveys undertaken by CORE provide data concerning this question. The initial survey on infrastructural capacity and teacher capability provided baseline information against which data from the mid-point survey could be

measured. The mid-point survey identified changes in teachers' use of ICT and increases in their confidence and capability, including the following points.

- Significant increases in teachers' professional use of ICT. Whilst overall, teachers used ICT most for documenting children's learning and communicating with parents, the largest increases in usage were centred on finding and developing learning resources, and using ICT for centre administration. The proportion of teachers who used online professional communities tripled during the period.
- While teachers began the programme reporting that they had relatively high levels of confidence in using ICT (both for personal use and for teaching and learning), their confidence had increased further by the mid-point of the programme from about 60% of teachers being "confident" or "very confident" in the beginning to 80% feeling "confident" or "very confident" after eighteen months.
- Teachers also reported that their technical skills had increased during the programme to date, across a wider range of ICT types. In the beginning, teachers felt they had high skill levels only in word processing, moderate skills levels in graphics, multimedia, telecommunications, and the internet, and low or non-existent skill levels in using spreadsheets and databases. For the majority of respondents skill levels increased in all of these areas except for internet use.
- In the mid-point survey, teachers were less concerned about keeping up to date with ICT, accessing ICT for children, pedagogical issues around the use of ICT, and getting ideas for using ICT for and with children than they were at the beginning of the programme. However, teachers reported being more concerned about finding the time to integrate ICT into their programmes and about issues of technical reliability, and just as concerned about funding and technical support as they were at the beginning of the programme.
- Teacher use of ICT for teaching and learning "with or by children" has also increased at the midpoint of the programme. In the baseline survey, teachers were asked to indicate the extent to which ICT was used with or by children. For four of the five indicators around two-thirds of teachers reported that they "rarely" or "never" used ICT for this purpose, whereas data from the mid-point survey reveals that the majority of teachers identified they used ICT in teaching and learning with or by children "sometimes," "often," or "always." The areas of greatest increase were in helping children document their ideas and thinking, finding or developing their own resources, and for creative activities.
- Finally, teachers reported "substantial" increases in their technological pedagogical content knowledge in the areas of assessment, children's self-assessment, communication, building reciprocal relationships, higher order thinking, creativity, and innovative teaching/learning practice. However, two areas of technological pedagogical content knowledge showed decreases - documentation and programme planning – a finding which Ham speculated reflected the emphasis of the programme on the other areas rather than these two.

Of interest is the change in participating teachers within the ECE ICT PL Programme: the mid-point survey notes that 48% of teachers who completed the baseline survey had left their service by the time of the mid-point survey and, similarly, 38% of respondents to the mid-point survey had joined their service since the baseline survey.

In addition to the surveys, the milestone reports provided evaluative comments on a number of trends concerning teacher capability, drawn from the national coordinator's and facilitators' work with services and individual teachers. Initial reports from facilitators suggest that whilst there were significant variances in ICT capability amongst teachers, generally teachers had greater ICT technical skills than they gave themselves credit for. ICT use within the services was often left to the teacher/s perceived within the team to have the "techie" skills, and the overwhelming focus of most teachers within the PL Programme was on learning how to use different ICT rather than on what to use ICT for, especially in terms of enhancing learning.

Tracking through the milestone reports reveals that throughout the first year of the programme, this emphasis on developing technical skills remained high for teachers with continued requests for workshops and a need for individualised follow-up during facilitator visits to services. Of interest is that the first milestone report for 2008 includes no direct discussion of ICT technical capability issues, although it is noted that the time frame covered by this report (mid-December 2007 – mid-March 2008) included the Christmas break period and a reduced focus on the programme by teachers. The evaluative comments included in the milestones also indicate that teacher confidence in the use of ICT has increased over the first eighteen months of the programme.

The impact of teacher participation in cyber safety workshops was specifically reported on in the June 2007 milestone where it was noted that, although participants were positive about the workshops, there was considerable variability in the actions taken by teachers and management to establish safe internet practices within their services. The following milestone reported significant progress by services in implementing sustainable cyber-safety practices.

A shift in capability emphasis is evident as the programme moved into its second year. Milestone reports have included evaluative comments on the generally positive development of teacher capability with regard to writing the centre milestone reports and dissemination, including the use of ICT to support these requirements.

Does the ECE ICT programme design, content and implementation by services achieve the intended outcome of *transforming pedagogical practice*?

A recurrent theme that emerges as the milestone reports are tracked is the shift in teacher attitudes reported both by facilitators and in centre milestone reports. Initially variations in teacher attitudes towards children using ICT were reported; however, reports quite quickly indicated shifts in attitudes with teachers becoming more trusting of children and increasingly willing to enable them to have independent access to ICT equipment. Shifts in teacher attitudes were identified within one report as an important factor in making the shift from increased teacher confidence in using ICT to improving children's accessibility to equipment.

Initial milestone reports indicate that participants were more focused on learning the technical aspects of using ICT than on the pedagogical aspects. Where evidence is provided within milestone reports of changes in pedagogical practices this tends to be illustrative rather than comprehensive. Initially, almost all participating services were using ICT for documentation and assessment; later reports provide examples of services creating links between services, teachers reflecting on and changing teaching practices (e.g., conversational style), and teachers communicating more effectively with children and families beyond the service.

Does the ECE ICT programme design, content and implementation by services achieve the intended outcome of *enhancing learning outcomes for children*?

Specific references to the programme goal of enhancing learning outcomes for children first appear in milestone reports from mid-June 2007. Facilitators' observations of increased access to and autonomous use of ICT equipment by children were commented on in several milestones. Examples of the impact of the programme on outcomes for children include the opportunities for children to learn or practice skills that arise from increased access to equipment; enhanced engagement by children in communicating with a teacher travelling overseas; children's artwork showing an increased attention to detail as a result of using digital microscopes; and children finding their "voice" through the use of some software programmes. A later milestone referred to a number of centre milestone reports where teachers are indicating that they are now viewing children as competent, capable ICT users, and noted the positive impact on teachers' attitudes when children and teachers are developing ICT competency and confidence alongside each other.

How successful are clusters in the ECE setting?

An analysis of the milestone reports suggests three key themes concerning the success, or otherwise of the cluster model within the ECE sector – the value of the model for participating services and teachers; the need for flexibility in the delivery of this component of the programme; and, the challenges that arise from having geographically diverse cluster groups.

The opportunity for teachers and teams to undertake the workshop and regional hui components of the ECE ICT PLP alongside colleagues from other early childhood services has been identified in milestone reports as valuable because they:

- provide opportunities for professional networking, especially for some rural services where such opportunities are seldom available
- provide the opportunity for relationships and interactions between teachers and/or services to develop over time
- build confidence and develop motivation to try out new practices back in their centres
- assist with developing dissemination skills. Most services undertook their first attempts at dissemination at workshops and hui within their clusters
- can act as an effective device to engage teachers who have stayed on the periphery of the programme.

A number of issues are identified within the milestone reports as contributing to the success of the cluster components, including scheduling regional hui on Saturdays so all team members can attend; being flexible with the teacher release funding to "reward" teachers who do give up a Saturday with either overtime or "time in lieu"; and, including specialist guest presenters at hui whose contributions add to high levels of participant engagement and satisfaction.

At the mid-point of programme the December 2007 milestone report expressed the view that the cluster workshops were the component of the model where flexibility and adaptation would be most required going forward. In elaborating on this, the report suggested that delivery of the workshops component would be likely to include more single centre workshops; a blurring of boundaries between centre visits and workshops; more evening and weekend workshops in order to meet service needs; more workshops focused on pedagogical conversations using data and scenarios from services' action research projects; more cyber safety workshops to bring new teachers up to speed; and the continuation of specific "techie" workshops where required.

The third theme that emerges from the milestone reports is the challenges arising from having some clusters spread over a wide geographical area. In these clusters, travel emerges as a significant issue for both facilitators and for participants. In addition, attracting and retaining facilitators is an issue whilst the costs of bringing cluster participants together is costly and therefore occurs more infrequently. Other issues raised concerning the impact on teachers and services participating in these geographically spread clusters include fewer opportunities to be exposed to a wide diversity of practices and ideas, and a reduction in collegial support and motivation because participating services are so far away from each other.

How useful is action research as a tool to accomplish the intended outcomes of the programme?

Analysis of the milestone reports identifies that the action research component of the ECE ICT PL programme has been the most problematic aspect for both the PLP Coordinator and facilitators, and for service teams to deal with. Although the initial reporting on the delivery of the action research workshops was positive, with facilitators noting increased teacher

confidence about launching into action research during follow-up visits, subsequent milestone reports raise on-going issues about the struggles that many services have had with their action research investigations.

Reports indicate that success in engaging in the action research investigation has been variable across services. Challenges faced by services in the early stages of the programme have included:

- identifying an appropriate research question. Many services have begun with questions that have been either insufficiently challenging or overly complex, and have at some point discarded these questions and begun again. Others have struggled to settle on a specific focus
- following the action research processes. Reports refer to teachers blurring their action research cycles and, for example, moving straight to the implementation phase
- identifying relevant data to collect.

The milestone reports also raise a significant number of factors which CORE believes are impacting on services' abilities to engage effectively with action research as a professional learning methodology, including the following points.

- Teams not operating as coherent units and therefore there is no commitment to a collaborative approach.
- Investigating team practices has not previously been part of the team's culture.
- Lead Teachers not providing leadership or administrative organisation to ensure that ongoing progress is made.
- Teams distracted by other developments (such as the implementation of 20 hours Free ECE, service re-organisation, staffing changes) and the impact of daily life in some services makes it difficult to stay focused on their action research investigation.
- Teams losing interest in their investigation or becoming frustrated, because their initial question was not pitched at an appropriately challenging level.
- There is not an existing strong culture of systematic data collection and evidence-based change in ECE, upon which the action research methodology can be built. As part of this, teachers believe that they can make improvements to their practice without having to undertake the extra work that action research entails.
- Teachers expressing a fear of research or belief that research is not part of what teachers do.
- Teachers having doubts about the validity of their data collection – manageability versus sample size.
- Teachers have engaged in a steep learning curve in terms of understanding and using ICT, alongside also engaging in learning about and undertaking an action research investigation.

Milestone reports have included suggestions for addressing some of the issues outlined above, including modifying the programme for those services struggling with the action research component and focusing more on the exploration of ICT possibilities. In considering possibilities for future ECE ICT PL programmes, one milestone report suggested delaying the introduction of the ICT component until year two of the programme. This would enable participating teachers to broaden their ICT capability and understandings before they established questions for their action research investigation.

Will the programme lead to sustainable and sound ICT pedagogy?

Each of the milestone reports provided to the Evaluation Team included comments about sustainability issues. In many instances these were not limited to sustainable pedagogy but also addressed issues around service organisation and management practices, strategic planning to ensure on-going access to quality ICT equipment, and threats to sustainability. Discussion in some milestones took a broad view so that sustainability was considered in terms of pedagogy, broadening general sector knowledge about ICT in ECE, and sustaining ICT PLP participants' enthusiasm for the programme. Reports note considerable variability amongst services in terms of attention to developing sustainable practices.

Initial milestones reported that many participants began the programme with the expectation that they would learn how to use ICT per sé rather than focus on strengthening and changing their pedagogical practices with the support of ICT. This trend is supported by the baseline survey (Ham, 2007) where the most frequently cited goal participants wanted to achieve as a result of engaging in the programme was the development of their own ICT technical skills. Tracking through the milestone reports a number of issues that have impacted positively on services becoming more aware of and developing sustainable practices are identified.

- Attendance at the ULearn 06 Conference. As the introduction to the programme for many participants, the conference offered new ways to think about ICT within teaching and learning.
- The requirement that services provide a strategic plan as part of a centre milestone report proved a useful catalyst for discussion about sustainability. Whilst there was considerable variation in services' depth of strategic planning, the process highlighted that most services did not have ICT budgets and relied on grant applications in order to purchase new equipment.
- As a result of participating in the cyber-safety workshops services began building audit procedures into their yearly review cycles and sharing safety messages with their communities. In some services, use agreements for parents, staff, and visitors are being put in place as part of normal procedures. However, a more recent milestone report also notes the need for further cyber-safety workshops as staff turnover in services continues.
- Early in the programme milestone reports noted the limiting nature of some services not having broadband access within the centre, or access being limited to the administrative spaces. As the programme has progressed, facilitators have noted the increased flexibility that is afforded by the acquisition of laptops and the wider use of internet, with almost 100% broadband availability within centres participating in the programme.
- Facilitators have commented that as children's access to ICT equipment becomes embedded within the service, such practices become commonplace and develop their own on-going momentum.

Several issues that threaten sustainability are also raised within milestone reports, including:

- service routines and structures that limit the ability of skilled teachers to support other team members to develop their ICT capability
- teaching teams who leave the use of ICT with and for children to the teacher identified within the team as the "techie" teacher
- the impact of staff turnover, especially when induction processes are not in place
- purchasing power in order to upgrade equipment over time. A number of milestones note that participating services have accessed grants from charitable trusts and caution that this approach is not sustainable in the long term. As services have proceeded through the programme, teachers and management have explored leasing options for laptops but, in many cases the required number is too low to be able to access such schemes. Teachers are questioning facilitators as to why they are unable to participate in the

MOEs leasing schemes, leading to recommendations in one milestone report that the MOE consider extending bulk buying deals to ECE, and investigate the feasibility of setting up bulk leasing deals for ECE.

A number of other issues concerning the development of sustainable practices are also referred to within milestone reports.

- Teachers access to broadband at home. Time constraints at the workplace mean that teachers using the PLP Online component of the programme tended to access this at home in their own time, rather that at the service.
- Management plays an important role in either supporting or working against sustainability. In organisations where senior staff or management personnel actively participated in workshops and hui, they contribute to sustainability by sharing ideas and practices with services beyond those involved in the programme; in contrast, other services have management who are encouraging individual teachers to carry the load of the programme, thus threatening sustainability.
- The diverse range of management structures in ECE services impacts on where the strategic planning and purchasing decisions are made. The design of the ECE ICT PL programme with its focus on centres/services makes it harder for facilitators to influence strategic planning at an organisational, rather than service, level.

To what extent are the ECE ICT PL programme's design, content and implementation by the services useful across all types of ECE services?

Whilst noting that the milestone reports are not designed to respond to this evaluation question, analysis of the reports does provide insight into a number of important issues to consider when thinking about the applicability of the ECE ICT PL programme across all types of ECE services.

The design and intensity of the programme is considerably more demanding than other MOE-funded professional development programmes requiring, for example, that participating centres engage in evidence-based research, prepare milestone reports, and disseminate their research to others. Whilst the milestone reports provide numerous examples of services achieving at this more demanding level, there is also evidence in each milestone report that suggests that the level is too demanding for all ECE services with, for example, centres choosing to withdraw from the programme because the remuneration is too low and the commitment demanded too high; high levels of anxiety amongst services concerning the preparation of their centre milestone reports; the substantial amount of release time required to enable participants to prepare for their first dissemination sessions; and the small number of services which to continue to make little progress within the contract. In addition, other factors such as staff engaged in study, staff turnover, small teaching teams (e.g., two teacher kindergartens) and the implementation of policies such as 20-hours free ECE have all impacted on both the retention and progress of participating services.

As a pilot programme, it is to be expected that there would be adaptations to the programme model as a result of lessons learnt through the piloting process. Several milestones provide useful comment on issues that have arisen that would need to be considered before delivery of the programme was extended. These include: timing issues around the completion of centre contracts so that these were finalised before the programme began; ensuring that advertising of the programme included clear statements about service eligibility and about the programme expectations; ensuring that cluster groupings were established in such a way that facilitator travel was manageable; and, ensuring that approval processes for centre action research investigations recognised that services would be confirming their research questions at different points in time.

The critical role of the programme facilitators is also evident throughout the milestone reports. The ongoing provision of team building opportunities and professional development

around facilitation, action research methodology, and technical skills for the facilitators themselves is evident through the milestone reports, and would presumably be required if delivery of the current model were to be extended across the ECE sector.

Milestone 06/07 includes an evaluative quote that neatly sums up the challenges that lie in delivering a programme such as the ECE ICT PL programme across all types of ECE services:

> The various local circumstances and organisational cultures continue to challenge the underlying premise of the contract set up: that resources, capability, dispositions towards professional learning and local support will be similar across the clusters. This is far from the truth and therefore rolling out the programme requires personnel who are prepared to exercise a good deal of flexibility and responsiveness to local circumstances (p. 16).

What are the emerging barriers that may make the difference between success and disappointing implementation and outcomes?

Throughout the milestone reports a number of potential barriers to the successful implementation of the programme are identified.

- The availability of relievers (especially qualified, registered relievers) to release staff to attend workshops and to work with the facilitators during their centre visits
- Participant expectations about the programme requirements, particularly attendance at workshop and hui. Clusters with high numbers of rural services found this to be more of a challenge, as did those in regions where a culture of attending professional development after hours did not previously exist.
- Allied to the above issue is a tension referred to, particularly in the early milestone reports, between what services and teachers expected to gain from participation in the programme and what the MOE expected in return for the level of resourcing that came with the programme.
- Lack of broadband access to the internet. Services where broadband access was not available within the play area were seen as having a barrier to web access for teaching and learning purposes. Teacher engagement with the on-line component of the PL programme was influenced by whether they had broadband access at home as many teachers said that they were too busy to join the online community whilst at work.
- The impact of personal circumstances (such as teacher sickness, maternity leave, overseas travel) and the implementation of ECE policies and developments (such as 20-hours Free ECE, kindergarten diversification, and the inclusion in the Kindergarten Collective Employment Agreement of release time for head teachers to engage in leadership professional development) were all seen as factors that diverted teachers' focus away from the programme for periods of time. The impact of such factors was identified as being greater on small teaching teams (i.e., two and three teacher teams).
- Staff turnover within services has been identified in milestone reports as a threat to the sustainability of practices. In addition, one of the most recent reports included facilitator feedback that with so many changes to staff, technical support for dissemination is likely to be an ongoing aspect of their work.
- Of interest was that whilst those services that were struggling to make progress consistently identified that lack of time was the biggest factor affecting them, facilitators felt that the time constraints faced were fairly consistent across all services that they worked with, suggesting that "lack of time" as a single factor was not necessarily a barrier.

What are the emerging enablers that may make the difference between success and disappointing implementation and outcomes?

Fewer enablers were identified in the milestone reports. Of these, a key enabler has been the level of professional development and ongoing support provided to the facilitators delivering the programme. Early milestone reports provided detailed information about the support and communication structures established for the team (who generally operated in physical isolation from each other) and about the professional learning programme set up particularly around developing the ability to mentor services through their action research investigations; developing further interactive facilitation skills; and, extending their existing ICT knowledge and skills.

In terms of enablers focused on the participating services, four aspects emerge from the provider milestone reports: firstly, the ability that facilitators had to flexibly adapt the programme model in order to individualise the delivery of centre visits, together with the provision of workshop follow-up tailored to the needs of individual services was noted. One provider report notes that the accessibility and responsiveness of facilitators was recognised within many service milestone reports. Secondly, the teacher release payments available within the programme played a major factor in encouraging participating teachers to attend out-of-hours workshops and hui, including on Saturdays. The flexibility in how this funding could be applied helped to mitigate against the shortage of qualified, registered relievers. Thirdly, services that have broadband access to the internet were more easily able to access the web for teaching and learning purposes. A final enabler identified in milestone reports was the sponsorship to the ULearn conference, with the following comment: "sponsorship to ULearn may well emerge as the single most significant enabler for this programme because of the motivation and exposure to possibilities it generates" (Milestone 07/07, p. 23).

Final comments emerging from the document analysis

To conclude this document analysis of the milestone reports there are some final comments that arise from the analysis of the reports supplied to the Evaluation Team. These themes are:

- *Milestone report style*
  When analysing the milestone reports, it is apparent that much of the rich detail about what is happening in individual services is being reported through other mechanisms, such as oral reporting, service milestone reports and at Advisory Committee meetings. Whilst these milestone reports do include examples of progress or issues arising, these tend to be indicative rather than comprehensive. This is not a criticism of the reports, but rather a comment that what is revealed through these written milestone reports is likely to be a partial picture of the work that has been undertaken and the progress made by services participating in the programme.

- *Intensity and complexity of the ECE ICT PL Programme*
  The intensity and the complexity of the model developed for the ECE ICT PL programme are key features that emerge clearly from the document analysis. With regard to intensity, this programme extends for three years in a pattern unfamiliar to most ECE teachers and also demands more of participants in terms of accountability (milestone reports), engagement in research activity and dissemination activities.

  The actual programme model is complex in its combination of centre visits, cluster workshops and hui, regional hui, Lead Teachers, the on-line community, and national ULearn conference opportunities. Likewise what the programme has aimed to achieve is complex – in addition to the three programme goals of increasing teacher capability, transforming pedagogy, and enhancing learning outcomes for children, participants have had to learn about action research and develop skills in dissemination and in writing formal milestone reports. These latter requirements appear to have demanded considerable input and energy from both the programme facilitators and from the participants. Where participants have been successful in achieving these multiple goals, the pay off has been high; for those where success has been slower or less achievable the demands appear to have been a cause of high stress for participants.

- *Variability in participating services and variability in progress*
  Whilst the services participating in the programme mostly come from the kindergarten and education and care sectors, collectively they are a diverse group of early childhood settings. The issues discussed in an earlier section of this report, concerning the usefulness of this programme model across all types of ECE services, are applicable here.

  The milestone reports are clear that progress has been variable across participating services, and have identified a number of internal and external factors that have impacted on progress, including issues like staff turnover, shortages of qualified registered relievers, team dysfunction, the implementation of other ECE policies such as 20-hours free ECE, and developments such as diversification within the kindergarten sector. Whilst outside the control of the programme provider, such issues are impacting on the pace of progress in some services and need to be taken into account when evaluating the overall benefits of the programme.

- *Flexible approach*
  In response to the individual needs of participating services and teachers, and in recognition that this is a pilot programme, the National Programme Coordinator and facilitators have taken a very flexible approach to their work with services. This is demonstrated, for example, through the two Auckland clusters working together on some aspects; providing follow-up workshops on cyber-safety to meet the needs of newly appointed staff; providing "just-in-time" support for services around preparing milestones and dissemination activities; adjusting the timing and patterns of centre visits to suit the needs of the centre; and blurring the boundaries between centre visits and cluster workshops.

- *The position of the ECE ICT PL programme in relation to other MOE-funded programmes*
  It is interesting to reflect on where the ECE ICT PL programme sits in relation to other MOE-funded programmes. By drawing on knowledge of the wider ECE sector including the provision and funding for the Centres of Innovation (COI) programme and the Kei Tua o te Pae and Te Whāriki professional development programmes, it is possible to situate all of these programmes on a continuum in terms of the funding that they attract and the demands that they make of participating services and teachers. The ECE ICT PL programme sits between the COI programmes on the one hand and the Kei Tua o te Pae and Te Whāriki programmes on the other. The evaluative comments made within the milestone reports suggest that some services and teachers have judged both the funding and the workload demands of the ECE ICT PL programme against their understandings and experiences of one or more of these other programmes, resulting at times in expectations that do not match the programme's outcomes and expectations.

Chapter Five: Internet Survey and Interview Results

Introduction

The data collected in this evaluation are presented in two results chapters. In this first chapter information and views from the participants in the programme is presented, whilst in the second results chapter data from the case study phase of the project is presented. This chapter presents the findings from two key data collection processes (internet survey, interviews). The multi-method approach adopted for this evaluation has enabled the evaluation team to present both quantitative and qualitative results in response to the six key evaluation questions. Demographic information about the respondents to each of the two data collection procedures is presented first, followed by a description of the coding procedures undertaken for the qualitative data. Each evaluation question will be dealt with in turn, with both data sources presented so that a full picture of the outcomes can be presented. The quotes that have been included in this results section are illustrative. In particular, they have been selected as a result of a systematic process whereby only those quotes that represented the significant number and/or majority of respondents were selected for inclusion.

Demographic Information

Respondents for internet survey

Surveys were completed by respondents from at least 51 of the 59 services currently enrolled in the programme (NB: in some clusters services with multiple licences are enrolled in the programme, and in some instances respondents identified the overall service name rather than their particular section).

There were 178 respondents to the internet survey, which represents approximately 60.4% of the total number of teachers/educators who are currently involved in the programme. The vast majority were female (98%) and over 40 years of age. In particular, 30% of the individuals were aged between 40–49 years and a further 30% were over 50 years of age. Twenty-four percent of respondents were aged 30-39 years while 15% were between 20–29 years of age. These demographics are interesting, given that Ham's (2007) baseline survey indicated that 57% of respondents had taught for ten years or less. In this survey, participant age cannot be assumed to be correlated with length of teaching service.

Respondents were asked to identify the type of service they were working in. Of the 173 people who responded to this question, 49.7% were working in an education and care setting while a further 41.6% were working in a kindergarten. Smaller percentages of respondents were working a hospital service (4.6%) or playcentre (4%). The average number of staff working in each service was seven; however the range was large with the smallest team comprising two staff whilst the largest had 29 team members.

When asked to indicate the number of children enrolled in their service, 123 participants responded to this question. Eight respondents who answered this question (6.5%) were from small services (25 or fewer children); 41 (33%) were from medium (26–50 children); and 74 (60%) were from large services (over 51 children). Fifty-five respondents (30.8%) did not indicate the number of children attending their service. The average number of children per service was 60, with a range from 20–130. Most respondents indicated that they worked in a service that catered for children over two years (61.1%) while 29.1% said that their service catered for mixed age groups. Less than ten percent indicated that they only worked with children aged under two years.

The Lead Teacher was asked to provide data regarding the ethnicity of children attending their service drawn from their 2008, RS61 form. Fifty Lead Teachers told us the ethnic make-up of the children attending their services. Twenty-five (50%) had numbers that generally reflect the NZ population; 12 (24%) were almost exclusively Pākeha children; four (8%) were predominantly a mix of Māori and Pasifika children; two were predominantly Māori; one was

only Pasifika; and six (12%) were of various other mixes (e.g., two were predominantly Pākeha and other European, one was predominantly "Other", and three had mixes of children but low Māori numbers). The average number of NZ Māori children in each centre was seven, Pasifika (3), Asian (4), NZ European/Pākeha (46), Other European (3), Other (2).

Respondents for the interviews

Telephone interviews were undertaken with the five facilitators employed at the time in the programme, together with the National Team Leader who was also covering the workload for the sixth cluster whilst a new facilitator was appointed. All interviewees were female and the five facilitators have worked with their clusters since the beginning of the programme.

Data Coding

The internet survey comprised both quantitative (N = 45) and qualitative questions (N = 18) together with an additional section completed only by Lead Teachers (containing thirteen quantitative and three qualitative questions). As part of the development of the evaluation matrix described in the methodology section above (see Appendix A) questions in the survey were mapped against the overall evaluation questions. Quantitative data were uploaded into SPSS in order to produce descriptive statistics whilst qualitative data were uploaded into NVivo to enable data to be coded into inductive categories using a grounded theory approach. Whilst the predetermined evaluation questions enabled the development of an initial set of possible categories, the evaluators were open to new categories emerging from the data as they proceeded through the data coding.

The qualitative data gathered through the interviews with programme facilitators was coded using a parallel process to that used with the survey qualitative data. Quotes from both the survey and the interviews are included within this results section as illustrative examples. As noted in the introduction to this chapter such quotes have been carefully selected as representative of a significant number of responses.

EVALUATION QUESTION ONE: **Does the ECE ICT PL programme design, content, and implementation by services achieve the intended outcomes of the programme?**

This first evaluation question is very broad in scope. To address this question the data will be presented by focusing on each of the three goals in turn.

GOAL ONE: Increase ICT Capability

Internet survey data

In order to seek information about this intended goal the respondents were asked to provide detailed information about their experiences with the various components of the programme. Second, they were asked about their experiences with and knowledge of internet safety. This was considered to be a critical aspect of teacher ICT capability and development, so that a safe environment could be ensured for all ICT users. Respondents were not asked to rate their current levels of ICT confidence and competence or to identify the types of ICT they were using as the CORE mid-project survey had previously collected data on these issues (see document analysis).

Programme components

The survey asked respondents to comment on the extent to which each of the components of the ECE ICT PLP had increased their knowledge, skills and confidence in relation to how ICT can enhance learning. These three aspects of capability were focused upon as it was believed that one can have increased knowledge about an area but be lacking in both skill and confidence to use that knowledge. Similarly, one can obtain a skill and have some confidence in using it but not necessarily have the knowledge about the activity to transfer this information to teaching situations or to mentor colleagues. Therefore the evaluation team believed that all three areas needed to be considered when discussing capability.

As can be seen from Table 1 below the first programme component focused on was the Hui. An overwhelming majority (88%) of respondents indicated that they had attended at least one Hui and 74.8% strongly agreed with the statement that they were a useful way of increasing knowledge about ICT. The majority of the remaining respondents (23.8%) agreed somewhat with this statement and only 1.4% disagreed somewhat with this statement. When asked about increasing their level of ICT skill, 51.3% agreed strongly while 42.6% agreed somewhat that Hui were successful in increasing their skill levels. Again, a smaller percentage (5.4%) suggested that they disagree with this statement. Finally, when asked about the success of Hui in raising their level of confidence results were very similar to the earlier responses regarding skill increases with 52.7% agreeing strongly with the statement and 43.9% agreeing somewhat.

The second programme component discussed was the workshops. Most respondents had attended at least one workshop (86.9%) and 75% of these people strongly agreed with the statement that the workshops were useful in increasing their ICT knowledge. Almost 72% of respondents strongly agreed that their skills had improved whilst 72.3% strongly agreed that the workshops had improved their level of confidence in using ICT to enhance learning. Almost all other respondents to these questions (range from 23 –25.7%) agreed somewhat with the statements about workshops increasing their knowledge, skill and confidence with ICT.

The respondents were also asked to indicate which aspects of the Hui and workshops they found particularly useful by rank ordering a number of potential benefits. They indicated that the *sharing of innovative practices* was the most useful aspect followed by *networking*, *introduction to new technologies* and *opportunities to use ICT equipment*. The inclusion of *guest speakers* and *being able to develop collaborative projects with teachers from other services* were identified as the two least useful aspects of the Hui and Workshops.

The survey then asked respondents about their use of the ECE ICT PLP Online website. Just under eighty-three percent of respondents indicated that they had visited the website. Almost 46% of the respondents agreed strongly that visiting the website had increased their knowledge of ICT with 52.1% indicating that they agreed somewhat with this statement. With regard to skill, 28.4% agreed strongly that the website increased their skills whereas 63.8% somewhat agreed that the website had been useful in increasing their ICT skills. Finally, 28.9% strongly agreed that visiting the website had increased their confidence while 59.9% somewhat agreed that the website increased confidence. When asked about which aspects of the website were particularly useful the *Café (Discussion Board)* was ranked as the single most useful aspect by 43% of respondents (55/128). This was followed by the *Spotlights*, *Resources*, *Blogs*, and *Information/Administration*. The *Online Workshops, Community Groups* and *Special Interest Groups* received the lowest rankings.

The next programme component focused on was the facilitator model. Almost all respondents to the survey (98%) answered this question and indicated that they had received advice and help from their facilitator. With regard to the extent to which ‘having a facilitator available to work individually with my centre/service’ helped improve their knowledge of ICT, 78.2% agreed strongly with this statement whilst 20% agreed somewhat. Similarly, 80.6% agreed strongly that the facilitator component helped them with their ICT skills whereas 14.5% agreed somewhat. Finally, 80% strongly agreed that the facilitator programme model increased their confidence with a further 17% indicating that they agreed somewhat with the statement.

Table 1: Goal 1: Increasing ICT capability

		Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly	Total Number of Respondents
Hui were successful in increasing:	Knowledge	0% (0)	1.4% (2)	23.8% (35)	**74.8%(110)**	147
	Skill	0.7% (1)	5.4% (8)	42.6% (63)	**51.3% (76)**	148
	Confidence	0.0% (0)	3.4% (5)	43.9% (65)	**52.7% (78)**	148
Workshops were successful in increasing:	Knowledge	0.7% (1)	1.4% (2)	23.0% (34)	**75% (111)**	148
	Skill	0.7% (1)	2.0% (3)	25.5% (38)	**71.8%(107)**	149
	Confidence	0.7% (1)	1.4% (2)	25.7% (38)	**72.3%(107)**	148
Online community was successful in increasing:	Knowledge	0.7% (1)	1.4% (2)	**52.1% (74)**	45.8% (65)	142
	Skill	0.0%	7.8% (11)	**63.8% (90)**	28.4% (40)	141
	Confidence	0.7% (1)	10.6% (15)	**59.9% (85)**	28.9% (41)	142
Facilitator was successful in increasing:	Knowledge	0.0%	1.8% (3)	20.0% (33)	**78.2%(129)**	165
	Skill	0.6% (1)	4.2% (7)	14.5% (24)	**80.6%(133)**	165
	Confidence	0.0%	3.0% (5)	17.0% (28)	**80.0%(132)**	165

In summary, the above components of the programme appeared to be useful in increasing the majority of respondents' knowledge, skills and confidence in using ICT to enhance learning. The Hui, workshop and facilitator components were all seen as particularly useful for increasing knowledge of ICT whereas the facilitator model was viewed as the most effective component for increasing participants' skills and confidence (as were the workshops to a slightly lesser degree).

Internet safety

Almost all of the respondents (N=169; 94%) who answered the question concerning cyber-safety indicated that they had gained knowledge about internet safety (e.g., cybersafety, Netsafe) from the programme. When asked to indicate where they gained this knowledge the three most frequently cited sources were through workshops, their facilitator and Netsafe resources. The respondents were then asked to indicate what changes, if any, had been implemented in their respective services with regard to internet safety. The most frequently cited changes were the creation of policy documents (80%), informing families (79%), systems for reporting inappropriate websites (56%), and anti-virus software (56%). Other initiatives included systems for logging on to the internet (39%), and software that restricts access to internet sites (25%).

Additional comments

When respondents were given the opportunity to provide additional comments about the professional learning experiences and opportunities available through the ECE ICT PL programme, 71 provided information. Most comments were very positive as illustrated by the following quotes.

> *I can not speak highly enough of the professional learning opportunities that this PD has offered. We live/teach in a rural area so the opportunities for professional relationships with others in the field that I know will be ongoing after the programme is complete has been immeasurable. The programme has strengthened our relationship as a team even though we have had a huge number of changes. We had introduced an induction workshop that we are all involved in when a new member joins us. This gives us a real sense of togetherness, sharing the same vision and journey. Our relationships with children have changed as we always view them now as confident and competent teachers and learners rather than just read it and acknowledge it. Our practice now proves it! We have three teachers keen to do further study that was previously unheard of (myself included). I have even considered an e-fellow. Two years ago I wouldn't have known what it was let alone ever believe I could do it.*

> *I felt the program expected a lot of personal interest and time to explore all the available learning experiences and if you're not the type of teacher who has time or interest in being on the computer again at home, you couldn't really maximise the potential of what was on offer. The documentation and report writing for each research cycle commanded a lot more time than I expected for our teaching team. Because our team has such a varying degree of ICT knowledge and skill and with the type of programme and learning environment that we have, our progress in using ICT as a learning tool with and alongside children has been a challenging journey. However as a teacher who has invested personal time and interest in extending on my ICT knowledge and skill, I think being part of the programme has definitely given me a lot in terms of using ICT to make "children's learning more visible" which incidentally is our centre's overall focus.*

> *All the learning opportunities within the ECE ICT PLP has allowed me to develop and transform my own beliefs regarding the use of ICT within early childhood centres.*

> *What an amazing experience: huis, workshops, conferences. I feel very LUCKY indeed. It is extra work on top of a busy schedule but the BENEFITS far outweigh the EXTRA WORK. Having a facilitator who comes to the centre; and being able to work one-on-one with her, I have learnt so much about ICT, making a PowerPoint, writing professional reports etc. It is a great challenge but I am SO enjoying it. Thank you.*

Interview Data

The facilitators and national coordinator were asked to provide their views about the impact of the programme in supporting participating services to achieve the three programme goals. Specifically, the interviewees were asked about the effectiveness of the overall model, together with the usefulness of individual component parts of the model. Some data from this question is reported within the results for Evaluation Questions 2(A) (cluster models) and 2(B) (action research).

The over-riding theme that emerged when the facilitators and national coordinator were asked about the effectiveness of the overall model and the component parts was the flexibility that they had to tailor the programme to the needs of individual services and participants. As one facilitator noted:

> *The strength of the programme is its flexibility – I can adapt it to suit the needs of the individual centres, for example, the timing of my visits (whether these happen during the session or at night), whether I'm working with individual teachers or with the whole group.* (Interview 1)

Her thoughts were echoed by another facilitator who commented:

> *The model is effective due to variety and being able to be in-tune with centres, flexibility. You can do more workshops or more visits. For one of the kindergartens there are more virtual visits, Skyping or emails. Whatever suits the centre.* (Interview 2)

There were also differences in how individual facilitators worked with the participants in their services, ranging from working with individual teachers in the office on aspects of ICT to working alongside teachers with the children in order to model pedagogical practices, as Interviewee 4 described: *"it is important to be in the centre with children, with parents so when you show them you are actively role modelling and so are bridging between the workshop and back in the centre".* The availability of relievers was, at times, a determining factor in how the facilitators organised their visits and worked with the teachers.

Four interviewees identified that the PLP Online was an important part of the programme for teachers, particularly in developing relationships and a sense of community beyond their services. The networking aspect has been useful where services have been exploring the use of similar ICT, such as blogs and Skype with services beyond their clusters. Interviewees reported that the *café* was the most accessed part of the website, both for networking and for technical information.

The ULearn conferences, regional hui and workshops were also identified by interviewees as important components of the programme in terms of building wider networks (especially where services had common action research projects) and in maintaining the momentum of the programme. The flexibility of the programme delivery was also evidenced in facilitators' comments about how they adapted workshops and hui to address issues of geographical distance and isolation within some of the clusters.

Information about participants' developing ICT capability was not specifically elicited during the interviews as the CORE mid-project survey was being analysed at that time with the results being made available to the evaluation team. However, close attention was paid to the development of participants' understanding and practices around cyber-safety as this had emerged as an important theme during the workshop with the MOE. All interviewees identified the importance of including the workshops on cyber-safety as a compulsory component of the programme, and noted shifts in teachers' thinking and practices about the use of visual images, internet access and the establishment of on-line activities such as websites and blogs. Some interviewees noted variations in the degree to which all services were adopting practices to support cyber-safety, with the participation of management personnel in cyber-safety workshops seen as an important catalyst to developing cyber-safety policies and practices for the service.

GOAL TWO: Transforming Pedagogy

Internet Survey Data

In order to gain information about this goal the respondents were asked a series of questions about their teaching practice related to the use of ICT, links to the community, and the way in which children were supervised while using the internet and ICT.

Using ICT with children

The respondents were provided with a list of possible reasons for using ICT with young children. They were asked to indicate which of the six listed reasons were the most relevant and which were the least relevant. The most frequently cited reasons were to *develop children's thinking and problem solving skills* and to *encourage children to reflect on their own learning*. The next most frequent response was to *develop children's communication or social skills for working collaboratively with others*. The three least relevant reasons were to develop *children's basic skills in computer literacy*, to *encourage children to become critical consumers* and to *develop skills for future jobs and careers*.

Reflective practice

Respondents were asked whether they use ICT as a tool to reflect on practice and 95.2% (167) of those who responded indicated yes. They were then asked to indicate the ways in which they used ICT in reflective practice. An overwhelming number indicated that they used ICT with learning and teaching stories (93%) together with photographs (89.9%) to support reflection. Video recordings were used by 50% of respondents whilst 21.5% indicated that they used voice recordings. Other less commonly used ICT to support reflection on practice included blogs, diaries on Google Docs and Photo Stories.

Links with the community

When asked about the use of ICT to collaborate and form links with the wider community, 135 (75.8%) respondents answered this question. Just over eighty-three percent of respondents indicated that this was an activity that they engaged in and gave examples of their practice, including emailing (58), using blogs (39), and using Skype (17). A number of staff indicated that they used these tools to keep in touch with families/parents/whānau (46) during the day and to share examples of children's work. Another group of respondents (18) said they used these tools to contact other ECE centres as well as local schools, health centres, libraries etc.

The following examples were indicative of many respondents:

> *Communicating with our local librarian – organising trips to him and visits from him to the kindergarten, booking entertainment for the kindergarten, inviting visitors and organising trips, etc.*
>
> *Established Google Docs to communicate with the wider schools in the area, with the committee and with colleagues in the [X] Association.*
>
> *Have a blog in our latest newsletter (sent digitally to most families now), which shows parents some of the attractions in the outdoor area at kindergarten – especially for those parents who rarely make it into the building. Communicate with outside agencies such as Special Education, use internet for research – ask questions and get answers off various sites. Children take cameras home, children and families email photos etc to kindergarten. Send things directly to family blogs that get sent to relatives overseas.*

Supervision of children

Another area of teaching practice that was investigated was the supervision of children as they engage in ICT and internet use. When given three options with regard to the way in which children are supervised with ICT equipment, 165 (92.6%) teachers responded as

follows: a slight majority of respondents (60%) indicated that they had a flexible approach to supervision depending on individual children's expertise. A further 21.8% said that the equipment is mostly used with adult supervision and the remaining 18.2% said that children have free access to the ICT equipment. A different picture emerged when they were asked about supervision of internet use. Of the 157 respondents to this question, the overwhelming majority (88%) indicated that it was mostly used with adult supervision, with only 6.4% suggesting that they use a flexible approach depending on the child's expertise. A further 5.7% indicated that they have safety measures in place therefore children are free to access the internet. When asked whether they agreed with their service's current practices for the supervision of children's ICT and internet use, 163 (91.5%) responded with the majority indicating that they agreed with their service's current practices (96%). However, nine respondents said there were issues around access to computers/internet for children, including that there were not enough teachers/staff to help and/or monitor usage (4) and/or that the centre had no internet access or it was only available in the office (5).

> *Children's access to equipment is restricted by staff readiness and availability to supervise safe use, which is to a degree decided by financial restraints and staff organisation. Higher staff to children ratios would result in equipment being more readily available which is my personal preference. Also all staff would be required to include the use of the ICT equipment, making it available to children daily, cutting out the reliance upon single staff. I feel this would require staff to develop their personal use and therefore increase their know how and confidence with equipment, benefiting the children as staff became more able to use the equipment with them.*

Interview Data

The evaluation matrix identified several key indicators concerning the transformation of pedagogical practices that we aimed to investigate through the interviews with programme facilitators and the national coordinator. These were: their perceptions of shifts in teacher attitudes, including how children were viewed in terms of their competency with and access to ICT; shifts in teachers' use of ICT to support reflective practices; and the development of collaborative practices through the use of ICT.

All interviewees were able to describe numerous examples where teacher practices had shifted during the course of the programme. An important theme that emerges through these data is the variation in what teachers bought to the programme, both in terms of ICT knowledge and experience and in terms of attitudes towards children using ICT. One respondent described participants in her cluster as coming from one of three attitudinal groups: the first group included those who thought that children shouldn't use ICT and that there was no place for it in ECE, whilst the second group was more receptive to the use of ICT but were concerned that ICT would end up dominating programmes. The third group was described as seeing ICT as precious, expensive equipment where adults made decisions about when it was available. Other interviewees felt that, although the pace of change was variable amongst services, that the changes occurring in those services where attitudes around children's competency and access to ICT were shifting were as important as the more visible changes that were occurring in other services:

> *One issue is around the rate of change – there are some real high flying centres but there are also some very conservative centres which are now making attitudinal changes – some of these attitudinal shifts are more exciting than the high flyers but might not be seen that way by others.* (Interview 6)

When discussing changes in pedagogy, all of the facilitators said that as teachers became more confident and knowledgeable about using ICT, their teaching practices around ICT changed. As one respondent commented, "*There have been shifts in practices because if teachers are more confident themselves then they are more likely to use it with children*" (Interview 2) whilst another felt that *"It's not about the ICT – it's woven through it. The teachers are learning to enhance learning with ICT" (*Interview 4).

Shifts in teachers' views of children as competent users of ICT and their subsequent access to ICT appear powerful from the examples offered during the facilitator interviews. One interviewee commented that:

> *I've seen huge shifts – at the start there were lots of teachers who were fearful of children using the equipment – scared that 'it would be broken'. They held the power over the equipment or, for some of them, saw no need for children to be using ICT's….Now I'm seeing computers out in the centre, not in the office; and the sheets that used to cover the computers are not there anymore. There's been a shift from 'we let the children…' to teachers seeing that children have core rights to access and use the equipment.* (Interview 1)

Another facilitator commented that there had been:

> *Huge variation from where they started to where they are now as individual teachers. One teacher reported half the children are new in the morning and the 'stars' are teaching other children. Pedagogy has changed. How they introduce changes is more relaxed. New children are observing the 'stars' and the teachers are sitting back more. They are not so directive, not so precious.* (Interview 3)

The shifts in attitudes appear to encompass teachers feeling more relaxed about younger children using ICT, as shown in this example:

> *In one education and care centre the teachers started off a bit reluctant about using the equipment but now their infants and toddlers have free use of the cameras – they're seeing these children taking and reviewing their photos. They're starting to send the camera home to help with the transition into the centre – children (and their parents if they are too young) are taking photos at home and the teachers are putting them onto a slideshow for when the child starts at the centre.* (Interview 5)

Another interviewee identified a possible explanation for the shifts in teacher attitudes:

> *One of the things that has helped is that ICT is probably the first area where some of the children have a greater intuitive knowledge than the adults do – it's a very credit based thing – for example, the curiosity that children show with the digital microscopes, such an intense focus, it engenders a shift in teachers' attitudes.* (Interview 6)

When asked about teachers using ICT in order to engage in reflection upon their practices, four interviewees provided examples of teams using google.docs or blogs as tools for planning and reflecting on practices. These teams were finding these to be useful devices that enabled all staff (and at times parents) to contribute to discussions and reflections asynchronously**.** Some teams or individuals were using reflective journals, and one team had trialled using video-taping "*to review their working with children. One teacher realized she was quite directive. [They were] using interviews and leading to changing the teacher's strategy*". (Interview 3)

Respondents were also probed for their views on the effectiveness of the ECE ICT PL programme in developing collaborative practices within and beyond services. A number of programme components, particularly the cluster model, workshops, hui and ULearn conferences were identified as being useful for developing relationships and networking between services across the country. Alongside these face-to-face components, interviewees referred to a number of services that were actively using Skype or blogs to communicate with other services and with their local schools or with parents and whānau members overseas. Several interviewees described how some services in their clusters are actively advocating for ICT with their local schools: "*they are into advocacy and asking primary schools 'are you ready for our children*?'" (Interview 2) Another respondent described how one of her services was focused on transition to school for their action research:

> *One centre's research was on transition to school and they have 11 schools they contribute to. They have developed relationships with schools and visited them all. They*

> *have taken photos of the teachers and the areas that children are interested in. The photos have been turned into booklets for each school and they are available for children to take home and use prior to a visit. They have also made corkboard displays and have engaged children in discussions about going to school and with their families who else is going to the school. It has influenced which school they would go to as before parents hadn't considered making a choice. Going to school is part of everyday conversation. There are plans to work toward reciprocal visits. The new entrant teacher is interested in Skype but it hasn't quite happened yet. The centre opened a Blog on transition experiences in order to introduce schools to the kindergarten community.* (Interview 3)

The evaluation team was also interested in the extent to which involvement in the programme was supporting collaborations between teachers and parents about children's learning. Discussion of these data is presented in the next section of this chapter, alongside other data concerning the impact of the ECE ICT PL programme on *enhancing learning outcomes for children*.

GOAL THREE: Enhanced Learning Outcomes for Children

Internet Survey Data

In order to investigate the extent to which the programme has facilitated enhanced learning outcomes for children, the respondents were asked to (1) indicate the extent to which ICT was used by all children in the centre, (2) provide examples of children's actual ICT use with specific learning outcomes in mind, (3) indicate the ways in which parent involvement may have changed, and (4) provide information about how ICT may have influenced transitions.

Equitable use of ICT by children

Respondents were asked a series of questions designed to elicit information about the equitable use of ICT by children when considered by the children's gender, any special needs or disability, ethnicity, first language usage, and age.

Respondents were asked to indicate the extent to which both girls and boys use the ICT equipment. Of the 163 respondents to this question, 77.9% said that boys and girls use ICT equipment the same amount of time while 20.2% said that boys use it more than girls. Less than 2% suggested that girls use it more than boys. One hundred and forty-two people responded to a question concerning the use of ICT by children with special needs or disabilities. Of these respondents, 62.7% indicated that these children used the equipment (in addition to any assistive technology) the same amount of time as typically developing children while 35.2% indicated that children without disabilities used the equipment more than children with disabilities.

When asked about the use of ICT equipment by Māori and Pasifika children 146 people responded: 87.7% indicated that these children used the equipment the same amount of time as other children while 11% said they use it less. Slightly fewer people (140) responded when asked about Pākeha children but similar results were found with 85.7% of respondents saying these children use the equipment the same amount of time as other children and 12.9% indicating that they use it more. One hundred and thirty-four people responded when asked about children for whom English is not their first language with 76.9% of respondents indicating that these children used the equipment the same amount of time and 17.9% noting they used it less than other children. A similar finding was indicated when the respondents were asked whether the use of equipment by children was equal regardless of ethnicity. Specifically, 86% of the 154 respondents to this question said that this was true while 14% said it was false.

Finally, when asked about the age of children using the equipment nearly half of the respondents were in services that didn't cater for children under two years of age. Of those respondents whose services did cater for under-twos, 53 (67.9%) indicated that the

equipment was only used by children over two while 25 respondents (32%) indicated that children aged under two used the ICT equipment.

How children are using the ICT equipment

Respondents were asked to provide examples of how children use ICT equipment under six pre-determined categories: using ICT equipment independently or with some assistance; as a tool to follow their learning interests; for communicating with others (locally, nationally or internationally); to re-visit previous experiences and learning; to enhance early literacy; and to teach others (adults and/or children) to use equipment or software.

(1) *Children using ICT equipment independently or with some assistance*. One hundred and fifty-five people responded with examples of how children were using equipment independently or with some assistance from others. Two-thirds of these respondents indicated that the children used cameras (100) often completely independently to take photos of themselves, friends and to record what they had been working on at the service. Examples were provided of children selecting photographs to be included within their portfolios and of children using their photos with Photostory3. A number of respondents described episodes of children making movies (16) and finding a game on the internet as ways that children may use the equipment independently. In addition 27 respondents mentioned the independent use of digital microscopes by children, as evidenced by the following quote:

> *A boy approximately 3 years old used photos he had taken with the digital microscope to make a photo story3. 'I know how to do this', he told me as he made his story.*
>
> *A child clicking on the internet explorer icon, using the favourites list to find the website that was sought after, and once at the appropriate site navigating her way around to the game she intended to play.*
>
> *The morning children frequently access the camera and now peer tutor the newer children who are keen to take a turn. It is not uncommon for children to document their own learning, e.g., a child discovered she could jump from the big box. Her friend was the one who photographed it.*
>
> *One of our girls uses the digital camera constantly to record imaginative scenarios for her story telling. These photos are then recorded in iMovie and in Comic Life - learning stories.*
>
> *Our children have taught themselves how to use Kidpix on the computer and take many photos using the kids' digital cameras. One child had figured out how to write using Kidpix and proceeded to write his name. The capital letters on the keyboard confused him a bit so I had to show him the L and the A but he knew what the enter button did and I showed him the backspace button to correct mistakes and space bar to put spaces between words.*
>
> *A four year old girl had built an amazing block construction, but it was the end of the day and she needed to pack it away, so she asked to use the digital camera to photograph her work, so she could rebuild it the next day and complete the parts she hadn't had time to complete.*

(2) *As a tool to follow the children's learning interests*. One hundred and fifty people responded to this question. Once again the ICT equipment referred to most frequently by respondents was the use of digital cameras (63) followed by using the internet (38), digital microscopes (36), and making movies (16). The following quotes provide some examples:

> *A child followed the metamorphosis of a butterfly from the egg stage using a camera. A process that took considerable time and patience.*

A child used the digital camera to record finding some spider eggs on the bottom of our basket ball net stand. Then they looked up spiders on the Internet with adult assistance.

One child - who recently turned two had an interest in ICT in general – he loved being able to use the child friendly camera, watch photostory3 that were made with photos of him in it – being able to do voice-overs about what he see's on the laptop screen etc.

A two year old with a real interest in animals, asked if he could watch the animals on the computer. He was referring to you tube clips that he had seen previously, that showed him video footage of his favourite animals in their natural settings.

A four year old girl wanted to explore whether or not birds have ears. Using the Internet she researched her questions to find the answer. The page was printed and shared with the other children both at this centre and at a kindergarten.

The digital microscope supported children in their passion for insects. They bought in finds from home and the kindergarten gardens to view through the microscope. Movie clips were taken of monarch caterpillars munching through leaves. The internet also provided quick and up to date information on the insects being investigated by the children. This was totally child driven and teachers were on hand to provide techie support where needed.

(3) *Communicating with others*. Respondents were asked to indicate whether children were using ICT equipment in order to communicate with others, locally, nationally and/or internationally, and 134 people responded with examples. The most frequently used ICT tool for communicating beyond the service was email (51), including sending photos to family members by email (28). Respondents also identified using Skype (24) and blogs (11) for communication purposes. The following examples are illustrative:

Children email their family members and sending photos of themselves engaged in an experience.

Probably emailing a child who is away in England and due to come back, keeping the relationship alive and well.

Children who have gone on over seas trips – e.g., a trip to Disney Land have emailed the kindergarten photos. These photos along with the letter from the child have been shown up on the big screen using the data projector for all the children to see and discuss. This has given a deeper understanding of where their peer is and what they are doing.

A recent immigrant child with English as her second language conversing with children from a total immersion language centre through Skype.

Using Skype to communicate with a grandmother in a different city.

Using Skype we have had a Mat time with C, a teacher in America, and talked about life in New Zealand and asked her questions about life in America. We also used our blog to ask her children questions about life in America and they used their blog to ask us questions about life in New Zealand.

(4) *ICT as a tool to re-visit learning experiences*. Respondents were asked to provide examples of children using ICT as a tool to re-visit previous experiences and learning. Of the 150 people who responded to this question 54.6% (82) identified the use of photos included in portfolios, e-portfolios, wall displays, Photostory formats, and sideshows while 31 respondents shared examples of children watching movies and DVD's that the children and teachers had made. Examples showing other tools such as Skype and the internet being used to re-visit learning were also provided.

Using the laptops to look through e-portfolios to revisit many past adventures.

Skyping – telling others about our learning experiences.

Internet to continue looking for harbour maps to extend his knowledge on types of harbours, geography aspects.

DVD's created through i-Movie have been used by children to revisit projects and individual achievements. One child replayed his rugby DVD constantly at both kindergarten and at home. His parents told us the family, friends and visiting tradesmen were asked to come and view his work.

One example is when a child narrated the local Māori legend from drawings done by many children, placed on a wall mural, digital photographed and placed into a Photostory format. This is still very popular story.

Digital photographs are used everyday to record learning and displayed on walls and in portfolios. S wanted to do a tricky pattern puzzle and had seen me taking a photo of the puzzle when another child had completed the puzzle. He asked Z if he could look at her portfolio and find the Story with the picture of the puzzle. They then worked on the challenge together – and of course took their own photo of their achievements.

The children are able to use the slideshows that run on the laptops to see themselves involved in learning. Teachers record their voice to share children's self assessment; M had created a video of herself engaged in an activity where she recognised her learning as 'perseverance' .When revisiting the movie with me M reflected on what that meant: "I know I persevere. That means I don't give up" and then she said, "I'm going to take photos of children persevering". M took the camera and went around kindergarten recognising the habit of mind [of] perseverance in other children and recorded it to later come back and clearly articulate others learning linking it to her own.

(5) *ICT as a tool to enhance early literacy*. The fifth question in this series of how children's use of ICT was supporting their learning focused on ICT as a tool for enhancing early literacy. One hundred and thirty eight people identified examples, including children typing, even if it is only their own name (44), and using computer programmes that target literacy (37). Others respondents identified exposure to print via the internet (30), and the development of oral and/or visual literacy, especially when children narrated their stories or told teachers what to write (21).

A photo story was made with a girl to retell a story the class had heard and made pictures of.

Taking photos of different numbers of things for a counting game

A boy under 2.5 made use of the microphone on the lap top to record his voice telling the story he made. He had to experiment with voice projection to ensure that he can hear his voice. Confidence to communicate in the form of oral literacy.

Reading and recognizing symbols on the computer/camera. Making books of experiences they have taken part in. Blowing up favourite children's books to enhance learning.

Most programmes require children to log in using their own name. Many of our programmes have huge amounts of environment print and the children can quickly identify these words like ...exit...stop...print...enter... basic directions etc. We have noticed that the children can quickly break that initial literacy code and make that all important link to literacy.

When using Photostory with a new 4 year old child at kindergarten, he became very animated in his speech (he is quite withdrawn), telling me about what he was doing."

Using programmes on the computer that involve clicking on letters they recognise (ABC learning disc) and using Kidpix, recognising their own name/file and typing into the voice activated part of Kidpix.

Children using large words created by teachers of favourite web sites, accessing words, using key boards to enter words into computers, children recognising and identifying differences in letter types - upper case and lower case – from screen/key board/word written and talking to teachers about this.

(6) *Teaching others to use ICT*. Finally, we were interested in whether there was evidence of children teaching others, whether children or adults, to use a piece of ICT equipment or software. One hundred and thirty one people provided examples. Most of the examples involved the use of equipment such as cameras (46), computers, (e.g., how to use the mouse) (33) and digital microscopes (25). Respondents also described children showing others to use software such as Kidpix and Photostory (41) and computer games (12).

Peer tutoring/adult tutoring is happening on an almost daily occurrence. Children have been shown how to make a slideshow in Kidpix and then have gone on to teach others. This is EMPOWERING for the child. Children often show me 'how to' do things too. Just last week a 4 1/2 yr old showed me how to increase the size of the you tube video we were watching by clicking on the button on the bottom/left side of the small screen. This no longer amazes me. It is normal. We are in a world of 'co-learning'; isn't it great!!

A 3 year old helped a 2 year old use the mouse to navigate through a toddler reader rabbit programme. The 3 year old used a hand-over-hand technique, and encouraging language to help the 2 year old.

S brought in his mum, dad and younger brother and sister and showed them how to Skype as they didn't have broadband at home.

Parental involvement

Respondents were asked to indicate if they had noticed any changes in parental involvement or engagement in their children's learning using ICT. An overwhelming number (N=138; 85.2%) of the 162 people who responded to this question indicated that they had seen an increase. Respondents were then asked, if parental involvement had increased, to indicate in which ways against a prescribed list of items. The most frequently cited items were *parents contributing more to their children's portfolio* and *parents staying longer to watch or engage with their children using ICT* (77.1%). More than one third of respondents (36.4%) identified *parents borrowing the equipment* whilst *taking an active role in seeking funding for ICT* was the least likely outcome (19%).

Respondents were also given the opportunity to indicate other ways in which they had noticed changes in how parents engaged with their children's learning as a result of ICT and 56 respondents provided other examples of this. In particular, a number of respondents said parents email the service or contribute to the blog, sharing news or just communicating with the service (18). Twelve respondents also mentioned that parents bring photos of their children's experiences outside the service for the child to use and share with others. Twenty respondents identified that parents have spent more time at the centre, for example, hearing and seeing what their children are doing; attending parents' nights; and learning more about the ICT programme. Four respondents mentioned parents getting equipment for their child to use at home or letting their child access home equipment, and parents actively supporting child's interests, and two mentioned parents donating money or equipment to the centre.

Attending parent information evenings to increase their knowledge so that they can work alongside their children with ICT equipment and sites.

Also, being early to watch us using ICT at 'end of session' mat times, where children are often involved, and are articulating learning/an experience/their knowledge.

Extending/supporting a child's interest, e.g., bringing insects from home, staying with child as they look under the digital microscope and/or look up internet to learn more. Parents seem more engaged with the programme as a result of ICT use.

Parents often spend longer at the beginning of the session alongside their child checking out the new stories, slide shows that maybe running on the computer.

When respondents were asked if they had any additional information to add about children's use of ICT 55 responded. Of these, 16 noted that they viewed ICT as a tool to help with children's learning. A further 15 identified that the levels of children's competence with ICT was high and that they were often surprised by this. The following quotes are illustrative of the sorts of comments made:

The children are becoming so competent and we are now collaborating with the new Entrant Class to ensure that this carries on into Primary School.

I believe it empowers children who speak English as a second language or are shy or having settling problems to become involved with the kindergarten programme, and to become leaders and confident learners. It is also a valuable tool to encourage children who are not normally involved in traditional literacy and language learning to become fully involved in literacy and language learning. It also adds another dimension to their research projects.

Opened a new door for supporting children's interests. The ease with which children develop skills and competence with ICT is no longer a surprise. It is natural and in tune with our philosophy of a child initiated programme.

The visual and narrative representation that ICT offers young children and their families is significant in my view. I have seen over and over again the immediate effects it has, especially for ESOL children and their families, special needs children and absent parents and many others. Our only stumbling block is sub-standard gear and time.

Children are more involved in their own self assessment through the equipment, identifying and documenting learning that is important to them and this is fostering ongoing positive relationships with families as DVDs/portfolios go home.

Transitions

Finally, when Lead Teachers were asked about how ICT use may have influenced transitions just over half of the Lead Teachers (55%) indicated that the use of ICT has facilitated transition of children and families into the service, 80% indicated that it had enhanced transitions within the service and 59% indicated that it had facilitated transitions from their service to school or another service.

Interview Data

The programme facilitators and national coordinator were asked a number of questions about the extent to which they were seeing ICT enhancing learning outcomes for children. Specifically, these questions addressed the extent to which services were ensuring equitable access to ICT for all children (including issues around a digital divide), what developments they were seeing in terms of children engaging confidently and competently with ICT, and how the programme was supporting services to engage parents more actively in their children's learning.

Equitable access

Respondents were mixed in their views about whether all children in the participating services had equitable access to ICT. As one respondent noted:

This is an interesting question. There is the issue of'"who's being silenced here?' but not all children are interested in ICT – you know, you can lead a horse to water … you can't force children to use ICT. (Interview 1)

As another respondent noted:

> *I agree with the idea of access but I've also seen 1 – 2 situations where teachers have pushed the use of something like Photostory onto all the children and I've discouraged this – it's just like the sandpit – not all children are interested.* (Interview 6)

Respondents indicated that few services were actively monitoring which children were (or were not) engaging with ICT, and where this was occurring it was focused around gender differences, rather than on other lens such as ethnicity, children with special needs or age. One area of exception concerned services working with children for whom English was not their first language where a number of respondents retold examples of ICT proving to be a powerful bridge in building communication and relationships between children and teachers.

When probed about the extent to which services were addressing issues of the digital divide, a different picture emerges about services' awareness of the potential for a digital divide within children's home contexts. As noted by Interviewee 6, "*Engaging parents was the focus for many centres in their action research*" and this focus may have contributed to services finding out about their families' access to and use of ICT. Several interviewees commented on services that had surveyed their families to see what ICT equipment was available at home (including whether families had broadband access), and had then tailored how they communicated with families to match, including using blogs, DVDs that could be viewed at the service or at home, slideshows at the service, and emails. One respondent noted:

> *Initially there were lots of surveys to parents and families – in my cluster, 8/10 centres had an initial action research focus on communicating children's learning to families. These surveys were really useful to centres in getting a picture of what parents had at home – a couple of the centres did workshops for parents on using ICT. One of the centres that's using blogging always has a laptop available for parents to view the blog at the centre. And also, centres are not throwing the old ways out just because they're using ICT – they're still doing the paper version of the centre newsletter if it's required.* (Interview 1)

Children's engagement with ICT

During each interview, facilitators and the national coordinator were asked about the extent to which they were seeing children engaging with ICT confidently and competently. Each interviewee was able to describe examples of children engaging in ways such as peer tutoring others (including adults); taking ownership of their portfolios including selecting artefacts to include and narrating the stories to accompany them; exploring different ways to use ICT equipment and software; to communicate with others; and to engage in more complex experiences. The following examples illustrate these points:

> *I have a lovely example in a centre with a teacher who's nearing retirement and not so skilled – in this centre they're using Kidspix for developing the children's pepeha and this child was tutoring the teacher: 'no, you don't do that, you do this…. You click on this here'. This would never have happened a couple of years ago*. (Interview 1)

> *Children are taking photos and videos – using them to document learning experiences and dictating stories to teachers and dictating into software.* (Interview 3)

> *Children are making decisions about what is the most appropriate ICT to use (for example, a camera or a microscope). I was in a centre last week and watched two boys sitting at laptops facing each other. They were challenging each other to find new functions – one would find one and then the other would have to find it as quickly as possible, and then they had to find new ways to use the function.* (Interview 5)

> *Children are also learning to be communicators to an audience, and to different audiences. For example, [name] Kindergarten is using Skype and when the children are Skyping they have to think about who is the audience and how do you communicate when the audience can't see what you see.* (Interview 6)

> *I think ICT is enabling children to have meaningful interactions with a wider world – it helps them to understand the abstract world – its allowing them to have more complex experiences, e.g., at [name] Kindergarten there were some children who were interested in the newly forming legs on their frogs – so they took photos of the frog's legs and then they laminated them and put them by the painting easels and then they were painting pictures of the frogs and then they took photos of different parts of the paintings and put them into Photostory and made a slide show of the pictures.* (Interview 6)

Parental involvement

Finally, the interviewees were asked about how the programme was supporting parents to engage more actively in their children's learning. As noted above, a number of respondents described how many services were focused on building relationships with parents within their action research projects. One interviewee noted, "*For the most part they've focused on building relationships – the challenge is whether the relationships then become a vehicle for talking about teaching and learning*". (Interview 6)

All interviewees shared examples where parents, and often the wider whānau, were engaging with what their children were doing at the service through the use of ICT. Services are using electronic communication (e.g., email, skype) and visual documentation (e.g., digital photographs and video) to share with parents and whānau on a number of levels – for example, as a support to children and families transitioning into, within or from the service; sharing what experiences and activities children are engaged in whilst at the centre; celebrating children's achievements; and inviting parents' voices to be included in portfolios.

> *For example, [name] Kindergarten has found using DVDs is getting parents in the door. Also [name] Kindergarten has found parents and grandparents are more engaged across the programme. [name] Kindergarten has been using DVDs to help transitions into the centre and this has generated positive comments from parents.* (Interview 6)

Whilst the examples provided suggest that parents are actively engaging with what their children are doing, through this use of ICT, what is less evident is the extent to which children's learning is fore-grounded in these communications

EVALUATION QUESTION **1(A): How successful are clusters in the ECE setting?**

The first evaluation question for this project included three sub-questions focused on the effectiveness of the cluster model, the usefulness of action research as a tool for achieving the programme outcomes, and the extent to which the programme would lead to sustainable, sound ICT pedagogy. This section of the chapter focuses on the first sub-question: How successful are clusters in the ECE setting.

Internet Survey Data

The cluster model

The survey respondents were asked whether or not they had engaged with colleagues in other ECE services within their cluster and the majority (81.1%) identified that they had done so. Just over half (57.7%) of the respondents strongly agreed with the statement that the experience had increased their knowledge about the way in which ICT can be used to enhance learning and a further 40% agreed somewhat with this statement. With regard to increasing their skills 54.7% of respondents agreed somewhat that engaging with colleagues in the cluster had been useful whereas 41.6% agreed strongly. Finally, when asked about whether the cluster experience had increased their confidence in using ICT 48.5% agreed somewhat and 44.1% agreed strongly.

Advantages of the cluster model

The respondents were then asked to provide some examples of the advantages of working in a cluster group. Of the 142 responses (79.7% of all respondents), 84 talked about sharing and gaining new ideas, and learning how others are doing things, 59 valued being able to network with peers at other services, and 31 mentioned getting support from peers and facilitators.

> *It removes the feeling of isolation that working in a Kindergarten can have, there are others out there doing and experiencing the same as us!*
>
> *Helpful to discover that others are all at different stages of the learning process – some we are ahead of and others are ahead of us. Makes good opportunities for interaction and sharing of experiences and discoveries. Learning new things (such as how to use Publisher, Power Point, etc) in a bigger mixed group built up personal self-confidence and made it fun to try new things, interaction with others outside safety of workplace group helpful experience.*
>
> *We are very pleased to have another [X] Kindergarten in this cluster, to be able to have a sounding board, bounce ideas off each other regarding the milestone reports and any issues and trends that might arise. The opportunities to network at the hui etc. are also valued.*
>
> *It provided us with contacts and support from people who were on the same 'page' as us. The cluster enabled us to discuss issues of concern and share the excitement of progress made within the project. We also got to meet teachers from other ECE service types and from areas that we generally do not have the opportunity to visit.*

Challenges of the cluster model

Respondents were also asked to identify any challenges of working in a cluster model. One hundred and twenty four (69.6%) respondents answered this question. Forty-seven respondents identified that time was an issue, whether not enough time to go to meetings with others, or enough time to do all the other work required in addition to cluster meetings. A further 39 said the distance between them and other centres in their cluster was a problem, with travelling adding to their time problems too. Seventeen respondents said the differences between centres were a challenge with different levels of ICT skills and knowledge, resources, focus, and philosophies cited as examples. A further ten mentioned problems with the facilitator component of the programme – most of these issues were a distance factor whereby the facilitator had to travel too far and couldn't visit centres as often as they'd like whilst four said they hadn't had a facilitator for most of the year. Finally, three people said only their Lead Teacher met with other services in their cluster.

> *Our cluster is geographically challenged as it stretches down the South Island. This has made it very difficult to share any face to face PD and the facilitator has been less available because of all the travel demands.*
>
> *Things that they are concentrating on aren't priorities to us and we need to recognise and be proud of our philosophy.*
>
> *Maybe not enough time together to build strong relationships.*
>
> *Everyone is quite far away from each other. Meeting is very time consuming, as is communicating with them.*

When Lead Teachers were asked about the programme approach of collaborating with other services, 47% agreed somewhat with the statement that this approach had been useful in building their centre/services' use of ICT. A further 27% agreed strongly and 20% disagreed somewhat with this statement.

Interview Data

The cluster model was generally recognised by the facilitators and national coordinator as a useful model for professional development where services were located within a close geographical distance and travel aspects were minimized. In particular, two clusters have drawn on their close geographical location with a number of cross-cluster activities and collaboration not evident in the other clusters. For three of the clusters, the distances between services appear to have had a significant impact on their ability to meet face-to-face on a regular basis; in addition, concerns were raised at the amount of travel required by programme participants in order to attend cluster meetings.

> *If only one person is going you need to be careful when travelling regionally. For the [service] people it is a 4 hour trip so they need to be put up overnight. I chose [location] as the venue as for others it's 2 hours of travel. You can't schedule anything in mid winter.* (Interview 4)

One respondent noted that use of a cluster model was complicated by the requirement that entry into the pilot programme had been open to any licensed ECE service. She commented:

> *Access to the programme had to be made available to all centres across the country so that anyone could apply and then the centres would be chosen and the clusters created from there. It was an equity argument but it has worked in reverse as some of the centres are so far apart that they are not able to spin ideas off each other. There are issues about how the clusters have been formed in terms of sustainability – needed more geographically contained clusters that are sustainable for the facilitators in terms of travel. [Location] has been highly successful with its two clusters.*
>
> *There is a real strength in the cluster model but for some clusters it is more of a virtual model – the delivery has to be blended and it can't all be virtual delivery.* (Interview 6)

EVALUATION QUESTION 1(B): How useful is action research as a tool to accomplish the intended outcomes of the programme?

Internet Survey Data

The experience of action research

This section of the chapter focuses on the second sub-question, *How useful is action research as a tool to accomplish the intended outcomes of the project?* The majority of respondents indicated that they had been involved in an action research project (92%) whilst involved in the ECE ICT PL programme. Almost half (49%) of these respondents indicated that they strongly agreed with the statement that the experience had been very useful in transforming their pedagogical practice whilst a further 44% agreed somewhat with this statement.

Training/support for action research

Respondents were asked to provide information about any training or support they received in helping them to implement their service's action research project. One hundred and twenty nine respondents answered this question and of these 91 said their facilitator provided them with help. Other respondents noted that their co-workers and Lead Teachers provided support (17), that attendance at hui was helpful (15), that the PLP Online café was useful (9) and that the funded Teacher Release days provided financial support (3). Attendance at workshops was noted by 38 respondents who gave a range of examples of both workshop topics and delivery (e.g., how to do action research, Netsafe, and workshops at ULearn, at the service and in the cluster groups) that had been helpful to them. Some workshops were run by facilitators whilst others were delivered by specialist brought in for the occasion. The following quotes are illustrative of the respondents' experiences.

> *Could have done with more before the start of the project or even a more concentrated approach in the first months. We floundered for the first six months while we came to grips with the research requirements and methodologies.*

Facilitator supported the development of cycle and action plan to help us keep on track. Some of the guest speakers and information regarding Action Research would have been more useful had they been made available sooner.

Our cluster facilitator was a wonderful support each time she came to visit-keeping us on track and helping us decide the 'where-to-from-here' stuff. She helped us reflect on what we had done so far and which direction to move on to. She supported us with one-on-one tuition when we felt we needed it and workshops and cluster group meetings etc as well.

We have had ongoing support from our facilitator. She helped us develop our research question, plan our steps in the project and is in contact on a regular basis. She sends us readings/articles when she comes across them that suit our research. We have received funding from the project to allow teachers non-contact, release time from the centre to work on their contribution to the project. We have had in-centre workshops as well as cluster workshops.

The majority of respondents indicated that the training and support was sufficient (81%). Those respondents that found it insufficient were asked what they would change. Thirty people responded to this question. Nine said they needed more time and help from their facilitator; seven wanted more hands-on training/workshops; four would like more release time to train and do the research; and four wanted more help in general.

Some of our staff (myself included) entered this programme with very little knowledge, skills or confidence in the use of ICT technologies. I feel that we continue to need a higher level of support in order to participate in this programme. Because of the sheer amount of time required for the Action Research and associated milestone reports, there are high levels of stress, anxiety and frustration within our staff who were already working in a fairly stressful work environment. I believe this is unsustainable, but to be honest do not know how it could be addressed.

This was totally new to us and we had difficulty fine tuning and following a limited goal – assistance was available, but not always appropriate.

A lot more of it (support) and release time to consolidate skills learned. In an ideal world, it would have been great to have had facilitator support more regularly. She has motivated, challenged and supported us and is a main reason we are still involved in the project.

I needed to know a lot more background to the project to place it into context.

Impact of action research

When Lead Teachers were asked to indicate how much progress they had made on their service's action research project, 46% indicated that they were meeting expectations, 14% were exceeding expectations and 40% indicated that they had made less progress than they had hoped for.

Lead Teachers were then given the opportunity to indicate the ways in which the use of action research had facilitated or hindered the use of ICT to improve pedagogical practices within their service/centre. Forty-three Lead Teachers answered this question and most were positive. In particular, 16 said that it helped improve their pedagogical practices; 16 said it increased their knowledge and use of ICT; 13 said it made them more reflective in their teaching; and finally two identified that it had encouraged them to think about the direction of their teaching programme.

It has encouraged us to reflect more on 'what learning is happening'. We have become more reflective practitioner[s].

The action research has facilitated the improvement of pedagogical practices within our centre. I feel that as a teaching team we have embraced new and innovative ideas of assessing and recording children's learning using ICT. This has gone even further to mean that we are extending the children's learning through ICT use too.

Given us a focus, and data to back up ideas and 'feelings'.

Made us more reflective as professionals. Developed us more as innovative leaders within the field of ICT. The documentation side of the research certainly puts the extra workload on teachers. Lack of financial assistance also hinders where we want to be at certain points.

Four provided negative responses, and these were mostly about time and attention to ICT taking away from teaching/pedagogical practices.

We put too much focus on the research, while neglecting to provide a pedagogically sound programme.

Interview Data

Each facilitator and the national coordinator were specifically probed for their perceptions on the usefulness of the action research component of the programme. Universally, there were mixed views with each interviewee identifying that whilst the action research component had been a very effective tool for some services the inclusion of the requirement for action research had not worked for other services. There were a number of comments concerning the timing of the introduction of the action research component with respondents suggesting that some services got "*bogged down in doing action research and lost sight of the programme goals*" (Interview 5). The key challenges identified by respondents in incorporating the action research component can be grouped as follows:

- lack of understanding of action research, including some teachers needing to shift their existing understandings and beliefs about what action research involves
- difficulties for some services in developing their research question and in then following the action research cycle
- changes to the team structure or staffing which results in new staff having to complete action research projects they were not involved in developing
- being required to develop an action research focus before the service team has been able to explore a range of ICT and identify an area of real interest.

In contrast, the facilitators identified that for some services the action research focus and process had worked well, providing a focus and clear direction, and encouraging participating teachers to engage in professional reading around their focus areas. Teaching teams who were already engaging in reflective practices were more easily able to undertake the action research component. One interviewee commented that when the action research process worked well, "*it's been a fantastic way to see the shifts and also to see more than just the action research questions – we get some real 'ah-haa' moments*" (Interview 5).

From the interviewees' comments, it appears that the success or otherwise of the action research component is strongly influenced by a number of factors, many of which are outside of the control of the programme or individual facilitators.

EVALUATION QUESTION 1(C): **Will the programme lead to sustainable and sound ICT pedagogy?**

This section of the chapter focuses on the third sub-question, *Will the programme lead to sustainable and sound ICT pedagogy?* A two-fold approach was taken so that data were gathered about both the sustainability of pedagogical practices and the sustainability of the service's ICT equipment and resources.

Internet Survey Data

Inducting staff

In order to gain information about the extent to which services felt the programme was leading to sustainable and sound ICT pedagogy, the Lead Teachers only were asked to respond to questions about sustainability. When asked to indicate whether processes or procedures were in place in their centre/service to induct new staff into the ECE ICT PL programme, almost two-thirds of respondents indicated that induction processes were in place (63%). Similarly, when asked whether there were processes or procedures in place to induct new staff into the specific use of ICT, the majority said yes (69%). The Lead Teachers were then asked to indicate whether the programme requirement that the service develop an ICT strategic plan had been useful in helping them to develop a sustainable approach to ICT. The majority of respondents agreed somewhat (60%) with this statement, while 26% agreed strongly. When asked how confident they felt about their ability to maintain the practices developed after the conclusion of programme, 60% said that they were confident and 32% said they were very confident.

What is needed to sustain the use of ICT?

The Lead Teachers were also given the opportunity to provide their views on the sorts of ongoing support they thought they would need to maintain the use of ICT beyond the end of the programme. Thirty-eight of those that responded to this question wanted ongoing training/professional development in ICT. A further 21 would like continuing interactions with other ECE centres using ICT, either as an online community (17) or in face-to-face meetings such as the hui (4). Twenty respondents would like on-going technical help, either a telephone help desk or online, and seven would like to continue with the in-person, individual help provided by facilitators.

> *Professional development with on-going support to lead us to the next step with whatever challenges I have as a teacher and for the children. Keeping up with new ideas and programmes.*
>
> *To maintain the online networking site so that teachers can continue to share innovative practice, share ideas and resources and maintain ongoing relationships across sectors.*
>
> *Obviously technical support is always needed.*
>
> *Our printing costs (with children and teaching increasing the number of learning stories, digital photos taken, information sourced from the internet and computer art/story writing, our printing costs have increased from approximately $100 per month to over $300 per month!). Digital cameras used by the children get constant use and are lasting approximately 18 months and our laptops and computers have needed repairs, which are always a costly business!!*

Interview Data

The interview data suggests that, although the concept of sustainability has been a key programme message from the outset, participants in the programme do not see the importance of this issue until well into the programme. Interviewees noted the emphasis placed on the development of sustainable practices within the programme by the Ministry of Education and referred to the requirement that all participating services develop and up-date ICT strategic plans. A number of respondents noted that the quality and usefulness of these strategic plans had developed over time, and that the requirement to include these within service milestone reports had been an effective device for keeping sustainability to the fore. Developing sustainable practices requires commitment from both teaching staff and from management personnel and some respondents noted that the commitment was not always there from both groups. For example:

> *Sustainability is not thought about strongly by management and associations. We are talking at hui about sustainability and we do bring in people. At [facilitator's] next hui we*

> *have specifically invited management people to attend – actually management people are always invited to attend events but they often don't come.* (Interview 6)

Most comments made concerning sustainability focused on the maintenance and on-going provision of ICT equipment, rather than on pedagogical practices. Facilitators initially had to deal with disappointment from some services that their programme did not include the same funding arrangements for leasing and/or purchasing equipment as were available for the ICT professional development programmes in primary and secondary schools. Developing ongoing funding streams for the purchase and replacement of ICT equipment has been problematic for some services, particularly as funding opportunities through charitable grants have reduced. Those services that were moving towards leasing arrangements for laptops and desktop computers were felt to be recognising and addressing the long-term requirements for equipment replacement. However, it was also acknowledged by interviewees that the purchasing and upgrading of other ICT hardware such as digital cameras and microscopes could be problematic, especially where theft or damage to equipment was not covered by insurance or where excesses were too high.

Interviewees noted that the induction of staff was a critical issue with one cluster having up to twelve new staff over the last year. The facilitator for this cluster noted that:

> *Thinking about sustainability in terms of induction was a real eye-opener for some – in the last year there have been more than 12 new staff join the programme. I ran a one day workshop for them focusing on aspects like action research, cyber safety to get them up to speed but I did also ask the centres to think about how they are going to manage this in future.* (Interview 1)

Facilitators reported actively encouraging programme participants to become more independent in solving ICT problems that arise. As one interviewee commented, "*I'm trying to work myself out of a job so I ask centres who ring 'What would you do if I wasn't here?' and encourage them to problem solve*" (Interview 2). Another commented that "*in terms of pedagogical sustainability – there is really good stuff happening with teachers – they are buddying up with new teachers*" (Interview 6).

EVALUATION QUESTION TWO**: To what extent are the ECE ICT PL programme's design, content and implementation useful across all types of ECE services?**

The second key evaluation question focused on the extent to which the design, content and implementation of the ECE ICT PL programme was useful across all types of ECE services. Both online survey respondents and the facilitators were asked specifically for their views about this question, with the results reported below. The discussion concerning this evaluation question (see *Discussion and Conclusions* chapter) will also draw on data reported elsewhere in the results section, including data around individual programme components and the barriers and enablers to the successful implementation of this programme.

Internet Survey Data

What are the critical components of the programme?

As the programme is a pilot project the respondents were asked to identify which components of the programme they had had some experience with, and to then rank these components from most important through to least important if the programme were to be made available to all ECE services on an ongoing basis. The most highly ranked aspect of the programme was the *facilitator* with 108 respondents ranking this component as most important. *Workshop*s were ranked as most important by 53 respondents whilst the *regional clusters* were ranked as number one by 33 respondents. Those elements of the programme that were considered somewhat important were the *action research project*, *self review*, *ULearn* and *centre/service milestone reports*. The three elements that were considered to be

the least important were *ILead*, *the online component* of the programme and the *dissemination* of findings.

When asked to comment about whether or not the programme is suitable for all types of services the following quote was indicative of the types of constraints that may exist for certain types of centres.

> *Time is not always available to us to go out and visit during session time as we are a sessional kindergarten that requires all 3 teachers to work at the same time. Time off needs to be allocated to go and see the other centres, or it can be taken as a PD day.*

Interview Data

In responding to the interview question, *From your experience, what issues do you see if the programme were to be made available to ECE services on an ongoing basis*, respondents identified a number of key issues that arose from their experiences with their clusters and the wider programme, as follows:

- The importance of beginning the programme with commitment from the whole service team. Interviewees recognised that teaching teams do not stay constant over a three year period but noted that those who began the programme with one staff member driving the service's involvement often struggled to maintain the momentum across such an intensive programme.
- A base level of ICT equipment and resources were seen by some interviewees as critical. Eighteen months into the programme some services did not have internet access within the service (or this access was limited to the office) and were struggling to obtain basic equipment such as digital cameras.
- Interviewees noted that the strength of the programme, from their perspective, was the intensity of professional development over the three year period but also noted that "*head teachers and teachers need to have the robustness to cope with the sustained nature of the programme*" (Interview 5). All clusters had services that had experienced set-backs to their progress due to factors such as staff turnover, diversification, staff conflict, management issues, teacher attitudes, and workload issues (especially for two-teacher kindergartens).
- The physical size and geographical spread of some clusters was an issue both in terms of facilitator workload and travel, and also for the participating services. One facilitator of a geographically spread cluster felt that "*it is less satisfying for the teachers than are the other clusters. A lot of the teachers have felt more isolated and there are less opportunities for cluster hui*" (Interview 5).

Respondents felt that for the programme to be effective across all types of early childhood services, it was essential to retain the flexible nature of delivery where facilitators could adapt how they worked with each service to meet both their philosophical and structural needs as well as address external factors (such as the geographical spread of a cluster or the availability of qualified relievers) that could impact on progress. Respondents also felt that programmes needed to be longer than one year and of sufficient depth and intensity. As one respondent commented:

> *You can't do ICT PD as one off workshops – teachers get caught up with the toys and they need space to critique it and make it work for them.The model needs to be flexible – to be able to personalise it. You need space and time to talk at workshops, allowing people who work all day to discuss and critique things*. (Interview 2)

Another facilitator commented that:

> *The action research model needs to be looked at. It has a place for high flying centres that are running with it but some need to walk first. Perhaps the action research could*

come in the third year. Perhaps the programme can have technology, pedagogy, then action research.

There needs to be a good length of time to get over the 'it's about the gear' and be quite specific in the advertisement so that people know what they are applying for. The programme needs a suitable length of time to develop relationships. (Interview 4)

EVALUATION QUESTION THREE**: What are the emerging barriers and enablers that may make the difference between success and disappointing implementation outcomes?**

The final evaluation question sought to identify any barriers and enablers that were emerging at this point of the programme that were impacting on the success or otherwise of the programme implementation. Data were gathered from both the internet survey respondents and from the facilitator and national coordinator interviews.

Internet Survey Data

Barriers

Respondents were asked to provide information about the barriers that they experienced as they tried to achieve the intended outcomes of the programme. Ninety-two respondents cited time constraints as the major challenge to achieving the programme outcomes with an additional seven respondents mentioning workload issues in particular.

Staffing issues were also important. Small teams identified having difficulty in fulfilling the administrative and reporting aspects of the programme. They also mentioned teacher-child ratios, which can be large and demanding, and a shortage of staff.

Because we work in a three teacher team it is difficult to work on ICT during session because it takes one teacher out of the programme. We have been eligible to have another teacher working with us on some days but it seems difficult to arrange that in advance to make sure you use the time wisely.

Other respondents working in large teams experienced challenges when team members were at widely different places in their knowledge and skill, together with the difficulties in just coordinating people to get things done.

Very hard working in such a large team, lack of time to get things done, integrate ideas.

Having a large team all with differing abilities. E.g. Some staff find it a lot longer to grasp certain things while others are ready to move on.

Forty-seven respondents identified staff turnover as an issue impacting on their ability to achieve the programme outcomes. The difficulties in working with old ICT equipment or not being able to access equipment was mentioned by 35 people with an additional 12 requesting funding towards ICT equipment. Twenty-eight respondents identified that a lack of skills or knowledge of either the respondent his/herself or other team members as a problem. In addition 21 mentioned that the MOE requirements were a burden. Twelve respondents noted that they had no or limited internet access within the service, a further 11 mentioned a lack of technical support, and nine respondents had problems with there being no facilitator for their area.

I felt the program expected a lot of personal interest and time to explore all the available learning experiences and if you're not the type of teacher who has time or interest in being on the computer again at home, you couldn't really maximise the potential of what was on offer. The documentation and report writing for each research cycle commanded a lot more time than I expected for our teaching team.

Our GROUP SIZE - 45 children per session (FAR TOO BIG). CHILD/ADULT ratio – 1 to 15 – far too BIG. Huge workload with individual portfolios, admin, fundraising, committee meetings, KA requirements, MOE requirements, etc.

However, due to the fact that it is largely unreliable, we often have to assist children especially with the jolly old computer!!

Adequate and functioning ICT equipment is also an issue at times as is getting help with ICT techie problems and computer breakdowns/malfunctions.

Because our team has such a varying degree of ICT knowledge and skill and with the type of programme and learning environment that we have, our progress in using ICT as a learning tool with and alongside children has been a challenging journey.

The writing of milestone reports has also been challenging and rather millstone like. The expectations surrounding the project (milestones, dissemination etc) have all been rather daunting.

Feel that the facilitator really not that supportive with our ideas, would tend to focus on h

Enablers

In addition to asking respondents what challenges they had faced, the survey also asked them what factors had supported them in achieving the programme outcomes. Respondents were able to identify a range of aspects with many able to identify more than one factor. It appears that the *facilitators* were one of the most beneficial aspects of the programme, cited by 108 people who mentioned the help and motivation provided by these professionals. Other specific programme components identified as enablers included *workshops* (35 respondents), *hui* (27), *conferences* (23) and *other professional development opportunities* (12). The provision of *release time* was mentioned by 31 respondents as being very helpful as was *support from fellow team members* (37). *Networking with other centres* (23) and *parents/whānau* (10) were considered important as were *Lead Teachers* (16). Having a *positive and enthusiastic attitude* was seen as an important factor by 13 respondents. Finally, *learning new skills* (9) and *seeing the benefits for the children* (11) were also mentioned.

Facilitator support has been indispensable, knowing our centre and staffs' personal working styles as well as strengths have made a huge impact upon our growth.

The ULearn conference is inspirational and gives us the momentum to keep going when times get busy. It helps with the 'big picture'.

In addition the professional learning days have been used to consolidate new learning before using it with the children. This time has been invaluable, e.g., we have been able to practice in private instead of trying to learn while working with the children when introducing something new.

Staff enthusiasm and shared vision has been the main driving force and knowing what we are doing is impacting positively on children and parents/families."

The lead teacher's commitment and passion.

The positive and proactive attitude of our team has been an important factor in the success of this programme. We have been enthusiastic and excited about the learning opportunities that the ICT programme would and has provided."

Team culture – willingness to give it a go.

For many respondents the impact of the programme in terms of enhancing their pedagogical practices and increasing their confidence in using ICT provided a strong motivational force. Throughout the survey, 57 respondents made specific mention of enhanced pedagogy, as illustrated by these quotes:

For myself it has been an amazing journey in which my pedagogical practice has been challenged and I feel overall I am a more effective teacher now than I was before being involved in the programme with regards to teaching and learning in partnership with children and families.

The introduction of ICT to my daily practice has provided a daily 'freshener' to my teaching. Reigniting and keeping my passion for teaching burning strongly. I wouldn't choose to be without ICT now.

I believe ICT has enhanced some of my delivery, supported effective task and time management, and added 'motivational' elements to practice that excites the 'where to next' juices!

ICT has enhanced my teaching practices by allowing me to share my teaching practice with the team and colleagues in [location] as well as nationally. Making my practice visible allows me and others to reflect and grow.

In addition, 32 respondents mentioned increases in teachers' confidence in using ICT:

My increasing confidence in using and experimenting with computer programs has changed the freedom I now give to children to similarly explore and experiment independently (rather than the instructive approach with limits on options available).

Interview Data

Barriers

When asked about barriers to the successful implementation of the programme outcomes, the facilitators and national coordinator's responses fell into four key areas: firstly, staffing issues including the availability of relievers (especially qualified and registered teachers) (5 interviewees); changes in the teaching team and issues around the recruitment and retention of teachers (3); having sufficient time, especially where some staff were also in training (3); and working within a large team where there were challenges in getting everyone together for meetings.

Lack of qualified, registered relievers (and the impact of not having this for centre funding) is the biggest barrier. (Interview 1)

How busy teachers are – education and care where teachers are in training. There is a lot of stress and outside hours work. (Interview 3)

Secondly, poor leadership (2), negative teacher attitudes towards the use of ICT in ECE (3) and disharmony between members of the teaching team or between the team and management (3) were seen as barriers.

At the beginning teacher attitude was a barrier. They were reluctant to focus on ICT. (Interview 3)

Poor leadership in 1 – 2 centres – there is also a huge variation in management support – for example across the [service] associations – some are not as supportive or have appreciated the value that they can gain from having their centres in the programme whilst others have seen the value. (Interview 6)

Thirdly, issues around resources included services having difficulty accessing the internet (3); issues around funds for purchasing equipment (3); and access to technical support, particularly as teachers became more skilled themselves and their requests for technical assistance became more difficult (1).

Technical support – because that's not my role and because these centres are now more engaged in ICT, they are asking more difficult questions. Having a helpdesk like the MOE one for schools would be really useful. The cost of technical support is very expensive and centres need to pay people to set up certain programmes or access to things. (Interview 1)

> *At the start of the project, five of the centres in this cluster had limited or no broadband access (either controlled by [management] as 'gatekeeper', or dial-up only). Similarly a large number of teachers had either no internet access at home, or dial-up (some of this was due to geographical problems).*
>
> *At this point all centres have broadband internet access, but the two [service name] centres are severely restricted in the ways that they can use the internet – they cannot download images, or receive emails with images in them, nor can they use skype or access blogs or websites that have not been authorised by their [management]. This is a major impediment. Their laptops cannot be connected to the internet at their centres either, as access to the [management] server is only through the administration computer.*
>
> *Many teachers have connected to broadband at home since joining the project, and a number have also bought their own laptops (particularly in the case of [name] early learning centre). Also at [centre], teachers have used their own money to buy equipment for children to use when the [management] has been reluctant, particularly in the case of cameras for under-two year olds.* (Interview 5)

Finally, the geographical spread and travel demands within some clusters were identified as a barrier by three respondents.

> *I've got one of the better clusters in terms of distances – most of my centres are in [location] and [location] and that's only 15 mins away. I do feel for the centres in [location] and [location] – they're further away and it is more difficult for them to come to workshops and cluster hui.* (Interview 1)

One final comment about a potential barrier was voiced by one respondent – although not a representative view it does raise an interesting issue about the challenges for teachers in grappling with an outcomes-based approach to early childhood education alongside traditional play approaches where outcomes are not pre-determined:

> *The slipperiness of 'outcomes for children' that is being emphasised by the MOE – we're dealing with really complex stuff here that is not easily seen or made sense of – articulating this is a real challenge. Centres understand the focus and want to 'crack it' but we also need to ensure that we don't lose the philosophy of playfulness that we've valued for so long*. (Interview 6)

Enablers

When asked to identify factors that enabled the outcomes of the programme to be successfully achieved the facilitators and national coordinator identified a wide range of factors. Most frequently identified was the ability of the programme to be flexibly delivered to services (four respondents). Specific aspects of the programme design were also identified by one or more respondents, including having closely located clusters and the relationships that developed between services; services being accountable to the MOE through the milestone reporting process; the dissemination processes that were empowering teachers; ULearn; and the on-line site. Having facilitators who were able to build relationships with their cluster services was important: "*need to have trusting relationships where the facilitator can then start to challenge*" (Interview 5).

The high level of funding that went with the programme was also valued by interviewees as an enabler, particularly when this funding was able to be used flexibly to meet the needs of the service. One respondent noted that the lack of specific funding for purchasing equipment had become an enabler in the sense that it built sustainability amongst services who had to plan for the ongoing costs of equipment from the outset.

A number of enablers centred on the services themselves were also noted, including the quality of services; their ownership of the programme focus; their determination to stay in the programme despite the demands and outside factors; and the role of supportive management:

> *Having supportive management (e.g., who place a high priority on organising qualified relievers; being prepared to pay for some of their staff to attend ULearn (approx $1500) without the teachers having to justify why they want to go). Because where management are part of the programme they have a much better understanding and so the teachers don't have to justify what they are doing or want to do.* (Interview 1)

Finally, whilst this evaluation is not focused on the provider of the ECE ICT PL programme, three respondents specifically mentioned the quality of support that they received themselves in their role as facilitators, particularly as they developed their own ICT expertise:

> *The ability to call on the greater CORE-Ed team, from fellow ECE ICT PL facilitators, to the directors, to the members of other CORE projects for advice and ideas.*

> *The facilitator meetings which happen quite frequently meant that we facilitators have got to know each other well, and again have worked across clusters to deliver workshops. Facilitators attending PL means that we have built our own confidence, knowledge and competency in our areas of interests and have shared these nationally through workshops and the development of resources ('how to's' and presentations).* (Interview 3)

Chapter Six: Case Study Results

Overview

This chapter presents a case study, developed from the site visits to six participating centres. The data was collected through observations, interviews, checklists, frequency counts and document analysis. In particular it presents information on the participant's use of their new knowledge and skills in using ICT in the early childhood programme and provides a broad overview of the degree and quality of implementation, the transformation of their professional pedagogical practice, and the sustainability of sound ICT pedagogy. Preliminary information regarding student learning outcomes and parental perspectives is also discussed.

This chapter will follow the same format as the previous chapter, reporting data for the specific evaluation questions addressed by this component of the evaluation. Detail on the selection of the six centres invited to participate in the case study component were provided in the earlier methodology chapter.

EVALUATION QUESTION ONE**: Does the ECE ICT PL programme design, content, and implementation by services achieve the intended outcomes of the programme?**

GOAL TWO: Transformation of Pedagogical Practice

Using ICT with children

Knowledge, skill and confidence in the use of ICT with young children together are indicators of successful implementation of ICT pedagogy. This multifaceted phenomenon was investigated during the site visits using a range of data gathering techniques including narrative observations, interviews with Lead Teachers, children and parents, document analysis, and frequency counts.

Across the services evaluators looked at how teachers were using ICT in the programme of learning with young children. These observations focused on a number of pre-determined indicators in order to gather a rich, descriptive picture of the use of ICT. Indicators used were:

1. how ICT was integrated into the learning programme
2. whether a broad and innovative approach was being used
3. links with the ECE community and the wider world
4. whether ICT was used as a tool to engage in reflection
5. how teachers engaged in the evaluation and critique of the ICT approach offered.

Integration of ICT into the programme of learning

The integrated use of ICT was viewed as an important element of effective pedagogical practices as it helps children to develop an understanding of the purpose and use of ICT in real life situations. The following example provides an insight into how the use of ICT was integrated in the programme of learning, illustrating how teachers are drawing on ICT resources and when required to offer an extension to the programme.

> *A child has a real interest in trucks. The teacher's husband arrived in his double trailer truck. The child's parents had already given permission for him to have a ride in the truck. The child documented his journey around the block with the digital camera. The teacher supported him in bringing up his photos using the slide show option on the camera. He scrolled down through each image sharing with the truck driver and 3 other children the detail about each photo. The child then explained where the cameras went after use. Reciprocal dialogue continued between the children and truck driver. "That photo was taken out the window", the child said. These pictures were later down loaded to the digital photo frame and will also be written up and included in the child's portfolio* (CS4-Integrated-3).

In contrast was the lack of integration evident when children engaged in using a computer that had pre-loaded educational software. In all of the Case Study services a computer was made available for children that had pre-loaded educational software and was available for use in the main playroom at different times throughout the day. However, in each case, this was an area where teachers were least likely to work alongside of children [unless additional devices were attached e.g. digital microscope]. The frequency counts show evidence that over five of the six services, there were 78 instances of children engaged in using computers with pre-loaded educational software. However, the observation records show that teachers engaged with children's learning at this activity on only seven occasions across the five services. This posed a number of challenges for children such as becoming frustrated and disengaged with the educational software due to lack of knowledge about how to operate them successfully. The following example is illustrative of others observed:

> *Two four year old girls have been sitting at the Little Tikes computer for some time, their heads together in a conspiratorial fashion. A is holding the mouse and clicking on various parts of the computer programme. "That's easy", says A. "Yeah, that's easy", laughs B. They both chuckle as they click on the letters of a keyboard. "I know that one", A states. "Do you have it in your name?" asks B. "No", A replies and clicks on the image of 'dog' and 'log' several times in quick succession (the voiceover says the words as they are clicked). Both girls laugh loudly and repeat the clicking with different sounds. When the word 'pup' comes up they are unable to find a rhyming word on the screen initially. B points to the cup. "There, do that", she suggests. The voiceover says "cup". "We know this", says A. A new word comes up "Oh, I know this one, it's hen". Neither girl can find a match for hen, and A holds the mouse up to her eye – looking through the red light. After several attempts A says, "Let's get outta here. We don't like that one – we're out of here". She clicks back to the main menu.* (CS6-Integrated-1)

Evaluators noted, however, that what was apparent when using these computers with pre-loaded software was the amount of peer tutoring. Observations show that of the 78 instances of child engagement with educational software, they worked with their peers on 20 occasions (51 children) versus 12 instances of children working by themselves. The example below shows evidence of the peer tutoring that occurred when children engaged with this learning experience.

> *An 'expert' child using a laptop is working alongside a child using a desktop. She notes that the child is using a computer programme (Kids Pix) which she appears familiar with and begins assisting a 'novice' in creating a page for his story book. She is moving images from the range of slides available that have been downloaded to choose from. The novice child attempts to move the slides but is challenged. The expert points to the boxes that he needs to click on. Collaboratively they move over the images and then choose the colour they wish the background to be. The 'expert' child types out the novice child's name and they then seek out the teacher permission to print it off.* (CS3-CL-1)

The physical placement of the equipment appeared to play a role in children supporting their peers. This enabled children to share knowledge, communicate with others, seek support, and work in a collaborative manner.

Parental Interviews

To gain a parental perspective of how ICT was being used with/by their children, individual semi-structured interviews were undertaken with a representative group of parents from each of the case study services. Parents were asked about any changes with regards to ICT use within the service that they may have noticed occurring since the service began on the ECE ICT PL programme. Parents from five of the six participating services indicated that they had seen increased usage of ICT in the programme of learning. The following examples are indicative of the comments made by parents on what this increased usage might look like related to their child's exposure and use of the equipment:

> *ICT is used more often in the service and children are beginning to use it*. (CS2-Parent Int-2)

> *More recently they have been using Skype and digital photography, the teachers used to do it all now the kids are running around with digital cameras. It's the same with the computers, the children get to use them and gain experience.* (CS6-Parent Int-2*)*

Broad and innovative use of ICT

The innovative teacher makes the most of the technology that is available to extend the curriculum and therefore enhance learning. Evaluators looked for broad and innovative uses of ICT in the programme of learning, using a checklist of possible practices that they may see evidence of. In addition, evaluators were asked to remain open to other approaches that may be evident in the service. The data show that the most frequently cited instances of innovative use of ICT were: the use of a blog site, email or Skype to communicate with the wider world. These were used in four services, and on multiple occasions in one. Using videos/DVDs to capture and revisit learning was also observed in four services on multiple occasions. Using video/DVDs to ease transitions was noted in two services with photographs used for the same purpose in two services on two or more occasions. Following children's interests through using DVDs (three services), and accessing information on the internet (three services), was also observed. As noted earlier, children using computers with pre-loaded educational software occurred in five of the services on multiple occasions. The use of ICT in art or musical experiences was noted in four of the services. Approaches that were used less often included undertaking voice recordings (two services), taking or using photographs for unspecified purposes (three services on multiple occasions) and using the digital microscope (1). Across the six services, the innovative practices observed tended to be strongly focused around the service's action research projects.

An example of innovative practice is evident in this observation.

> *A skype session has been preplanned between the service and another rural service. The teacher has invited children to dress up in their costumes from the production a few weeks earlier. They stand at the computer ready to show them to the recipients at the other end. Immediately a teacher and child appear on screen. "Hello everyone", says teacher B. "You look like a duck." …. C suggests that the bellbirds might like to have a turn and three children move to the front of the screen. Immediately and unprompted they sing a song about Bellbirds (from their recent production). The teacher passes them bells that they can use. When they are finished there is silence. C asks "Could you hear that alright?" ….* (CS6-Innovative-1).

The teacher commented in a follow up conversation with the evaluator that the use of Skype in the service was beginning to be further integrated into the ECE programme: She also suggests that the more exposed children are to the technology (frequency of use) the more meaningful the learning experience has become. This teacher states:

> *…because children's interest and enthusiasm was stirred by the initial Skyping session [with the other service], ongoing sessions have been meaningful. Children understand that the children they are conversing with are in another service and it is real (as opposed to watching TV). Sessions are becoming more natural and inclusive, almost an everyday occurrence*. (CS6-Innovative-1)

Transitions

A theme that emerged through the data was the broad and innovative use of ICT as a tool in easing the transition of children between home and the service and school. A number of observation records provide evidence of this; the example provided is indicative of how photographs and visual images are used to ease these transitions.

> *Within the first two weeks of a child starting at the service a short video is taken of them engaging in daily activities. A learning story is written and a short questionnaire accompanies these to engage parents in their child's learning.* (CS2-Innovative-1)

Using ICT to assist children in transitioning from the service to the school environment is also being explored as indicated by the following teacher statement:

> *Following on from the reciprocal service and school visits, the New Entrant teacher is working with her class in making a transition to school video which depicts what the school children think the children at the service should know about starting school. One of the service teachers is supporting the New Entrant teacher in her editing of this movie which will eventually be added to the service blog.* (CS4-Innovative-1)

The interest that both the ECE teacher and the primary school teacher share in transitions and ICT has provided an opportunity for each to work collaboratively to create an ICT artefact that has the potential to enhance the transition process. It demonstrates how a community of learning is being establish with and through the use of ICT.

Links with the ECE community and the wider world

How services are collaborating and forming links with the ECE community and the wider world has been included as part of the internet survey (refer to previous chapter) and the case study data included here provides a rich description of what this look like in practice.

Links with the ECE community

Parents were asked in the interview if they had "noticed any changes in the service's use of ICT and what this might look like?" Parents often commented on the link of between the technology and the child's home life/experiences:

> *The fact that the ICT is instantaneous and can link to the home is invaluable, for example the service emailing home learning stories and weekly updates and being able to engage with these when I am ready*. (CS1-Parent Int-1)

> *He loves (using) the computer and is familiar with computers as he has one at home. My child uses equipment at home and this reinforces the learning from home to the wider world. The teachers reinforce the responsibility of caring for the equipment and this has resulted in attitudinal change.* (CS3- Parent Int-1)

During their interviews, Lead Teachers were asked about teachers' awareness of children's engagement with ICT at home and the influence of this knowledge on their practice. The initial responses generally related to how teachers gathered this information, focusing on the resources available in the home setting rather than on the impact of this knowledge on their pedagogical practices.

> *Have asked parents a question about this in their child's profile.* (CS5-LTI-1)

> *Children's experiences range from TV and video right through to computer games, video cameras and pix phones.* (CS4-LTI-1)

> *nquire whether families have access to a DVD player so that they can play the centre-created DVD.* (CS2-LTI-1)

When this question was probed further (e.g., "and how does this influence your practice?") two Lead Teachers responded by suggesting they use this knowledge to scaffold the child's learning:

> *Teachers observe children's use of the computer and through this have develop an understanding of how much exposure children already have had in the home. Drawing on this knowledge teachers scaffold children's learning.* (CS2-LTI-1)

This general comment appeared to focus on the further development of ICT skills/leadership and did not make a connection to the children's specific learning interests and how these might be being supported in the home setting.

Parents were asked what opportunity they had available to them to engage in the use of ICT with their child. Most participants identified that they had been invited to participate in the use of ICT with their child. In two centres computers were available for parents to be able to log onto and check the services blog. In one service the Lead Teacher commented that this was also supported with a parent workshop whilst in another service teachers had developed an introductory book to blogging to aid parents in navigating the service blog site (CS4-DA-1).

Linking with the wider world through ICT

The importance of making connections with families, communities and the wider world is a cornerstone of ECE philosophy and is reflected in guiding policy documents. The evaluation matrix had identified this aspect as an important indicator and so we were interested to see what opportunities to engage and collaborate with the wider community were made available through the use of ICT. Strong evidence of this was observed in half of the case study services. The following observations give a flavour of such activities:

> *Teachers from overseas had recently visited the service. When in New Zealand one of the teachers had purchased a number of hand made puppets and took them back with her overseas to her service. When sharing them with the children they discovered that they were unsure of one of the species of birds so they took a digital photo and sent it through with an email to the staff and children at ECE service. This email was shared using a data projector with the older children and the questions that the overseas children had posed were read to the NZ children and teachers asked the children what they thought the bird might be. As the NZ teachers pointed out they could have very easily responded with the answer to the overseas children but through posing the questions to the NZ children they had the opportunity to share their thoughts and suggestions with their overseas peers via email.* (CS1-CL-1)

> *A child came to the service with a bag made from seatbelts. This intrigued children and teachers alike. On the bag was web site address. The teachers decided to get on to the site to find out more about the bags. The children had lots of questions about how the bags were made. These were written down in an email letter to the company, e.g., where did the seat belts come from, were they from old cars, trucks or maybe new ones? To the children and teachers' surprise they received a reply. The company in California was thrilled to hear from the service. All their questions were answered. To the amazement of everyone, the person who started the company is a New Zealander. It is a big company with 35 employees. The company sent small gifts to the children and photos of the company's 10th celebration.* (CS4-CL-1)

These observations suggest that ICT can assist in fostering communities of learners. The ease and speed with which communication occurred appears to contribute to the children's ongoing interest. Teachers were also aware of the opportunities that were afforded to them through using ICT for this purpose and drew upon their pedagogical knowledge to engage children in the process.

Reflective practice

Engaging in reflective practice is an important attribute of being an effective teacher. Reflective practices support teachers to identify and be critical of their assumptions and to remain open to new ideas and practices. The writing of the milestone reports and the shared action research focus had provided teachers with an opportunity to engage in deep reflection about their ICT journeys. It would seem that the programme requirements of milestone reports and dissemination demanded that teachers made time to reflect on their progress whilst the shared action research focus fostered dialogue and cohesion within the teams. One Lead Teacher reported that *"The milestone report writing has enabled the team to think more deeply about the effectiveness of what is happening for children and families"* (CS4-LT1-1) whilst another Lead Teacher commented:

> *The overarching focus of the service for the action research has encouraged the entire team to work together and has encouraged teachers to rethink what they do.* (CS1-LTI-2)

Engaging in reflective practice was not limited to the teachers in these services. In all six case study services there was evidence of teachers using ICT (or ICT artifacts) as a method to engage children in reflection as indicated by the following observational data.

> *After a very wet day children were able to spend sometime outdoors. While outside they noticed that the boat in the playground had filled with water. This lead to a discussion about where the water was going to go to and a number of suggestions were offered by the children, e.g., down the pipes. The children then had the opportunity to engage in drawing their understanding of pipes and how they shifted the water. Teachers then sourced pipe images on the internet and set them scrolling on the laptop for the children. Children were able to draw on these images to further inform their understanding and drawings of pipes. Many of these drawings became more detailed through this process.*
>
> *Photographs were then taken of the children's work and were made available to them on PowerPoint presentation. These photos were then used as further provocation for the children's work and to inform the wider teaching team of children's interests.*
>
> *Teachers then took the children on a walk of the local community where they looked at pipes, drains and manholes. Photos were taken throughout this walk and then placed onto the PowerPoint presentation and children referred to these further when completing their drawings which continued to become more detailed.*
>
> *A child then brought in a book from home that shared information on pipes, water purification and sewerage. Children continued to discuss the use of these systems and their art work continued to be enhanced through this process. Further photos of children's work were added to the PowerPoint presentation. When a child was looking at his earlier drawing on keynote and compared it to the one he was currently working on he said, "This is what I could do then and this is what I can do now".* (CS1-Reflection-1)

Engaging in evaluation and critique of the use of ICT

The Lead Teacher interviews suggest that engaging in the evaluation and critique of the use of ICT varied across the services. When asked "how do you evaluate the effectiveness of your approach to using ICT in the service?" Lead Teachers comments included the following:

> *No formal system exists to undertake an evaluation of ICT effectiveness.At the ICT meetings the mechanics of using it is discussed, e.g., presenting information using this programme. How effective has the format of communication (e.g. DVD/learning story) been in gaining feedback from parents is also discussed as this relates to the action research* focus (CS2-LTI-1).

The use of ICT was informally discussed in a third of the services involved in the case study. The remaining services responded more generally about observing children in order to scaffold their learning and to gain an understanding of children's skill and competence with ICT.

During the site visit evaluators also looked for evidence of teachers engaging in evaluation and critique of ICT in the daily programme. Wide variation across the depth of this critique is evidenced in the examples provided below:

> *A concern was raised by the team about the amount of time that was spent behind the camera and how this meant that they were not working alongside children to scaffold their learning (at that time). It seemed the team had talked together about this and while they might be able to draw on parents and other support people in the service to also work with children they stressed the importance of having a 'balance' of using the ICT and working with children.* (CS2-LTI-1)
>
> *A father made available to the service a computer programme for the staff to load onto the children's computer. This was made available to children in the two to three and a*

> *half year old room and was a talking book (Green eggs and ham). Over time this programme proved very popular however teachers noted that this programme created passive viewing, "just like watching TV". Children did not interact with this educational software and were concerned about this. This team discussed this issue and decided to remove the piece of educational software from the computer.* (CS1-LTI-1)

Whilst there was evidence that teachers were engaging in critique, the level of this varied greatly across the services visited. We were interested that in the second example above teachers discussed the concerns that they had over the "passive nature" of the educational software and decided to remove it, as this team had also suggested that they found "*games challenging to incorporate across the curriculum*" (CS1-LT1-1). The same service also suggested that as part of the ECE ICT PL programme they would like to be challenged more on pedagogy. We wonder whether the intense programme focus on the action research investigations is resulting in missed opportunities for participants and facilitators to engage in discussion and critique about the use of ICT (or ICT pedagogies) in areas unrelated to the action research focus.

Purchasing Criteria

In order to ascertain the depth of thought that underpins the purchasing of new ICT resources, Lead Teachers were asked about the criteria they use to inform the decisions made about purchasing. The view represented in a five of the nine lead teacher interviews indicated that considering how the technology could be used to support children's learning was an important criterion. Only one service appeared to have established a clear set of criteria for any ongoing purchases:

> *Selection criteria is established around three key areas. There are i) cost - 'value for money'; ii) availability - 'it's 2 hours to the nearest hardware so we have to know that we can access support'; followed by iii) careful research around the particular equipment that would best suit the learning needs of the ECE community.* (CS6-LTI-1)

In other services the criteria was not so clear, and in case study three the criteria was focused around ICT that has been observed in other ECE services and appeared to be a costly mistake.

> *The process of deciding what resources to acquire was generally based on the teaching team's visits and networking with others and being inspired by what they observed in practice with colleagues… However, the team needed follow-up instruction (ongoing support) and that much of the equipment sits in the cupboard until they receive professional development so that they are competent to use it.* (CS3-LTI-1)

ICTs are expensive and it is important for teachers and others involved in the purchase of equipment to do so from an informed basis. Careful consideration, such as that described by the case study service six above, is about the cost, intended purpose, and available support is necessary.

Parents' Voice

Another voice that emerged in the critique of ICT was that of the parents. A small number (4) voiced their concerns regarding the use of ICT by young children in an early childhood setting.

> *We try to keep our kids away from it actually, especially at this age we'd rather see them outdoors so we don't get involved in it.* (CS6-Parent Int-3)

> *Personally I think it's too early. I think communication is really important for the future. Face to face, one on one communication is number one for me. School, sure, but you can take it too far too early. You've got a long time to do that sort of stuff. Face to face is the hard stuff and it's so important. Being competent technically is not being competent socially. I want to see my children learn the basis of communication first and only then move on. It's easy enough at home to put out a computer to entertain the kids but much*

> *harder to get out paints and stuff like that – the creative stuff – that's what I want to see here. I recognise that for families with low levels of technology at home this may be more important.* (CS6-Parent Int-3)

> *Have some concerns about the use of ICT in ECE. Particularly not keen on the TV or computer being used as a babysitter with videos or DVDs. Do not think the use of the TV is necessary.* (CS5-Parent Int-1)

Parents also stressed the importance of having a balance of ICT with more traditional experiences offered in the learning programme. A strong view evident in parent feedback was that play was a highly valued approach to learning. Parents also expressed concern over children being "rushed" to learn ICT skills at a young age and advocated the importance of their children being able to share in the same learning opportunities they had experienced in their own childhood (such as outdoor play and art).

> *It is good for children to get an introduction to this area but old fashioned play is really important too. Painting, being outside are important. I think there's too much focus on a computer, as adults we all work on computers all the time. Honestly, I'd rather see them play.* (CS6-Parent Int-2)

GOAL THREE: Enhanced Learning Outcomes for Children

In this section data about children's equitable access to ICT, children's use of ICT, and how services supervise children's use of ICT will be discussed.

Equitable use of ICT by children

In order to develop a comprehensive picture of who was engaging with what types of technology, and with whom, frequency counts were conducted in each of the six case study centres. During the frequency count periods, a total of 185 boys (52.7%) and 166 girls (47.3%) were observed using ICTs. There was only one recorded observation of a child with identified special learning needs engaged in using ICT (a computer). Because of the way frequency counts were taken, it is impossible to know if each instance of ICT use was by a different individual; therefore, numbers discussed below do not necessarily indicate numbers of individual children.

The ICTs that children predominately engaged with were computers (127), followed by overhead projectors (73), digital cameras (24), watching a DVD/movie (23), digital microscopes (5), an electronic whiteboard (4) and using a video camera (1). It is important to point out that in these observations not all children were physically using the equipment; for example, children may have been watching a DVD, sitting alongside a teacher who was working on the computer, or watching a presentation by adults using the overhead projector.

When examining ICT by gender, a weighted calculation of the number of occurrences per total number of boys or girls enrolled across the services is given in brackets behind the actual number of observations. This number indicates the percent of occurrences of the behaviour corresponding to one boy (or one girl), which allows a fair comparison of ICT useage between the genders.

The data show that there were only slightly more instances of boys (143 [0.30%]) than girls (119 [0.27%]) involved in the use of ICT; however, there were some sizeable differences in types of ICT they used and with whom. For example, more than twice as many girls (9 [.42%]) used desktop computers than boys (4 [.17%]), for reasons other than educational software. However, a greater number of boys (46 [.32%]) were involved in using computers with pre-loaded educational software than girls (32 [.25%]). Boys were also more likely to use laptops (23 [.34%]) than girls (13 [.22%]).

The findings indicate that girls were more likely to work with a teacher (26 [0.32]) than boys (23 [0.25]), while boys were more likely to work independently (25 [0.35]) than girls (14 [0.22]). When working in mixed gender groups, children were more likely to be working with a teacher (15 groups as opposed to 10 without a teacher). Boys were nearly twice as likely to work with same gender peers (31 [0.36] vs 16 [0.20]).

Observations also highlighted issues related to gender. In the example below children are engaged in using a computer with preloaded educational software in an area of the ICT environment that teachers across the case study services infrequently engaged with.

> *Two four year old girls have been sitting at the Little Tikes computer for some time. A is holding the mouse and clicking on various parts of the computer programme…. "There", she says as she puts a butterfly onto her card. "And one more", she moves another butterfly across… 'Silly bug' appears on the screen followed by a turkey image. Both girls laugh. "Not that", says B. " We don't want those in ours – we want girl things". A clicks on heart image. B says "Oh love hearts – Valentines Day. Oh we want a prettier one than that, don't we? Put another one." A says, "No, this is a love heart" B replies "But have you seen the flower one – that is pretty?" …* (CS6-Integrated-1)

In all of the services it was observed that children had either supervised or restricted access to the technologies available. A question asked of children in the informal interviews was if they (or any of the other children) used the camera at the service? In one service the children related this to children's age or physical size.

> *No, cause I am too little.* (CS1-Child Int-3)

> *[Childs' name] sometimes uses the camera cause he is a big boy.* (CS1-Child Int 2-1)

These comments suggest that children perceive the use of the camera as being restricted according to age or physical size. This appears to be a message that children are picking up implicitly in the services.

A blog site in one service has also been used as a regular method of communication for families with children who have special learning requirements.

> *The Group Special Education itinerant early intervention teacher uses the blog to communicate to the parents of the two children she works with. Entries are made most days she is working with the children at service. These comments are particularly appreciated by the Dads of these two children as they have less opportunity to be involved at the service. One of these families has added their own documentation of their child's experiences at home and with friends and extended family in the wider community.* (CS4-DA-1)

How children are using the ICT equipment

Evaluators used a range of photographs of ICT equipment (similar to that which was available in the service) in order to ask children if they were familiar with the equipment and if they knew what it was used for? The most recognised piece of equipment was the children's computer (KidsDesk). Children in four of the services recognised this image and talked with the evaluator about how they used it.

> *We play stuff with ourselves and with (child's name) and (child's name) together. We like to play Kidspix.* (CS4-Child Int-3)

> *I use it with my other friends. I used to do it with R cos she is a schoolgirl. I don't get to have a turn any more but we can sneak in when no one else is there sometimes.* (CS6-Child Int-1)

Children in three of the services identified the digital microscope and comments included:

> *We have a digital microscope, sometimes kids use it too.* (CS2-Child Int-2)

> *It's an incubator, it helps you see things. I turned it on and I put a feather under it and the light comes on and we saw it on the computer and we saw it.* (CS6-Child Int-2)

The digital camera was recognised by children in four of the centres. Children talked about who taught them how to use the camera and responses included:

> *I (learnt to) use it myself.* (CS3-Child Int-1)

> *The teachers showed us which buttons to press and then we just did it*. (CS6-Child Int-1)

Children were asked what they did if they experienced any problems with the technology that they were using at the time.

> *Get a teacher and say. 'can you help please?' No more kids can help, only teachers.* (CS4-Child Int-3)

> *If you click too many times we tell the teachers and they put a cover on it and we have to wait, then it goes back on again.* (CS6-Child Int-1)

> *Just keep trying, just a little bit.* (CS3-Child Int-1)

Children were asked if they had ever shown anybody else how to use the ICT equipment that they had available in their services? In four of the case study services children shared information about this.

> *I show all the little kids so the little kids know.* (CS4-Child Int-3)

> *No cause they already know, any big children knows but not the little kids.* (CS6-Child Int-1)

These last responses parallel the data above concerning children's access to ICT equipment, suggesting that children in these services relate children's competence in solving ICT problems to age or physical size.

A range of observations were also undertaken of the way in which children were engaging with the use of ICT in these services. In two of the case study centres examples related to the use of digital microscopes as in these examples:

> *J, a four year old boy, runs outside to search for spider webs… "There's one up here", he calls and slides back down the slide to tell his teacher who brings a piece of black paper outside. Together they carefully transfer the web from the roof to the paper and look at it closely… J carries his prize indoors to the digital microscope. He asks the teacher to turn on the laptop. She invites him to turn it on and to focus the lens so they can see the web. J slowly turns the lens and readjusts his paper until he has perfect focus. The teacher works out how to use the programme to take photos then, once successful, shows J how to take a picture of them, and to save it on the laptop.* (CS6-Integrated-1)

> *As the teacher was walking through the discovery area she noticed a child looking at a leaf under the digital microscope. She stopped and initiated an interaction and asked the child what he might see if he changed the magnification of the lens. The teacher proceeded to model moving the magnification to see if they could see more detail.* (CS4-Integrated-1)

In these observations having ready access to ICT aided the integration of the technology into the programme. Because the technology was permanently situated in the playroom, children and teachers were able to make regular use of it.

Children were also observed in five of the six services engaging with ICT in a way that supported or extended their learning in areas of interest.

> *C had taken the digital camera home and was sitting on the couch the next morning with the teacher and 3 other children. As they viewed the photos he had taken at home conversation emerged about family members.* (CS4-Integrated-3)

> *An overhead projector was set up on the table in the service and the light projected onto a screen. Children were provided with transparencies and white board markers to draw their pictures. The teacher worked alongside the child as she spent a sustained amount of time engaged in this artwork and many children came and looked at and commented on the projected image.* (CS1-Integrated-1)

In these observations the teacher had noticed something that the child was interested in, recognised its significance and responded by engaging with the child and offering some extension to the learning experience. ICT was not the focus of these interactions but a tool for sharing a message and extending the learning programme.

Using ICT to communicate with others was reported in all case study services. A range of approaches were used across the services to communicate including the use of email, sending photographs, texting parents, creating DVDs/PowerPoint shows focusing on the child and/or the programme of learning, Skype and Blogs.

> *On the blog there are video clips and stories and photos of children's learning experiences, recent and up coming events, e.g. the ECE ICT PLP case study research and the teachers presenting at the U learning conference. Parents are invited to comment, and many do so.* (CS4-DA-1)

> *Four year old O is sitting on C's knee at the laptop and together they Skype her Grandmother in Auckland (this is a regular session which began when O's mum went to Auckland to stay and skyped the service). Grandma is waiting at the other end and her face appears beaming onto the screen. O immediately shows Grandma some of her friends who are beside her dressed up in costumes from the recent production.* (CS6-CL-1)

> *Within the first two weeks of a child starting at the service a short video is taken of them engaging in daily activities. A learning story is written and a short questionnaire (3 questions, parent's voice) accompanies these to engage parents in their child's learning. The lead teacher indicated that as an outcome more parents are contributing to their child's portfolios. She also believes that the relationship with the family becomes established faster through this interaction and resource. It assists parents in understanding how the child spends their time in the service and reassures them that they are settling well.* (CS2-Innovative-1)

ICT and ICT generated artefacts have assisted teachers in communicating with families. A picture or video highlights a child's actions and emotions in a different way to text, and can be reassuring to parents as their children settle into the centre. As one parent suggested (CS1-Parent Int-1) the use of ICT to communicate some of these messages meant that she could look at this material when she had the time to really engage with the information. The use of ICT to communicate with parents has strengthened parents' involvement in the programme and engagement with their children's portfolios and programme books in more that half the case study services.

Using ICT as a tool to revisit learning through ICT generated artifacts was evident in all of the services. Photographs were used in all services as a tool to facilitate discussion about prior learning. The use of DVDs or videos was also evident in four of the case studies.

> *Presentation of children's photographs, projects (e.g. a recent large-scale production) and downloaded documentaries/websites are shared daily as relevant (i.e., there is no standardized daily procedure for their use; it is determined by what is happening at the time). For example a slideshow is made available during the day and parents are invited to view this.* (CS6-DA-1)

> *The teacher describes how they use ICT to settle children. The child took photos and down loaded these and a selection was chosen to put in her portfolio. She then told a story about the friends in the photos. "A., S., A., and M., are nice and they are my friends."* (CS3-Reflection-1)

In these examples visual images act as a prompt for children to recall and discuss past experiences. This mulitmodal approach to learning was a theme that emerged in the data. ICT and ICT artefacts were used in this process to support children's developing literacy skills. As the examples highlight below this can occur through speaking, listening, reading and writing.

> *Using the computer to record voice the child talks into the computer and plays back his voice. A collaborative approach is used and the teacher provides guidelines and this develops into the duo singing the ABC song. "I can do music", the child exclaims. The teacher explains that this supports his development and that children responding positively to voice recording through use of the I-Pod helps with developing the link between the computer and songs for mat time.* (CS3-Integrated-1)

> *Over the course of a number of days the children had been reading and acting out a story of the Gingerbread man. On the first day the teachers had taken a leading role in acting out the story with the children. Today the children used the dress ups for the characters of the story and acted it out at mat time with the teacher narrating it. While this was occurring one of the teachers was videoing it. After making their own Gingerbread men the children watched the video that had been created and invited their parents to also watch. Much laughter and smiles were evident on their faces.* (CS2-Integrated-2)

> *The child observes the teacher using the computer and says to the teacher that she can do her brothers name "P..e..r". The teacher asks, "What about your name?" and the child responds by sounding out each letter of her name…. The teacher says, "One thing I noticed is you didn't put a capital on your name, you need to backspace. Go up here and save it as, I think we will save it as XY. Can you see your name here? That's your folder, it's got your stories in it."* (CS5-Reflection-2)

Valuable opportunities arose for peer tutoring to occur (for children, parents' and teachers') when ICTs were observed in services. The following examples highlight how this is occuring across the different levels of learners in these ECE services.

> *As J is completing his second set of images of the spider web using the digital microscope a peer asks, "How did you do that?". The teacher invites J to explain, step-by-step, the process…. J leads a small group of children in search of spider webs and together they take them back to the microscope….. J stays close for some time, ensuring that the other children can access his advice where necessary.* (CS6-Integrated-1)

> *The teachers have recently written an introduction booklet to blogging and this is now available to new parents.* (CS4-DA-1)

> *Children finding new things act as leaders. The teachers are sometimes a step ahead or a step behind. We are 'green' and learning alongside them.* (CS3-LT1-1)

Supervision of ICT equipment

Children had free access to computers in two services and digital cameras in three services. Four services allowed children restricted access to computers and three to digital cameras. In these services the access was often heavily supervised: children could request to use the equipment and the teachers would make a decision about access, e.g., switching the computer on or being available to supervise the use of a camera.

As highlighted previously, when ICT is integrated both teachers and children begin to draw upon it as a natural extension of the programme. However, these findings suggest that when

ICT is heavily supervised it is still be viewed as equipment that is “special” or situated as ‘other’ in a number of services.

In one of the services that allowed children free access to the cameras, children were restricted to taking only four photographs and this rule was enforced by the teachers. The evaluator enquired as to why the service had this rule and the response was “due to the cost of printing”. A further point noted by the evaluator was that little guidance around how to take a good photo (e.g., framing of the image) or discussing what was being portrayed in the photo and why they had chosen to take the picture was occurring (CS6-RQ-1). In contrast another service encouraged children to *“think about the pictures that they are going to take”* (CS5-E&C-1) although in the observation no demonstration or modelling of this was evident.

Sustainability

Parental perspectives were also sought on how sustainable they felt the service’s approach was to using ICT. They were asked the question “do you think this current approach to using ICT is sustainable?” and to provide an explanation as to why they had this view. A reoccurring theme evident was the idea of a balanced approach in using ICT, and for it being an integrated component of the overall programme.

> *The technology mirrors the core philosophy of the service and this is why it is sustainable. Teachers have thought about the technology and how it will be used in the child’s world.* (CS1-Parent Int-4)

> *It is a natural part of the day to day running of the service.* (CS1-Parent-1)

> *The application of ICT is sustainable it is embedded in the ethos of learning.* (CS3-Parent Int-1)

These comments made by parents suggest that the integration of ICT usage into the daily programme may be an important factor in developing and maintaining sustainability. A small number of parents (3) also commented on the issues and concerns that they had about the sustainability of this focus. Comments included the amount time that teachers put into this new endeavour, staff turnover, owner/management support, the financial constraints on the growth of this programme in their services, breakages and vandalism of the resources (i.e. theft). These concerns are also reiterated by teachers who identify them as barriers to successful ongoing integration.

Lead Teachers in three services also shared their views on whether the ICT PL programme would assist in leading to a sustainable and sound ICT pedagogy. One service raised concerns regarding the focus the ICT PL programme had on practical skill-based tasks and identified a stronger pedagogical basis as an important component of ensuring the transformation of practice.

> *Would like to be more challenged on pedagogy to date I feel the programme has been focused on the bells and whistles of ICT and not the pedagogy. No link has been made between skills and pedagogy. The service has been asked to engage in academic research but not academic discussion.* (CS1-LTI-1)

A second service raised similar issues, and referred to the effectiveness of the professional development.

> *The project over 3 years is weak in terms of what I thought it would touch on (knowledge and skills).* (CS5-LTI-1)

The third service identified the issue of the Lead Teacher driving the ICT approach in the service.

> *The main focus for the teachers at this time was sustainability of ICT practice. The tendency for one teacher (i.e. Lead Teacher) to be the only person to work with the technology was recognized and staff are actively working together to allow more novice members to participate, even if this means more time initially.* (CS6-LTI-1)

These comments suggest that the pedagogical approach to using ICT in ECE and the skills required for this to be successful could be further developed by the programme. As intended in the programme model, Lead Teachers can and are driving the programme implementation in their services; support may be required for Lead Teachers in some services to ensure that the wider team commit to and remain fully involved.

EVALUATION QUESTION ONE (B): **How useful is action research as a tool to accomplish the intended outcomes of the programme?**

Although the case study protocol had not intended to specifically focus on the action research component of the programme, a theme that emerged during the case study site visits was the services' involvement in their action research projects. During their interviews Lead Teachers often made reference to their investigations that were underpinning and guiding their use of ICT in their service.

> *Discovering about research processes was described as a "huge learning curve" for these teachers and was valued for its potential to refine evaluation.* (CS6-LTI-1)

> *Action research question is great and it keeps us on track.* (CS5-LTI-1)

However, some services were focusing so closely on their research that other uses for ICT were not being addressed. During one of the Lead Teacher interviews, when the evaluator enquired about children's use of the computer with pre-loaded educational software, the response was:

> *…that computer educational software programmes were clearly stated as NOT being the focus for this project and were not profiled at all during the [MOE] interview.* (CS6-LTI-1)

While computers with pre-loaded educational software may not have been the focus of the ECE ICT PL programme they were one of the most frequently used pieces of technology used by children in this service. The data reported in an earlier section of this chapter shows that all centres visited for the case study component had computers available for children with pre-loaded educational software yet teachers were less likely to work alongside children with these programmes. Because these computers and software were physically present within the services, it would seem that they are viewed as an appropriate learning experience but the data shows that teachers did not use the opportunities afforded through this technology to further children's learning.

Similarly, when evaluators posed a question to Lead Teachers about the children's engagement with ICT in the home and how this might influence practice, two Lead Teachers suggested that this was not the focus of their research.

> *The focus for the service was more concerned with facilitating community and global networks than the ICT itself.* (CS6-LTI-1)

> *This question has not been the focus of the action research and the centre was currently focusing on 'how families can be involved more in their child's learning and the effects this has on the child's learning'.* (CS2-LTI-1)

The use of action research appears to have had a mixed impact in the six case study centres. Whilst it has supported teams to work together and stay focused through the programme, in some instances it appears to have limited the integrated use of ICT within the service.

EVALUATION QUESTION THREE**: What are the emerging barriers and enablers that may make the difference between success and disappointing implementation outcomes?**

The services' views on potential barriers and enablers in the successful implementation of the programme are reported in this section.

Barriers

During the site visits teachers were asked to consider the barriers that they had experienced or noted as they tried to achieve the programme's intended outcomes.

Time was the barrier cited most often (14) with teachers expressing this in terms of the limited amount of time available to engage in the use of ICT alongside children; to engage in reflection; to ensure that the individual components of the programme are met (i.e., action research and milestones); to explore the equipment; and to engage in the extra meetings required. The second most frequently identified barrier was equipment (6) with teachers raising concerns about access to an adequate amount of equipment to use with children. In two of the case study services teachers raised concern about using their own personal ICT equipment at the service. Access to ongoing technical support and guidance was problematic for many services (4), together with: the absence of a facilitator (1); changing staff (2); and the limited focus on pedagogy in the ICT PL programme.

> *Equipment which has not been successful is the child video camera which did not seem to be compatible with the hardware and now sits in the cupboard. Keeping the equipment up to standard and operational at all times is a challenge at times, especially when there is no face-to-face IT support.* (CS6-LTI-1)

In two case study services evaluators noted issues with the physical layout of the service and concerns regarding health and safety.

> *A laptop was set up on the table for children to look at the scrolling images; however, the electrical cords were trailing across the ground.* (CS1-Environment-1)

> *The placement of the computers alongside each other was problematic. On the second day of the site visit a child brought a DVD from home to watch and there was quite a large group of mainly boys around the desktop watching the superhero DVD. The child who was attempting to work independently on the laptop beside them was constantly distracted from his work, therefore was unable to concentrate for any length of time.* (CS3-Environment-1)

Enablers

During the Lead Teacher interviews six (of nine) teachers commented on aspects of the ICT PL programme that they found beneficial. The components of the programme most frequently cited as enablers were the facilitator visits (5) and the importance of the workshops (2). This is illustrated in the comment below:

> *The value of the service visits was seen in terms of the ability to sit one-on-one with the facilitator and discuss the relevance of their specific work coupled with the back up of more generic hui/workshops which was seen as ideal*. (CS6-LTI-1)

In contrast, however, one service indicated that they had not found the workshops informative enough.

> *We expected to be skilled up and to get information about programmes for use in the centre. [Another course offered in Auckland] was more valuable than the workshops we have had.* (CS5-LTI-1)

In half of the case study services the Lead Teacher role was a shared position and this ensured that there was full coverage in the services that had separate areas for specific

groups of children, and to alleviate pressure of the extra workload. One Lead Teacher also commented about how this opportunity was further developing her leadership skills:

> *As a teacher I have been able to take a leadership role and share my skill and knowledge of ICT (through drawing on personal experience).* (CS1-LTI-1)

Summary

This chapter has presented Case Study data in support of goals two and three of the intended outcomes of this programme, i.e., *transformation of pedagogical practice (linked to ICT) that leads to an enhanced community of practice* and *enhanced learning outcomes for children*. It has presented data on how useful the action research component is as a tool to accomplish the intended outcomes of the programme and identified emerging barriers and enablers to the successful integration of ICT into the ECE service.

The level of ICT integration in the service was an important factor in determining children's use, positive parental perceptions, and perceived sustainability of ICT in ECE. Examples highlight how some teachers' are incorporating ICT into their teaching repertoire seamlessly and it is this level of integration that parents suggest that will make the use of ICT sustainable. The physical placement of ICTs also seems to contribute to the level of integration. Having ready access to the technology with, for example, the digital microscope set up and available for use or a camera that is easily accessible enabled teachers to build on children's learning as and when it happened.

In some of the case studies services it was evident that teachers have given consideration to both the pedagogical strategies used and the physical location of the ICTs in order to foster collaboration and peer tutoring. However, in contrast was the lack of integration evident when children engaged in using a computer that had pre-loaded educational software. The very limited engagement in this area by teachers posed a number of challenges to children who became frustrated or disengaged due to their limited knoweldge of how to operate the software sucessfully.

There was variation across services in terms of their evaluation and critique of ICT usage and purchasing decisions. Some services clearly articulated purchasing criteria whilst others were less well defined, resulting in some situations where technologies were not being used to their fullest potential. ICT was also used to assist in smooth transitions in a number of services and this fostered a collaborative project with a local school in one case study service. The use of ICT to foster a community of learners was evident in the case study services, with links being made both nationally and internationally.

In many of the services parents were invited to use ICT alongside their children. The use of ICT to communicate with parents was appreciated and resulted in their greater engagement in aspects of the programme. We were interested in the number of parents that reported that they had some concern over the use of ICT by their children in ECE. These parents strongly advocated a balance of learning experiences being offered to their children and yet had not appeared to have raised their concerns with the teaching staff.

Children were familiar with a range of technologies and could discuss the purpose of and processes involved in using them. An implicit message that children seemed to be receiving regarding the use of ICT, and their ability to solve any ICT issues, was that it was dependent on a child's age or physical size. Whilst boys used ICTs slightly more, girls were more likely to use computers for purposes other than educational software. The observations also highlight how children, parents' and teachers are using ICT to make meaning in ways that are increasingly multimodal.

The action research focus and the subsequent service milestones provided an opportunity for services to engage in dialogue about the use of ICT – a process viewed positively by teachers. However, our data revealed that in some case study services the action research

focus narrowed attention on ICT to the detriment of other ICT possibilities occurring in the service.

The emerging barriers and enablers of success were also investigated. Teachers identified a number of barriers with time being the greatest concern. Teachers also acknowledged a number of enabling factors that had supported them on their ICT journeys, including the facilitator visits and the workshops.

Chapter Seven: Discussion and Conclusions

This section of the evaluation of the ECE ICT PL programme includes discussion of the findings arising from the document analysis, internet survey of programme participants, telephone interviews with the National Coordinator and facilitators, and case study of six participating early childhood services. The section is organised according to the evaluation framework used, based on Guskey's (2000, 2002) model of professional development programme evaluation. Each level addresses one or more of the evaluation questions and programme outcomes; in addition, particular indicators were developed in the evaluation matrix for each of the programme goals and these have been mapped against relevant levels within the framework.

The evaluation questions and indicators addressed in each of the four levels are:

- Level One: This first level of analysis addresses the first outcome of the ECE ICT PLP, that of *increased ICT capability amongst participants*. Specific focus areas from the matrix include the following points.
    - Teachers (and possibly parents) demonstrate increased ICT capability in terms of skills, knowledge and confidence.
    - Teachers are using an increased range of ICTs appropriately.
    - Teachers have increased knowledge about cyber-safety, and are using this knowledge to develop appropriate cyber-safety practices in their service.

- Level Two: The evaluation questions addressed at this level are:
    - Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme
    - How successful are clusters in the ECE setting
    - How useful is action research as a tool to accomplish the intended outcomes of the programme
    - What are the emerging barriers and enablers that may make the difference between success and disappointing implementation and outcomes?

    In addition, this level addresses the issue of capacity sustainability, particularly focused around the ongoing resourcing of ICT equipment and resources.

- Level Three: This level addresses the following evaluation questions:
    - Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?
    - Will the programme lead to sustainable and sound ICT pedagogy?

    This level also addresses the second programme outcome: *transform pedagogical practice (linked to ICT) that in turn leads to an enhanced community of practice*. Specific focus areas from the matrix include:
    - Teachers view children as competent and capable learners
    - Teachers trust children to use ict equipment
    - Teachers are increasingly comfortable with allowing children to make decisions about the use of ict equipment
    - Teachers are actively using ict to support and enhance reflection on their practices;
    - Teachers are taking a collaborative approach to using ict with teachers, parents and children all engaging in collaborative projects
    - ICTs are being used by teachers to strengthen a range of pedagogical practices (e.g., documentation, sharing children's learning with parents, revisiting learning with children).

- Level Four: This analysis provides preliminary information about the third programme outcome, namely *enhanced learning outcomes for children*, including parental perspectives. Specific focus areas from the matrix develop to address this third programme outcome include:
    - Teachers notice and recognise trends of ICT use amongst different children in their service (e.g., gender, age, ethnicity, disability, digital divide)
    - Teachers develop strategies to respond to differences in trends of ICT use by children
    - Children are confident and capable with ICTs, including:
        - using ICTs as tools for learning
        - using ICTs for communicating with people beyond the centre.
    - Children act as "experts" with adults and other children who are "novices" in using specific icts
    - The use of ICTs have strengthened transitions of children and families:
        - into the service
        - within the service
        - from the service to school or another service.
    - Children's use of metacognitive strategies is supported by their engagement with icts
    - Parents' perspectives on their children's learning are supported and enhanced through the use of ICTs.

Evaluation Question Two, *To what extent are the ECE ICT PL programme's design, content and implementation by services useful across all types of ECE services*, is addressed in a separate, final section. This is because the discussion about and conclusions reached for this question draws upon data for each of the other evaluation questions and for each of the three programme goals. Whilst this project seeks to evaluate the efficacy of the ECE ICT PL programme in terms of current participants, looking forward what is of most value is consideration of its applicability and usefulness to the wider ECE sector.

It is important to note at the outset of this section that at the time of the evaluation, the ECE ICT PL Programme was mid-way through the three-year programme and thus it is unreasonable to expect that each of the three key outcomes of the programme – increased teacher capability; transformation of pedagogy; and enhanced learning outcomes for children – will have been fully achieved at this stage.

Level One: Participant learning

This first level of analysis addresses the first outcome of the ECE ICT PLP, that of *increased ICT capability amongst participants*. Specific focus areas from the evaluation matrix include the following points.

- Teachers (and possibly parents) demonstrate increased ICT capability in terms of skills, knowledge and confidence.
- Teachers are using an increased range of ICTs appropriately.
- Teachers have increased knowledge about cyber-safety, and are using this knowledge to develop appropriate cyber-safety practices in their service.

Results informing the discussion at this level of the evaluation come predominately from the document analysis (including the baseline and mid-point surveys undertaken by CORE of teacher capability and service capacity), with some further data from the online survey conducted with programme participants and the telephone interviews with the National Coordinator and the facilitators. The high turnover of teachers within services participating in the ECE ICT PL Programme is evident in the CORE survey results, with trends in increases in both capability and confidence being reported predominately for those participants who had been in the programme since its inception.

Increased teacher capability

That participants have increased capability in terms of using ICT is clearly evident through the CORE surveys which indicate "significant" increases in teachers' professional use of ICTs and the purposes for which they use a variety of technologies. In addition to the high use of ICT for documenting children's learning (Lee, Hatherly, & Ramsey, 2002) and communicating with parents, participants are increasingly using ICT for finding and developing learning resources and for centre administration. The development of teachers' technical skills beyond word processing skills into graphics, multimedia, telecommunications, spreadsheets and databases is perhaps as reflective of the demands of the accountability requirements of the programme (e.g., milestone reports, action research investigations, and dissemination requirements) and of other current administrative requirements (such as 20-hours free ECE) as it is of teachers using ICTs to support their pedagogy and to enhance children's learning outcomes.

Confidence in using ICT devices and a knowledge of how to integrate them in a pedagogically appropriate manner into the learning programme has been identified as a concern in many studies (Cox, Preston, & Cox, 1999; Hall & Higgins, 2002; Judge, Puckett, & Cabuk, 2004). Therefore it was interesting to note the results of teacher confidence evident in the survey conducted by CORE. Teachers' confidence in using ICT, both for personal use and for teaching and learning, has increased over the first half of the programme despite initially quite high confidence levels. Provider milestone reports also indicate that many teachers had higher skill levels than they gave initially themselves credit for.

Aligned to teachers' increased confidence with and usage of a range of ICT, the CORE surveys reveal a "substantial" increase in teachers' technological pedagogical content knowledge across the areas of assessment, children's self-assessment, communication, building reciprocal relationships, higher order thinking, creativity, and innovative teaching and learning practices. Significant shifts have also occurred in teachers' use of ICT "with or by children" across a range of indicators.

Teachers' attitudes to the use of ICT in the learning environment has been identified as an issue in a number of studies (Laffey, 2003; Loveless, 2003; Mumtaz, 2000). Therefore, investigating this aspect of professional practice was an important element of this evaluation. Changes in teacher attitudes towards the use of ICT in early childhood education, and about the level of access that children should have to ICT equipment have emerged from the interviews, survey and provider milestone reports. The interviews identified that some clusters began with participants who believed that there was no place for ICT in early childhood programmes, or who were concerned about the impact of ICT on more traditional aspects of programmes, or who believed that the expense incurred with purchasing ICT equipment meant that access should be restricted to the adults in the service. For some facilitators, the attitudinal shifts in participants who began with such views were described as important as the achievements of "high flying" services that began with positive attitudes towards ICT in early childhood. Although the online survey did not ask teachers about changes in their own attitudes concerning the use of ICT in early childhood, a number of respondents explicitly referred to positive changes in their attitudes when responding to the qualitative components of the survey. Mitchell and Cubey (2003) have identified that when teachers engage in effective professional development opportunities are made available for them to investigate and challenge assumptions, adapt their teaching practice, and explore their beliefs and attitudes. The various components of the ECE ICT PL Programme have provided teachers with the opportunity to engage in such practices. Discussion around changes in participant attitudes is provided within Level 3 below.

Cyber-safety

A key aspect of increased capability, identified in early discussions between the MOE and the evaluation team, concerns the development of participant understandings of and practices around cyber-safety. Almost all respondents to the online survey indicated that they had gained knowledge about cyber-safety as a result of participating in the programme with

workshops, information from facilitators and Netsafe resources being the most common sources of information. Major changes in practices reported by participants concerned developing policies and informing parents about cyber-safety issues. Progress in adopting cyber-safe practices was identified in both milestone reports and interviews as being variable, with management involvement in establishing and implementing cyber-safety policies and practices noted as a key element in making progress.

Given the role that management play in facilitating or hindering the establishment and implementation of cyber-safety policies and practices, it would seem prudent to require management participation in this aspect of the programme if it is rolled out to the wider ECE sector, particularly where services are managed within an umbrella organisation structure. In addition, milestone reports have indicated the need for facilitators to offer additional workshops on cyber-safety for teachers new to the programme – given the high staff turnover in participating services identified in the CORE midpoint survey, it is likely that ongoing support will be required to induct new teachers into cyber-safe practices.

Summary
In summary, participation in the ECE ICT PL programme has clearly resulted in increased confidence and capability in the use of a range of ICTs in early childhood settings at this point in the programme. Even where participants had joined the programme part-way through, their responses to the mid-point survey suggest generally higher levels of confidence and skills than those who participated in the baseline survey and are not now part of the programme. This may be due in part to the development of induction processes to ensure that new teachers are supported to use the technologies available in the service and to the increased confidence of existing team members to mentor and support their new colleagues in developing capability. The variability in implementation of cyber-safety policies and practices does, however, suggest that this aspect may require ongoing attention and support from the programme.

Level Two: Organisational support for change

The focus at this level is on the *organizational support for change, and the processes and implementation* of the programme. The specific evaluation questions addressed are:

- Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme
- How successful are clusters in the ECE setting
- How useful is action research as a tool to accomplish the intended outcomes of the programme
- What are the emerging barriers and enablers that may make the difference between success and disappointing implementation and outcomes?

In addition, this level addresses the issue of capacity sustainability, particularly focused around the ongoing resourcing of ICT equipment and resources.

Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?

The programme is a highly complex mix of delivery components, including centre visits by a facilitator; clusters of services who come together for workshops; regional hui and Lead Teacher hui organised by their cluster facilitator; an online community for participants and facilitators; and opportunities for participation in national conferences such as ULearn. Developing a professional development model that addresses the complexities of the relationship between technology, content and pedagogy is challenging (Misher and Koehler, 2006). Within the programme the three goals of increasing *teacher capability, transforming pedagogy*, and *enhancing children's learning outcomes* are intended to be met through the above components and through engagement in an action research investigation into an ICT innovation for their service. A number of service accountabilities are built into the programme design including the provision of regular milestone reports, development of service strategic plans, and dissemination of their action research findings.

Data concerning the extent to which the design and content of the PL programme, together with the implementation by services, are able to achieve the intended outcomes of the programme to date were gathered predominately through the document analysis, online survey, and interviews.

The survey results revealed that most respondents had experienced the programme components of attending hui and workshops, working with their facilitator in their service, and visiting the PLP Online site. A strong pattern emerged when respondents were asked to indicate the extent to which each of these components had contributed to their development of knowledge, skills and confidence: for each aspect, the highest responses to the category of "strongly agree" were for *facilitators, workshops, hui,* and *PLP Online*, in that order.

Whilst the survey design does not allow the inter-relationships between programme components to be teased out, it may well be that the individualised follow-up to workshops and hui that is provided by the facilitators (as evidenced through the milestone reports and interviews, and in the qualitative survey data) accounts for the especially high ratings given to the facilitator component of the programme. Hampton's work (2000) supports this finding as her study cited the importance of ongoing contact with the facilitators as one of a number of indicators that led to change occurring in teachers' professional practice.

Programme participants were asked to rank the usefulness of a number of aspects of workshops and hui: for these programme components the most useful aspects were *sharing innovative practices, networking with others, being introduced to new technologies*, and *having opportunities to use new ICT equipment*. These hands-on aspects were seen as more useful than having presentations from guest speakers or being able to develop collaborative projects with teachers from other services. A number of milestone reports, particularly in the early phases of the programme, indicate the strong participant focus on "techie" style workshops that developed their technical skills and confidence rather than on how these technologies could be used with children.

Similarly, participants were asked to rank the usefulness of a number of aspects of the PLP Online website: *the café (discussion board), spotlights, resources, blogs* and *accessing programme information and administration material* were the most highly ranked, whilst the least useful were the *online workshops, community groups*, and *special interest groups*. An analysis of the milestone reports reveals comparable results with teachers reporting that they use PLP Online to find answers to technical questions, make contact with other teachers, download information about writing milestones, share successes and ideas and look for ideas, find information about references and readings, and to feel part of the community.

Discussion of the effectiveness of the programme's design, content and services ability to achieve the programme goals of transforming pedagogy and enhancing learning outcomes for children is included below in Levels Three and Four respectively. The remainder of this section now moves to focus on the usefulness of the cluster model and action research, sustainability of capacity, and barriers and enablers (including situational variables) that might impact on the programme.

How successful are clusters in the ECE setting?

Participants in the ECE ICT PL programme were asked to indicate whether they had engaged with colleagues in other services through their clusters, and just over 80% had done so. When asked about the extent to which participation had increased their knowledge, skills and confidence very high responses were received if the two categories of *strongly agree* and *agree somewhat* are combined. However, when the two categories are spilt out and the category of *strongly agree* only examined the clusters are clearly most effective in developing knowledge (57.7%) ahead of skills (41.6%) and confidence (44.1%). A comparison of the respondents' ratings of the cluster component against the rating of the facilitator, workshop, hui and PLP online components discussed earlier (see chapter five above) shows that for the three areas of knowledge, skills, and confidence clusters are rated behind the facilitator,

workshops, and hui, but ahead of the PLP online component. In a related question, Lead Teachers were asked to rate the usefulness of the programme's approach of collaborating with other services in terms of building their service's use of ICT. Less positive responses were received to this question than to earlier ones concerning programme components, with 27% *strongly agreeing* and 47% *agreeing somewhat* with the statement.

When all respondents were given the opportunity in the survey to identify the advantages of cluster groups, three key aspects emerged: sharing and gaining new ideas; networking with peers in other service; and getting support from peers and the facilitator. Networking is an approach that Gould (1998) strongly recommends when using cluster groups and, as suggested in Cherrington and Wansbrough (2007), having participants that were "homogeneous in terms of centre setting and roles in the centre, if not training levels" (p. 39) may ensure the success of such opportunities.

The value of the cluster model for participating services and teachers also emerged through the provider milestone reports. In addition to the reasons offered by respondents above, reports also note that the clusters have assisted with the development of dissemination skills and that the clusters can act as an effective device for engaging teachers who have stayed on the periphery of the programme. Milestone reports indicate that participants have been highly committed to attending cluster hui, usually held on Saturdays: between 80 and 100% of teachers within individual clusters have attended cluster hui and are reported to value the opportunity to participate in these as a team. The ability of the programme to use the teacher release funding in a flexible manner has been identified in the document analysis as a factor in the success of Saturday cluster hui.

When asked about the disadvantages of cluster groups, survey respondents identified five key issues: time available for meeting with others and for undertaking the work required between cluster meetings; distances between services within the cluster; differences between services on a number of levels – philosophy, action research focus, available resources and capability; being in a cluster that was geographically too large for the facilitator to visit often; and only having Lead Teachers meet in the cluster. The negative impact of having cluster groups that were geographically widespread also emerged very clearly from both the facilitator interviews and the milestone reports. Concerns about the impact of up to four hours travel for facilitators and teachers; safety aspects involved in travelling long distances through winter; and the reduction of face-to-face contact between facilitators and teachers in some clusters were all noted.

In summary, the cluster model is an effective professional development model, ***in some contexts***. Where participating services are able to easily come together for components such as workshops and hui, where the facilitator is able to conduct the visit component flexibly in order to meet the service's needs, and where there is a reasonable degree of homogeneity between the participating services, then the cluster model is effective in broadening teachers' perspectives, providing support and networking opportunities, and developing communities of practice. However, the data suggest that where factors, such as the geographical spread of services, exist then the model is severely compromised and participant teachers do not enjoy the benefits that an effective cluster group can bring. It would appear sensible that any future provision of the ECE ICT PL Programme be managed to ensure that viable cluster groups are established, rather than expecting facilitators and participants to compensate for external factors beyond their control.

How useful is action research as a tool to accomplish the intended outcomes of the programme?

A mixed picture has emerged from the data about the usefulness of action research as a tool to achieve the intended outcomes for the programme, at this stage of the programme's implementation. The analysis of data from the survey, interviews and document analysis suggests that a complex set of factors impact on the ability of teams to engage in and utilise action research in a meaningful and effective way.

The survey asked questions of both participants and Lead Teachers about the action research component. Interestingly, whilst almost half of respondents strongly agreed that participation in their action research investigation had been very useful in transforming their pedagogy, and a further 44% agreed somewhat, Lead Teachers were less positive about the degree of progress that they had made on their service's project with forty percent indicating that they had made less progress than they had hoped for. In addition, when Lead Teachers in the six case study services were asked whether engaging in an action research project had facilitated or hindered their use of ICT to support pedagogical practices, four of the nine responses were negative. Data from the case study component of the evaluation also suggested that the intense focus on the action research investigation resulted in some services not recognising and responding to other ICT interests. Facilitators, too, were mixed in their views as to whether the action research component was useful or not.

Most survey respondents identified that they had received training and assistance to support them in engaging in action research as part of the ECE ICT PL programme, and 81% of respondents felt that this training and support was sufficient. Given the results noted above, these data are interesting and suggest that it is not the quality of professional development that is impacting on the rate of progress. Rather, as the points below illustrate, it may be the complexity of both the ECE ICT PL programme and its interface with factors external to the programme that impacts on the degree to which action research is able to be a useful tool.

Some facilitators felt that there were services that would have benefited from exploring ICTs in some depth before deciding on their project focus as they struggled to manage the action research component alongside developing competency with the technical aspects of a range of ICTs. Furthermore, the interview data suggested that some services were struggling to understand the action research methodology or had difficulty in developing their research question and following the action research cycle, whilst the qualitative survey data identified that some services felt they were floundering as they got to grips with the action research processes. For services who are (or were) struggling with the action research component, issues such as the time required for the investigation, the impact of the project on other aspects of their work, and the need for ongoing support from their facilitator were raised as concerns.

Even services that were positive about the action research component identified that it demanded significant commitment of time and energy to undertake their investigation. Additional factors identified in the milestone reports as impacting on services' abilities to engage in action research included: poor leadership or administrative support; lack of coherent and collaborative team approaches; unfamiliarity with gathering and using evidence to support teaching practices and decisions; belief that research is not part of what teachers do; and, the impact of other developments such as the introduction of new policy (e.g., 20-hours free ECE), structural re-organisation, and staffing changes.

The views about the action research component were not all negative, by any means. The facilitator interviews highlighted that teaching teams which were already engaged in reflective practice found it easier to undertake their action research project. Engaging in their project had helped improve pedagogical practices, increase knowledge and use of ICT, and encourage reflective practices. Similar findings are evident in studies undertaken by McLeod (1999) and Depree and Hayward (2001). In addition, the interview data suggests that the action research component provided a focus for professional learning and encouraged wider reading.

In summarising this section, it is important to keep in mind that the programme was at its midpoint when the evaluation began. As the programme moves into its final year and teachers have a greater understanding and confidence in using action research processes the complexities of the programme and the impact of external factors may have less impact on services' progress with their investigations. The issues raised in this section do, however, indicate that both services and teachers need to be robust in order to manage the demands of the programme within the current early childhood context of policy changes and sectoral development.

What are the emerging barriers that may make the difference between success and disappointing implementation and outcomes?

Data drawn from the survey, telephone interviews, document analysis and case studies inform this section of the discussion. The barriers most frequently identified by participants and facilitators mirror those previously identified in the literature on early childhood professional development (Cherrington & Wansbrough, 2007; Gaffney, 2003; Liddington, 2000) such as time, staff workloads, staffing changes, difficulties in accessing qualified relievers, and inadequate management support. The extremely high rate of staff turnover, with 48% of teachers who completed the baseline survey having left their service before the midpoint survey, is very concerning, as it might be expected that staff who had bought into the programme would be expected to stay for its duration.

For participants in this programme, finding the time to engage fully in all aspects of the programme and to meet the accountability requirements was the greatest issue and would appear to be a significantly greater concern than for participants in other MOE-funded professional development programmes (Cherrington & Wansbrough, 2007). Collectively, the barriers of time, high staff turnover and an insufficient pool of qualified relievers suggests that the intensive model used in the ECE ICT PLP is likely to be too demanding for many ECE services (particularly those already recognised as struggling) in the current climate. However, if the programme were rolled out beyond this pilot, services with stable staffing teams who are already operating within a culture of reflective practice are more likely to have the mechanisms in place to deal with the demands of the programme.

Several identified barriers reflect the specific nature of the programme – difficulties with old or unavailable equipment; accessing funding for equipment; lack of ICT skills and knowledge; the accountability requirements of the programme; no or limited internet access; lack of technical support; and, the environmental set up in the ECE services. Similar issues regarding access to hardware and software were also raised as a concern in the City of Manukau Education Trust report (Williamson, 2005). The findings from that report highlight that "all types of early childhood providers are under resourced in terms of information communication technology and that clear discrepancies exist in terms of the level of use" (p. 25). In two of the services visited for the case study component teachers were using their personal equipment due to the inadequacies of equipment in their service. In order to maximise the benefits of participation in the ECE ICT PL programme and in recognition of the increased use of ICT across early childhood in general (partly as a result of the dissemination activities of the ECE ICT PLP), it would seem useful for the Ministry of Education to consider what role it can take in facilitating services' access to cost-efficient technical support and leasing/purchasing arrangements. The main findings evident within the evaluation of the *Laptops for teacher's final report (years 7 & 8)* (Cowie, Jones, Harlow, McGee, & Miller, 2008) demonstrated that when teachers had improved access to ICT resources afforded to them though the TELA laptop ownership programme then positive changes occurred to teachers' confidence, efficiencies, integration, communication and collaboration. If early childhood teachers were able to access a similar initiative then similar benefits may also become evident within the ECE sector.

Inadequate management support is also identified above as a barrier to maximising positive outcomes from the ECE ICT PL programme. The governance and resourcing demands of services effectively using ICTs for both administrative and teaching purposes requires that management are "on board" in terms of developing and implementing policies (e.g., cyber-safety) and strategic planning, and that they are committed to the on-going financial resourcing (including funding for internet access). Data from this evaluation highlights that the "centre-based" approach used in this programme does not automatically include management where services operate under an umbrella organisation. Future provision of the ECE ICT PL programme could usefully include a component specifically directed at management in order to address this potential barrier.

What are the emerging enablers that may make the difference between success and disappointing implementation and outcomes?

Overwhelmingly, the key enabler identified by respondents to the internet survey was the assistance and motivation provided by their facilitator. Data from the interviews suggest that the facilitators' ability to develop and sustain relationships with their cluster services was an important aspect of this enabler. Given the complexity and intensity of the programme, it is likely that the support from the facilitators has been an important factor in assisting services to manage the demands of engaging in action research, writing milestone reports, and disseminating their research findings.

Qualitative data from the survey revealed a number of internal factors that were enabling positive outcomes from the programme: respondents highlighted the motivation arising out of, for example, seeing positive shifts in their pedagogical practices, having a positive team culture, having support from their colleagues, and the Lead Teacher's commitment and passion. Seeing the benefits for children was a further internal enabler. Data from the interviews supports the positive impact of internal factors for those services that had ownership of their action research focus, supportive management, and a determination to continue in the programme despite the challenges.

The various components of the programme were all identified as enablers by between sixteen and thirty-five survey respondents, suggesting that the variety of programme components created opportunities for participants to find a match with their own preferred delivery modes. The higher level of funding available for this programme, together with the ability for it to be used flexibly to meet service needs, was also identified as another enabler by both survey respondents and the interviewees.

The identification of these enablers provides a flip-side to many of the barriers identified above and further supports the suggestion that, if the programme were to be rolled out, that the model is an effective one for services with strong internal factors. The critical role of the facilitators within the programme is a key aspect that would need to be addressed if the programme were offered to greater numbers of services, given the need for facilitators who are highly skilled in delivering professional development and in pedagogical use of ICT.

Sustainability of ICT capacity

The final section within this level of analysis addresses the effectiveness of the programme in developing a sustainable ICT capability, in terms of equipment, in the participating services. The development of sustainable pedagogical practices is addressed in the discussion of Level Three below.

A key element in the programme concerning the establishment of sustainable practices has been the development of a service strategic plan. Lead Teachers were positive in their views that their strategic plan was useful in developing sustainability. The discussion of emerging barriers above highlighted issues around inadequate equipment; the interview data has further indicated that there are issues for services in developing on-going funding streams and with the insurance costs for digital cameras and microscopes. Within some of the case study services, concerns raised by parents about the financial costs of ICT equipment, and the impact of breakages and theft on programmes support these data. The suggestion made above that the MOE consider what role it can play in facilitating cost-effective access to technical support and leasing/ purchasing options would certainly assist services in developing sustainable ICT capacity.

Level Three: Participants' use of their new knowledge and skill

This level focuses on the *participants' use of their new knowledge and skill* and addresses the following evaluation questions:

- Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?
- Will the programme lead to sustainable and sound ICT pedagogy?

In addressing the first of the two evaluation questions above, this level focuses specifically on the second programme outcome: *transform pedagogical practice (linked to ICT) that in turn leads to an enhanced community of practice*. Specific focus areas from the matrix include:

- Teachers view children as competent and capable learners
- Teachers trust children to use ict equipment
- Teachers are increasingly comfortable with allowing children to make decisions about the use of ict equipment
- Teachers are actively using ict to support and enhance reflection on their practices
- Teachers are taking a collaborative approach to using ict with teachers, parents and children all engaging in collaborative projects
- Icts are being used by teachers to strengthen a range of pedagogical practices (e.g., documentation, sharing children's learning with parents, revisiting learning with children).

Transforming pedagogical practices

In this initial section of the discussion for Level Three, the first three focus areas from the matrix listed above – *teachers view children as competent and capable learners; teachers trust children to use ICT equipment*, and *teachers are increasingly comfortable with allowing children to make decisions about the use of ICT equipment* – are addressed collectively.

Data from the internet survey, interviews and case study give insights into teacher attitudes, their supervision of children using ICT, and their beliefs about the purposes for using ICTs in early childhood. A common theme through the interviews was the variation in what individual teachers brought to the programme in terms of their existing attitudes, knowledge and experience in using ICTs, and that as they became more confident and knowledgeable their teaching practices changed. Facilitators also described seeing powerful shifts in teachers' views of children as competent users and attributed some of these changes to teachers observing children's intuitive knowledge about using equipment (especially when teachers and children began with similar levels of competency) and their intense curiosity that equipment such as digital microscopes fostered.

As teachers' views of children's ICT competency have shifted, facilitators reported less anxiety about equipment breakages and a more relaxed approach to children accessing equipment. In the survey teachers were asked about how the use of equipment by children was supervised and the results suggest that teachers were generally trusting of children's use of equipment. Within the six services visited for the case study, a similar pattern existed - children in two services had free access to the computer(s) and in three services had free access to the digital cameras. The restricted access to ICT in the other services was often heavily supervised.

A different pattern to access emerged when survey respondents were asked how internet use by children was supervised: 88% said the internet was mostly used with adult supervision whilst 6.4% had a flexible approach, and 5.7% had safety measures in place and therefore children were able to freely access the internet. These results suggest that the messages concerning cyber-safety have been heard and incorporated into teacher practices.

Of interest to the evaluators visiting the six services in the case study was that each had computers pre-loaded with educational software and yet there appeared to be an avoidance

by teachers of working with children with these packages: of the 78 instances of children engaged in using pre-loaded software observed in five of the six services during the case study visits, teachers were involved in only seven of these episodes. Evaluators observed children becoming frustrated and disengaged with using the software packages due to a lack of knowledge about how to use them successfully. A Lead Teacher in one case study service commented "*…that computer educational software programmes were clearly stated as NOT being the focus for this project and were not profiled at all during the [MOE] interview" (CS6-LTI-1)*. Given that all the case study services had pre-loaded educational software it is reasonable to assume that many of the other participating services in the programme will also have computers with such software and that similar patterns of usage will exist. Having these software programmes available for use by children would indicate that teachers believe that they do have a role to play in the ECE programme. Therefore, it is important teachers develop the ICT skills and pedagogy necessary for the successful integration of these resources into the programme of learning (O'Rourke & Harrison, 2004; Sheridan & Pramling Samuelsson, 2003). Whilst the evaluators do not have a position on the appropriateness or otherwise of educational software in ECE programmes, given that they are present within early childhood services, it seems sensible for the ECE ICT PL programme to re-consider its stance on educational software in order to support teachers in developing the knowledge required both to critique the value of individual software packages and to consider pedagogical practices that will support children where these are available in the service.

Teachers actively use ICT to support and enhance reflection on their practices

Almost all respondents in the survey identified that they were using ICTs to assist them engage in reflective practice, predominately through the use of teaching and learning stories and photographs. Half the respondents identified that they used video recordings and just over one-fifth that they used voice recordings. Some use was made of blogs, diaries on Google.docs and photo stories. Facilitators indicated that they had observed limited examples of services using Google.docs and blogs, reflective journals, and video recordings. Given that only one facilitator identified that one service in her cluster had used video as a tool to record and then examine aspects of teacher practice (specifically teachers' conversational styles) it appears that there is room for development in the use of ICTs such as video for supporting and enhancing reflection on teacher practices. The value of such a practice is supported by the results in two British studies involving the use of video to examine beliefs and practices (Moyles, Adams and Musgrove, 2002; Wood & Bennett, 2000).

Beyond the use of ICTs to enhance and support teacher reflection on their practices, the action research and service milestone requirements of the programme were specifically identified by Lead Teachers in two case study services as having supported deeper reflection and thinking about practices by the teaching team.

Teachers take a collaborative approach to using ICT with teachers, parents and children all engaging in collaborative projects

Three-quarters of the respondents to the internet survey identified that they used ICTs to form links and collaborate with the community (both within and beyond the ECE service community). Tools most commonly used were emails, blogs and Skype in order to keep in touch with children's families during the day and to share children's work (e.g., through emailing photos), and to make and maintain contact with other ECE services, schools and other agencies. The interview data supports this, revealing that some services were using Skype, and blogs to communicate with families, other services, and schools. The use of ICT to support children's transitions to school was also noted by some facilitators.

The case study component of the evaluation enabled some of these issues to be explored a little further. When interviewed, parents were positive about the way in which ICT was supporting continuity between home and ECE service, with examples of how children were using equipment in both contexts, and of parents who were emailed learning stories and

newsletters which they could then engage with at a time that suited them. Lead Teachers were asked about their knowledge of children's use of ICT at home, and the extent to which this influenced their practices. Their responses emphasised how they gathered this information and what equipment children were using, but not what they were using it for (i.e., what learning interests was it supporting). Similarly, the impact of this knowledge on teacher practices appeared to focus more on ICT skills and leadership rather than the interests that the child's use of ICT at home related to.

The case study data includes some detailed observations of ICT in three of the six services being used to foster collaboration with others beyond the service community, including another ECE service overseas, to support the transition to school, and to find out more about a unique bag brought to the service by a child. Apart from these latter examples, the results generally in this section suggest that while many services are using ICT to communicate within and beyond the ECE community that perhaps much of that communication is not specifically focused on children's learning interests at this point in the programme.

ICTs are being used by teachers to strengthen a range of pedagogical practices

Data from the internet survey revealed that teachers had increased the range of ICT that they were using or had started to use these in innovative ways to support their pedagogical practices. The greatest increases in use of equipment were with digital still cameras (127), internet (119) and digital microscope (115) whilst between 86 and 50 respondents also recorded starting to use video cameras, data projectors, DVD/video players, digital movie creators, and digital voice recorders. A number of software programmes and applications were also identified that respondents had started to use including, for example, Sykpe, blogs, photo story.

These results were supported by the data from the case study services which showed in many of these services teachers using blogs, email and Skype to communicate with the wider world; videos and DVDs to capture and revisit learning, and to ease transitions; DVDs and accessing information on the internet to follow children's interests; and using ICT within art or musical experiences. As children became more familiar with the ICT tools themselves, technologies such as Skype were being integrated more fully into the programme.

The integrated use of ICT is viewed as precursor to quality practices as it helps children develop an understanding of its purpose and use in real life situations and therefore was an important focus of the observations (Brooker, 2003; Sheridan & Pramling Samuelsson, 2003). Data from the case study services indicated that teachers were using ICTs in an integrated manner to support and spark children's learning interests: for example, children in one service engaged in a lengthy exploration of their hands and comparing them under the digital microscope before and after washing, whilst in another a trip around the block in a large truck was organised for one child passionate about trucks which he was able to document and share with the teacher, the truck driver, and other children back in the centre. A third example involved children exploring where the water in the playground went after it rained and led into a sustained exploration of pipes through searching for images on the internet, taking a walk around the neighbourhood to look at drains and pipes and photographing these, reading a book brought in by a child about pipes and sewerage systems, and encouraging children to represent their thinking through drawing and including these in a PowerPoint presentation.

Teachers engage in evaluation and critique of the use of ICT

The evaluation team was interested in the extent to which teachers in the case study services engaged in evaluating and critiquing the use of ICT during the visits and took the opportunity in the Lead Teacher interviews to focus on this issue. These interviews reveal that, although there is some evidence of evaluation and critique of the use of ICT within the programme that much of this occurs in an informal manner. Discussions with Lead Teachers suggest that evaluatory discussions tend to be focused on observing children in order to

scaffold their learning and to gain an understanding of children's skill and competence in using ICT equipment, rather than on issues such as the "fit for purpose" match between technologies and what the service want to achieve with it. Observations gained of teachers engaging in evaluation of ICT equipment or usage also suggested variation in the depth of critique. These data suggest that, at this point of the programme, there is room for further development of teachers' abilities to engage in critique of ICTs. As teachers move into the final year of the programme, their technical skills and knowledge of a range of ICTs should be sufficient that they can shift gears from the excitement evident in many responses about the possibilities inherent with IC technologies to critiquing and thoughtfully selecting those technologies that best fit their purposes.

Will the programme lead to sustainable and sound ICT pedagogy?

The discussion in Level Two above has addressed issues around the sustainability of capability whereas this discussion will focus on the sustainability of sound ICT pedagogical practices. The importance of the evaluation question that asks whether the ECE ICT PL Programme will lead to sustainable and sound pedagogy is highlighted in the data from the baseline and midpoint surveys undertaken by CORE (Ham, 2007; Ham 2008) which indicates that 48% of respondents who answered the baseline survey were no longer teaching in their service by the time that the midpoint survey was undertaken. Such high staff turnover figures suggest that it will be challenging for individual services to sustain sound ICT pedagogical practices without robust strategic planning and induction processes in place. Around two-thirds of services have general induction processes in place for new staff, with a slightly higher figure (69%) having specific ICT induction processes in place. Facilitators commented on the crucial importance of strong induction processes, with one facilitator reporting that her cluster had twelve new staff join it since its inception. Facilitators also reported delivering additional workshops on topics such as cyber-safety to enable new staff to quickly get up to speed.

Lead Teachers responding to the internet survey identified that the development of their service strategic plan has been useful in developing sustainable approaches to the use of ICT. Facilitators interviewed felt that the development of the strategic plan together with the requirement that services report on progress in implementing their action research plan in their milestone reports was a useful accountability device that demanded commitment from both management and from teaching staff.

Lead teachers are confident that their services will be able to maintain sound ICT practices after the completion of the programme. The provider milestone reports includes a comment that as children's access to ICT equipment becomes embedded within the service, such practices become commonplace and develop their own on-going momentum. Thus, it may well be that as a culture of ICT usage becomes more common-place that these practices remain embedded in spite of changes within the teaching team. Despite their confidence that their services will maintain sound ICT pedagogical practices after the completion of the programme, when Lead Teachers were asked in the survey what on-going support they felt they needed to maintain the use of ICT beyond the programme, most (38) wanted on-going professional development; continuing interactions with other services, either on-line (17) or face-to-face (4); the availability of technical assistance either on-line or through a telephone help-line (20); and ongoing facilitator assistance (7). These results suggest that at least some level of on-going professional support will be required to assist services to sustain the progress that they make through the programme.

Level Four: Student learning outcomes

At this level of the evaluation the *student learning outcomes* provide the focus of investigation. This analysis provides preliminary information about the third programme outcome, namely *enhanced learning outcomes for children*, including parental perspectives. Specific focus areas from the matrix develop to address this third programme outcome include:

- Teachers notice and recognise trends of ICT use amongst different children in their service (e.g., gender, age, ethnicity, disability, digital divide)

- Teachers develop strategies to respond to differences in trends of ICT use by children
- Children are confident and capable with ICTs, including:
  - using ICTs as tools for learning
  - using ICTs for communicating with people beyond the centre.
- Children act as "experts" with adults and other children who are "novices" in using specific icts
- The use of ICTs have strengthened transitions of children and families:
  - into the service
  - within the service
  - from the service to school or another service.
- Children's use of metacognitive strategies is supported by their engagement with icts
- Parents' perspectives on their children's learning are supported and enhanced through the use of ICTs.

Enhanced learning outcomes for children

In this initial section for Level Four, the first two indicators from the matrix – *Teachers notice and recognise trends of ICT use amongst different children in their service* and *Teachers develop strategies to respond to differences in trends of ICT use by children* – are addressed together, given their related focus.

The results to questions in the internet survey around teachers' perceptions of children's equitable use of ICT equipment show some interesting patterns. Survey respondents were asked a series of questions designed to gather information about the equitable use of ICT by children when considered by the children's gender, any special needs or disability, ethnicity, first language usage, and age.

Results for each dimension show disparities amongst who uses ICT within the centres. Between 65% and 87.7% of survey respondents felt that children used the equipment the same amount of time, depending on the dimension. However, twenty percent of respondents indicated that boys used ICT more than girls; just over thirty-five percent of respondents felt that children without disabilities or special needs used ICT equipment more than children with disabilities; eleven percent of respondents said that Māori and Pasifika children used ICT equipment less than other children; nearly thirteen percent indicated that Pakeha children used ICT equipment more than other children; nearly eighteen percent noted that children with English as a second language used ICT less than other children; and, finally fourteen percent felt that there were variations in useage by children of different ethnicities.

When asked about the age of children using the equipment nearly half of the respondents were in services that didn't cater for children under two years of age. Of those respondents whose services did cater for under-twos, 67.9% indicated that the equipment was only used by children over two while 32% indicated that children aged under two used the ICT equipment. These results are supported by the case study interviews with children, where some children indicated that access was restricted to older or bigger children.

The case study protocol included a component to measure the frequency of use of ICT equipment by boys and girls, and where possible by children with special needs. These frequency counts, averaged over the six case study sites, indicated that 52.7% of participating children were boys, and only one child with identifiable special needs was observed engaged with ICT equipment (information was sought about children attending with identified special learning needs from the Lead Teachers). Interesting trends in the use of equipment also showed across gender: girls used the desktop computers for non-educational games twice as frequently as boys, and were more likely to work with teachers than boys were; boys were more likely to use laptop computers. Mixed gender groups were more likely to work with teachers than single gender groups. Interviews with children during the case study site visits also suggested that physical size (i.e., age) was a determining factor in being able to access ICT equipment.

Facilitators noted that few services are actively monitoring which children do or do not engage with ICT with those who have done so, mostly focusing on gender. Many of the action research projects focus on engaging parents and this has encouraged data gathering around what ICT equipment and broadband access parents have within the home so that communication between the service and families can be tailored to match. However, teachers remain cognizant of the fact that parents may have limited access to reliable and current hardware, software, and connectivity and offer these initiatives in addition to their traditional programmes.

Mixed views emerged from the facilitator interviews about issues of equitable access to ICT equipment by children, with some respondents querying whether children were not engaging with ICT because other children dominated its use or because they were not interested. The parallel between not forcing children into playing in the sandpit if they are not interested was drawn with suggestions that children should not be forced into using ICT equipment.

Given the examples above of the powerful potential of ICT to support children in their learning, these teachers' views that ICT equipment is not being used equitably (together with the trends observed in the case study services) are concerning. It would seem helpful for these issues to be explored with participants during the remainder of the programme, and for support to be given to services on how they might more actively gather data to identify trends and then develop effective strategies for responding to these trends. Whilst we share the facilitator views that children should not be forced into using ICT, we do think that teachers have a responsibility to address inequities in how children experience and use IC technologies.

Children's use of ICTs

Three related indicators from the matrix are discussed in this section of the chapter: *Children are confident and capable with ICTs, including using ICTs as tools for learning and using ICTs for communicating with people beyond the centre*; *Children act as "experts" with adults and other children who are "novices" in using specific ICTs*, and *Children's use of metacognitive strategies is supported by their engagement with ICTs.* Data from the survey, interviews and case study are drawn upon to inform the discussion in this section.

The survey gave respondents the opportunity to provide examples of children using ICT with six pre-determined categories, including using ICT independently or with some assistance, as a tool to follow learning interests, for communicating with others (locally, nationally and/or internationally), to revisit previous experiences and learning, to enhance early literacy, and to teach others (adults and/or children) to use equipment or software. For each category between 131 and 155 respondents provided examples. Whilst some of these were very brief there were also significant numbers of very rich examples that clearly demonstrate that children are indeed highly capable and competent in using ICT equipment to support their learning and to communicate with others. Similarly, there were numerous examples of where children are actively taking on the role of expert with other children and with teachers. Additional comments from respondents highlighted that some had been surprised at children's high levels of competency.

Facilitators interviewed were also able to give many examples of how children were engaging competently and confidently with ICTs, including peer tutoring other children, parents and teachers. Examples highlighted included children using ICT to communicate with others outside the service, children taking ownership of their portfolios, and children engaging in deeper, more complex experiences (such as observing and documenting the changes as their service's tadpoles metamorphosed into frogs). The case study component of the evaluation provided the opportunity to observe how children were using ICT and which equipment was being used. Significant levels of peer tutoring were observed with computer educational software programmes (see earlier comments about this issue). Frequency counts revealed the equipment observed most frequently in use was computers (127),

overhead projector (73), digital cameras (24) and watching a DVD or movie (23). Digital microscopes, electronic whiteboards and movie cameras were observed rarely in the case study site visits. It is important to note that in the data above children frequently were not in control or actually using the equipment but were with adults who were controlling the use. However, parents interviewed as part of the case study visits described seeing changes in the use of ICT within their child's service with more ICT equipment available and more of it being controlled by children.

We were interested to hear children's views about how they used ICT within their centre and thus the evaluators engaged in informal conversational "interviews" with children in each of the case study sites. Photographs of ICT equipment were used to encourage conversation about whether particular technologies were available in their service and how they used them. The most frequently recognised pieces of equipment were Kidsdesk Computers (4/6), digital cameras (4/6) and digital microscopes (3/6). When asked what they did if they had problems in using a piece of equipment responses included: asking a teacher, keeping on trying, or asking their big brother. Children in four case study services talked about peer tutoring of children, their siblings and parents, and in one case even offered to teach the evaluator how to make a photo story. Variations in access were identified by some children who, when shown photos of equipment such as digital cameras, responded that they didn't use it with explanations such as "because I'm too little" or "[Child's name] sometimes uses the camera cause he's a big boy".

The results concerning how children are using ICT show some very positive trends (for example, just how competent children can be in using a range of ICTS and the potential that ICTs have for fostering complexity in learning) but also suggests that the final year of the programme will be important in helping teachers to address pedagogical concerns, including power issues around access and control, and the messages given to, in particular, younger children about using ICT.

The use of ICTs have strengthened transitions of children and families into the service, within the service, and from the service to school or another service

Data from the Lead Teacher questions within the internet survey, interviews, and from the case study site visits informs this section of the discussion. Lead Teachers were asked to identify whether the use of ICT was strengthening transitions for children into, within, and from the early childhood service. More than half felt that transitions into the service (55%) and from the service (59) were strengthened whilst 80% felt that transitions within the service were strengthened.

A number of services in the programme have focused on supporting children's transitions into, within or from their service for their action research investigations, including one service who was working with the eleven schools their service contributed to. Within the case study services, several innovative projects were observed, particularly around transitions into and from the service. One of these projects had spread into the local New Entrants class where the school children had made a video with their teacher of all the things they felt children starting school needed to know. Milestone reports and interview data also suggested that teachers in the programme were starting to advocate on ICT matters with their local schools and involve them with their ICT activities.

Parents' perspectives on their children's learning are supported and enhanced through the use of ICTs

Data for this section of the discussion is drawn from the internet survey, facilitator interviews, and from the case study. Eighty-five percent of teachers had noticed an increase in parental involvement in their children's learning, predominately through parents contributing more to their children's portfolio (77.1%), parents staying longer in the centre to watch and engage with their children using ICTs (77.1%) and parents borrowing equipment to use outside the service (36.4%). Other ways in which teachers described parents engaging more actively in

their children's learning included parents contributing photos of experiences beyond the service, communicating with the service through email and blogs, spending more time at the centre with their child or attending workshops where they learnt about ICTs. Evaluators in the case study sites observed that services were providing parents with opportunities to engage with ICT with their children through such strategies as the availability of the service computer so that parents could log into the services blog, and by the provision of workshops and introductory booklets for parents on aspects such as blogging. Similarly, the facilitator interviews noted services are using a range of ICTs (such as email, Skype and visual documentation) to invite parental engagement in a number of areas (such as transitions, sharing children's learning and interests, celebrating achievements and inviting parents' views).

A number of services have identified a focus on building and strengthening relationships with parents for their action research investigations. A cautionary note was sounded through one of the interviews about the extent to which these relationships were then able to become a vehicle for strengthening teaching and learning. In addition, the extent to which children's learning was fore-grounded and made explicit through documentation and the use of a range of ICTs was an issue identified in the interview data.

Finally, the case study interviews with parents indicated that, whilst parents were generally supportive of the use of ICTs to support teaching and learning, four parents across three sites raised concerns. These concerns included preferring their children to engage in outside, social and creative activities not easily provided at home; their children not being interested in ICT; that TV/DVDs/videos should not be used as "babysitters"; and that it was important to have a balance within the programme (i.e., that use of ICT should not dominate).

EVALUATION QUESTION TWO: ***To what extent are the ECE ICT PL programme's design, content and implementation by services useful across all types of ECE services?***

This evaluation question is addressed in a separate, final section because the discussion about and conclusions reached for this question draws upon data for each of the other evaluation questions and for each of the three programme goals. Whilst this project seeks to evaluate the efficacy of the ECE ICT PL programme in terms of current participants, looking forward what is of most value is consideration of its applicability and usefulness to the wider ECE sector.

We reiterate that the ECE ICT PL Programme was mid-way through the three-year programme at the time that the evaluation began and thus it has never been intended that each of the three key outcomes of the programme – *increased teacher capability; transformation of pedagogy*; and *enhanced learning outcomes for children* – will have been fully achieved at this stage.

Respondents in the internet survey together were asked what components of the ECE ICT PL Programme were most important to retain if the programme were to be offered beyond the pilot. Overwhelmingly (and not surprisingly, given earlier results) the facilitators were identified as the most important component of the programme (108) followed by the workshops (53) and cluster components (33). The action research, self-review, ULearn conference and milestone reporting components were seen as somewhat important whilst the ILead, PLP Online and dissemination components were seen as less important (although we note that not all participants have had the opportunity to attend a ULearn conference or ILead hui and that dissemination activities are in the early stages). Comments provided by the online survey respondents indicate that there are constraints that exist for particular service types (such as being a session service and not being able to have teachers leave the session to observe in other services) that they felt impacted on the effectiveness of the programme for their service type.

Data gathered in the case study indicated that services that functioned well and had a high level of management support were looking for a greater level of pedagogical challenge within the ICT PL programme. While it is clear that teachers do need the skills to use ICT, numerous studies have identified the importance of teachers having adequate knowledge to support and extend children's learning in this area (Bain, 2000; Mishra & Koehler, 2006; Patterson, 2004).

A range of issues were identified by facilitators when asked what they thought was important if the programme was to be extended beyond the pilot. These included having a base level of ICT resources and equipment, including internet access; the need for a programme that was longer than one year; and the need to have geographically viable clusters. Most importantly, facilitators felt that being able to sustain momentum within a complex, intense programme such as this required a robust service and team who all were committed to the programme and who were strong enough to cope with the intensity of the programme alongside the array of potential external factors that may impact on the programme's implementation in their service.

Conclusion

The six questions identified by the Ministry of Education for this evaluation of the ECE ICT PL programme have been addressed in the above discussion. There are, in addition, a number of points that we wish to make in concluding this report that to some extent sit outside the scope of the evaluation questions but which we see as important issues and comments to make. These are:

- ***Flexibility of delivery:*** The flexibility with which the programme provider has utilised the mix of programme components in order to responsively meet the diverse needs of a diverse sector is a strength of the delivery of this pilot programme. The evidence gathered from all data sources clearly indicates that this application of a flexible approach has been an important factor in maintaining teachers' commitment to and engagement in the programme.
- ***Impact of external factors on the implementation of the programme:*** The ability of teachers to implement the programme within their services and their practices is frequently impacted upon by factors (both barriers and enablers) external to the ECE ICT PL Programme, and outside the control of either the programme provider or the participating teachers. Achievement of the programme goals must, therefore, be seen within the context of a sector undergoing rapid change and development in many areas including the implementation of new policies, diversification, and attainment of staffing qualifications.
- ***Variations in what participants brought to the programme:*** Aligned to the points raised above are the variations in what participants brought to the programme in terms of their previous knowledge, experiences with and attitudes towards ICT in early childhood education. Clearly, participating services did not start on a level playing field, and therefore progress towards the achievement of the programme outcomes at this point and at the end of the programme must be against where the participants started from.
- ***Staff turnover – service or sector sustainability:*** As noted earlier in this evaluation we were concerned at the high levels of staff turnover identified through the respondents to the CORE baseline and midpoint surveys, and the impact of this turnover on the abilities of services to make maximum progress towards the achievement of the programme goals. The impact of high staff turnover has been noted in other early childhood evaluations (e.g., Cherrington & Wansbrough, 2007) where the point was made that staff turnover might mean that some professional learning gains might be lost from the individual service but not necessarily from the whole sector. It is possible that teachers who are moving into other services are taking their learning from the ECE ICT PL Programme and using this to contribute to ICT developments in their new services.

- ***Children using ICT in ECE services:*** The survey provided very rich data about the many ways in which children in the participating services are using ICT to support their learning and to communicate with others, some of which has been included as illustrative examples earlier in this report. Whilst the examples of children using ICTs do not necessarily apply to all children in all the participating services, they do provide clear examples of how it is possible for ICTs to support children's learning in early childhood settings.
- ***Suggestions for the remainder of the programme:*** Earlier sections of this discussion have identified some areas which we suggest the Ministry of Education and the programme provider consider incorporating into the remaining delivery of the current pilot programme. These suggestions are that 1) participants be supported to monitor and respond to trends in children's use of ICTs that might reveal inequitable access for children on the basis of gender, ethnicity, special educational needs or age; 2) participants are supported to further develop skills in critique and evaluation of the use of ICT; 3) that where computers with educational software are used by children teachers engage with and scaffold children's learning, and 4) a stronger focus on the pedagogical implications of using ICT with young children is incorporated into the programme.
- ***The intensity of the programme is both a strength and a weakness:*** It is our view that the intensity of the programme is both a strength and a weakness of the programme model. It enables strong, stable, robust teaching teams to fly but it is clearly apparent that the progress is considerably slower and the payoff is less for those services which have struggled (whether with the complexity of the programme, the impact of factors external to the programme, or a combination of the two). At times it appears that meeting accountability measures such as milestone reports and dissemination resulted in services and teachers "taking their eyes off the ball" in terms of their focus on teaching and learning. We, therefore, do not believe that this is a model suitable for application across the whole ECE sector in the current context. Having said that, however, we do not believe that the model should be scaled back so that it is suitable for all services as this will result in strong services being unable to access a programme that stretches them professionally and pedagogically and which is resulting in positive outcomes for children. Rather we would argue for dual model that allows services to select from the current intensive model or from a scaled back one with fewer accountability demands (such as milestone reports and dissemination) whilst still focused on the overall programme goals. Obviously, achievement of these goals will be slower for services in the latter model but the alternative of not providing this type of programme at all means that children and teachers in these services will not have access to support for the use of ICTs for teaching and learning purposes, and this will then lead to issues of equitable access for those teachers and, more particularly, the children.

Finally, the evaluation team would like to acknowledge the obviously high levels of commitment to this pilot programme from both the participating teachers and the programme provider evident throughout the data gathered. As noted above, much of the qualitative data that demonstrates the richness of what is occurring in the programme was unable to be directly reproduced in this report for space reasons. In our view, it is unlikely that the successes achieved to date would have been possible without these high levels of commitment.

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Appendices

Appendix A: Evaluation Matrix

Question 1. Does the ECE ICT PL programme design, content and implementation by services achieve the intended outcomes of the programme?

Goals	Focus areas	Data collection methods			
		Document analysis	**Survey**	**Interviews**	**Case studies**
1. Increasing capability	Teachers have increased knowledge about cyber-safety, and are using this knowledge to develop appropriate cyber-safety practices in their service.	No. of workshops; Issues arising about cyber safety	Changes in practice	Service progress with addressing cyber safety; issues arising.	Policies, passwords, teacher-parent conversations, parent reports, environmental cues
	Teachers (and possibly parents) demonstrate increased ICT capability in terms of: - skills - knowledge - confidence	Use of baseline/midpoint survey results to ascertain increased capability to this point in the programme	What facets of ICT PLP have helped this and why/how? Extent of engagement in ICT online aspects	As a probe within wider question about the effectiveness of the overall programme and individual components: What is it about this programme that makes it effective/not effective at increasing capability? Barriers/enablers (see later question re barriers/enablers)	In what ways are we seeing teachers use ICT – admin, pedagogy. Have parents developed ICT capabilities? What facets of programme have worked or not worked for your centre? Examples of action research projects Potential of the programme to enable very individual foci within each service
	Teachers are using an increased range of ICTs appropriately.	Use of results from baseline and midpoint resource survey to identify breadth of ICTS used and increases in range used in individual services.	Current use, which new ICTs are now being used, and any ICTs no longer using and why?		Observations of ICT use in centres. Discussions with teachers, parents, management about how decisions are made about which ICTs to use; prioritising new purchases etc

Goals	Focus areas	Data collection methods			
		Document analysis	**Survey**	**Interviews**	**Case studies**
2. Transforming pedagogy	Teachers view children as competent and capable learners with ICT. Teachers trust children to use ICT equipment. Teachers are increasingly comfortable with allowing children to make decisions about the use of ICT equipment.	Spotlights and online discussions as examples of shifts in teacher attitudes and practices. Examples within milestone reports of shifts in attitudes and teacher practices.	Teacher attitudes with a focus on changes to practice, with examples. How is equipment controlled in your service – agree/disagree statements	To what extent are you seeing shifts in teacher attitudes towards, and practices around children using ICTs? Probe: - seeing children as competent and confident with ICTs - children's independent access to ICTs - power issues around use of ICTs - spill-over of attitudinal changes into other aspects of curriculum	Observations of teaching/learning. Teachers engaging in reflection and critique of the use of ICT (by children and adults) Written recording of interactions, conversations, language. Observations of children interacting with peers and adults (initiating, or being directed). Policies around ICT use. Examples of action research projects
	Teachers are actively using ICT to support and enhance reflection on their practices.	Spotlights and online discussions as examples of reflective practices (including shifts/ development of reflection) Milestone reports of teachers using ICTS to assist their reflection (e.g., use of video to examine own practices)	Reflective practice – provide examples. How on-line and face to face interactions have facilitated pedagogical changes.	Probe for question above: - teachers using ICTs to engage in reflection upon their practices	Conversations with teachers. Observations of ICTs being used by teachers to support reflection (e.g., video recordings of their practices) Impact of milestone reporting requirements on teachers' developing reflective capabilities

Goals	Focus areas	Data collection methods			
		Document analysis	**Survey**	**Interviews**	**Case studies**
	Teachers are taking a collaborative approach to using ICT, with teachers, parents and children all engaging in collaborative projects.	Examples within milestones, spotlights that illustrate ways in which teachers, parents and children are collaboratively engaging with ICTs, both within and beyond the service.	Collaboration within and beyond the service – provide examples	As a probe for wider question about effectiveness of programme model: - Effectiveness of programme in developing collaborative practices within and beyond services	Observed examples of collaborative projects within and beyond the service. Conversations with parents, teachers, children. Environmental artefacts illustrating collaborative projects.
	ICTs are being used by teachers to strengthen a range of pedagogical practices (e.g., documentation, sharing children's learning with parents, revisiting learning with children)	Examples within milestones and online component of the purposes for which ICTs are used.	How the service uses ICT equipment. Has focus/use changed over time?		Observations of ICT use by children, parents, teachers, management (portfolios, posters etc). Environmental artefacts showing past and current usage of ICTs
3. Enhanced learning outcomes	Teachers notice and recognise trends of ICT use amongst different children in their centre (e.g., gender, age, ethnicity, disability, digital divide). Teachers develop strategies to respond to differences in trends of ICT use by children.	Issues raised within milestones around which children within services are or are not using ICTS. Evidence of participant awareness of this issue through the online discussions and spotlights	Use of equipment by individual children. Usefulness of spotlights in highlighting different practices. Usefulness of the programme (including individual components) in helping teachers to broaden the use of ICT to include all children	To what extent are services ensuring that all children have access to ICTs? Probe extent to which access might be different for children of different ages, ethnicities, learning needs, gender, and access to ICTs outside the service. Is the digital divide (between those children who have access and are using ICTs and those who do not/are not) being reduced or widened?	Observations. Frequency counts of which children are using ICTs Environmental artefacts – which children are visible, not visible in service-wide documentation? Discussions with teachers about inclusion of all children

Goals	Focus areas	Data collection methods			
		Document analysis	**Survey**	**Interviews**	**Case studies**
	Children are confident and capable with ICTs, including: - using ICTs as tools for learning - using ICTs for communicating with people beyond the service.	Examples within milestones, spotlights and online discussions of this outcome in action (or progress towards).	Examples of children engaging confidently and competently with ICTs – using the equipment, ICTs as tools for learning, ICTs for communicating with others.	What developments are you seeing in terms of children engaging confidently and competently with ICTs? *Probes:* - using the equipment, - ICTs as tools for learning, - ICTs for communicating with others.	Observations, conversations with children. Examples of the types of ICT activities they have engaged in and for what purposes: - using the equipment, ICTs as tools for learning, ICTs for communicating with others.
	Children act as "experts" with adults and other children who are "novices" in using specific ICTs.	Examples within milestones, spotlights and online discussions.	Examples of children acting as teachers – with other children, with adults.	Probe for question above: - children as teachers for both other children and for adults	Observations Environmental artefacts (wall displays, portfolio items) Examples described by children, teachers and parents
	The use of ICTs have strengthened processes for the transitions of children and families: - into the service - within the service - from the service to school or another service	Examples within milestones, spotlights and online discussions.	Questions directed at lead teacher around increased use of ICTs to support transitions	Probe for question below about parental engagement: - Use of ICTs to support transitions into, within and beyond service	Policies Written material to support transitions – starting at the ECE service, preparing for on-going transitions – to support parents Displays, service-made books about transitions (e.g., from under-2 to over-2; to school) Virtual visits to new entrants classrooms Use of ICTs to share children's day/session at the service with parents (e.g., emails, photos, phone calls).

Goals	Focus areas	Data collection methods			
		Document analysis	**Survey**	**Interviews**	**Case studies**
	Children's use of metacognitive strategies is supported by their engagement with ICTs	Examples within milestones, spotlights and online discussions.	Examples of visible use of metacognitive strategies by children		Observations, conversations with children, discussions around portfolios
	Parent's perspectives on their children's learning are supported and enhanced through the use of ICTs.	Examples within milestones, spotlights and online discussions.	Has use of ICTs increased parental engagement in their children's learning? Examples.	How is the programme supporting services to engage parents more actively in their children's learning?	Conversations with parents: - about their own child's ICT experiences - the use of ICTs to create artefacts to share children's learning between home and service

Appendix B: **ECE ICT PLP Evaluation: Teacher Survey**

Part 1. Information about this survey

Thank you for taking the time to complete the following survey. (Victoria University of Wellington College of Education Ethics Committee application SECTE/2008/25).

Although there are six sections with about 10 questions in each (plus an additional 13 questions for Lead Teachers), you will notice that many of the questions only ask you to respond by ticking a box. We anticipate that the survey will take approximately 30 minutes to complete; however, if you need to exit and come back to it later you can do so by clicking on "Exit Survey" at the top of every page, and all your work will be saved (Mac users will need to close their browser window instead). You can then come back at a later time to finish by clicking on the link in the email we sent you – so save that email! Do not forward that email with the link to someone else, because if they use that link they will go into your survey and their responses will overwrite yours. If you change your mind about an answer you can use the "Prev" button at the bottom of each page to go back to previous answers.

When you have completed the survey and wish to submit it, click on the "Done" button at the bottom of Page 7. If you decide you wish to delete any or all of your answers and not submit them, you can go back and delete any responses you wish.

You will notice that near the end of the survey there is a special section that we would like the LEAD TEACHER to complete in addition to the other questions in the survey.

If you have any questions or problems with using this survey, please contact Susan Davidson at (04) 463 9743, or susan.davidson@vuw.ac.nz

At the bottom of each page is a progress bar (see below) that shows you how much of the survey you have completed. So, by reading this page you've completed 14% of the survey! Please click on the 'Next' button to continue.

Part 2. Background information

1. Your age

- ☐ under 20
- ☐ 20-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50+

2. Your gender

- ☐ Female
- ☐ Male

3. Please tick any qualifications you are studying toward:

- ☐ Diploma of Teaching Early Childhood Education
- ☐ Bachelors Degree (please specify type of degree)
- ☐ Postgraduate qualification (please specify type of degree)
- ☐ Not applicable: already qualified (please specify)
- ☐ Not applicable: not studying

Degree types for above:

4. Name of your centre/service:

Name of your centre/service:

5. Type of service

- ☐ Kindergarten
- ☐ Education and Care
- ☐ Hospital Service
- ☐ Playcentre
- ☐ Pacific Island Early Childhood group
- ☐ Other (please specify)

6. Your main role (tick all that apply):

- ☐ Head teacher/Manager
- ☐ Lead teacher
- ☐ Teaching staff

7. Number of teaching staff in your service

☐

8. Number of children in your service

Girls ☐

Boys ☐

9. What age group of children do you mainly work with?

- ☐ Under 2 years
- ☐ Over 2 years
- ☐ Mixed age group

10. Please identify any ICT below that you have started using as a result of the ECE ICT PL programme, or are now using in a new or innovative way.

☐ Computer	☐ Digital still camera	☐ Mobile phone
☐ Email	☐ Roamer	☐ PDA
☐ Internet	☐ Video camera	☐ Digital microscope
☐ DVD/video player	☐ Digital voice recorder	☐ Interactive whiteboard
☐ Fax machine	☐ Digital movie creator	☐ Data projector
☐ Scanner	☐ Email	☐ iPod

☐ Other (please specify)

Part 3. Professional learning experiences/opportunities

The ECE ICT PLP includes a range of training and learning experiences/opportunities (e.g., Hui, workshops, dedicated website, on-line discussions, facilitator visits).

One of the broad goals of the ECE ICT PLP is to increase teachers' ICT capability. We can look at capability as including KNOWLEDGE about the way in which ICT can be used to enhance learning, the SKILLS involved with using various types of ICT equipment to enhance learning, and your level of CONFIDENCE in using ICT equipment to enhance learning.

11. Have you attended any of the ECE ICT PLP's Hui?

☐ Yes

No

If you ticked 'no', skip to Question 13.

12. If you attended any PLP Hui since joining the programme, please tick how much you agree or disagree with each statement below.

The hui are very useful in increasing my:

	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly
KNOWLEDGE about the way in which ICT can be used to enhance learning.	☐	☐	☐	☐
SKILL in using ICT to enhance learning.	☐	☐	☐	☐
CONFIDENCE in using ICT to enhance learning.	☐	☐	☐	

13. Have you attended any ECE ICT PLP Workshops?

☐ Yes

No

If you ticked 'no', skip to Question 15.

14. If you attended any PLP workshops since joining the programme, please tick how much you agree or disagree with each statement below.

The workshops are very useful in increasing my:

	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly
KNOWLEDGE about the way in which ICT can be used to enhance learning.	☐	☐	☐	☐
SKILLS about the way in which ICT can be used to enhance learning.	☐	☐	☐	☐
CONFIDENCE about the way in which ICT can be used to enhance learning.	☐	☐	☐	☐

15. We are interested in finding out which aspects of Hui and workshop(s) are particularly useful. Please rank ALL of the following statements by placing a 1 next the MOST useful through to a 6 next to the one which would be the LEAST useful.

Networking	
Sharing of innovative practice	
Introduction to new technologies	
Opportunities to use ICT equipment	
Guest speakers	
Developing collaborative projects with teachers from other services	

16. Have you visited the ECE ICT PLP Online website?

☐ Yes

No

If you ticked 'no', skip to Question 19.

17. ***If you have visited the website, please tick how much you agree or disagree with each statement below.***

Having access to an online community is very useful in increasing my:

	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly
KNOWLEDGE about the way in which ICT can be used to enhance learning.	☐	☐	☐	☐
SKILLS in using ICT to enhance learning.	☐	☐	☐	☐
level of CONFIDENCE in using ICT to enhance learning.	☐	☐	☐	☐

18. ***We are interested in finding out which aspects of the website have been particularly useful to you personally. Please rank the following website components by placing a 1 next the MOST useful through to an 8 next to the one which has been the LEAST useful (no need to rank those you haven't visited).***

Community Groups	
Café (Discussion Board)	
Spotlights	
Online Workshops	
Resources	
Special Interest Groups	
Blogs	
Info/Admin	

19. ***The ECE ICT PLP model includes having a facilitator work with each cluster group, and each centre/service individually.***

Have you received help/advice from a facilitator when she has worked with your individual centre/service?

☐ Yes

No

If you ticked 'no', skip to Question 21.

20. If you have received help/advice from a facilitator, please tick how much you agree or disagree with each statement below.

Having a facilitator available to work individually with my centre/service has been very useful in increasing my:

	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly
KNOWLEDGE about the way in which ICT can be used to enhance learning.	☐	☐	☐	☐
SKILLS in using ICT to enhance learning.	☐	☐	☐	☐
level of CONFIDENCE in using ICT to enhance learning.	☐	☐	☐	☐

21. Have you engaged with colleagues in other ECE centres/services in your cluster?

☐ Yes

☐ No

If you ticked 'no', skip to Question 23.

22. If you have engaged with colleagues from other centres/services in your cluster, please tick how much you agree or disagree with each statement below.

Engaging with colleagues in my cluster is very useful in increasing my:

	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly
KNOWLEDGE about the way in which ICT can be used to enhance learning.	☐	☐	☐	☐
SKILLS in using ICT to enhance learning.	☐	☐	☐	☐
level of CONFIDENCE in using ICT to enhance learning.	☐	☐	☐	☐

23. Have you been involved in an Action Research Project as part of ECE ICT PLP?

Have you been involved in an Action Research Project as part of ECE ICT PLP? Yes

No

If you ticked 'no', skip to Question 25.

24. If yes, please tick how much you agree or disagree with the statement below.

	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly
The focus of the Action Research project has been very useful in transforming my pedagogical practice.				

25. Have you gained any knowledge about internet safety (e.g., cybersafety, Netsafe) from the Programme?

Yes

No

If you ticked 'no', skip to Question 28.

26. If so, how did you gain this knowledge? Please tick all that apply.

Hui

Workshops

iLead

ULearn

Colleagues

Facilitator

Netsafe resources

Netsafe website

Other (please specify)

27. What changes, if any, have been implemented in your centre/service with regard to internet safety? Please tick all that apply.

- ☐ Policy documents
- ☐ Informing families about internet safety
- ☐ Systems for logging on
- ☐ Systems for reporting inappropriate websites
- ☐ Anti-virus software
- ☐ Firewalls
- ☐ Software that restricts access
- ☐ Other (please specify)

28. Do you have any further comments about your ECE ICT PLP professional learning experiences/opportunities?

Part 4. Your teaching practices

29. Please rank the following reasons for ICT use in your centre/service by placing a 1 next the MOST relevant through to a 6 next to the one which has been the LEAST relevant.

Reasons for ICT use with children:

To develop children's basic skills and computer literacy	
To develop children's thinking and problem solving skills	
To develop children's skills useful for their future jobs/careers	
To develop children's communication/social skills for collaboration and working with others	
To encourage children to reflect on their own learning	
To encourage children to become critical technology consumers	

30. Do you use ICT as a tool to reflect on your teaching practice?

- Yes
- No

If you ticked 'no', skip to Question 32.

31. If so, please identify the ways in which you use ICT in reflective practice? (Please tick all that apply)

- Photographs
- Videos
- Voice recordings
- Learning and teaching stories
- Other (please specify)

32. Do you use ICT to collaborate/form links with the wider community?

- Yes
- No

If you ticked 'no', skip to Question 34.

33. If yes, please provide some examples.

34. Do you have any further comments about your teaching practices and ICT?

Part 5. Children's ICT use

35. Please tick the statement that best reflects how the use of ICT equipment (e.g. digital cameras, voice recorders, etc) by children in your centre/service is supervised:

☐ Equipment is mostly used with adult supervision.

We have a flexible approach to supervision depending on individual children's expertise.

Children are able to freely access the ICT equipment.

36. Please tick the statement that best reflects how the use of the internet by children in your centre/service is supervised:

☐ The internet is mostly used with adult supervision.

We have a flexible approach to supervision depending on individual children's expertise.

We have safety measures in place (e.g. filters, etc), therefore children are able to freely access the internet.

37. Do you agree with the way supervision of children's ICT and internet use occurs in your centre/service?

☐ Yes

No

38. If not, then how and why would you personally do things differently?

For Questions 39-45, please tick the appropriate answer for each statement as it applies to your centre/service:

39. Boys and girls use the ICT equipment the same amount of time.

☐ Yes

No, boys use it more

No, girls use it more

40. Children with special needs/disabilities use the ICT equipment (in addition to any assistive technologies) the same amount of time as other children.

☐ Yes

No, children with disabilities use it more

No, children without disabilities use it more

41. The amount of time that Māori/Pasifika children use the ICT equipment compared to other children is:

☐ more

less

the same

42. The amount of time that Pākeha children use the ICT equipment compared to other children is:

☐ more

less

the same

43. The amount of time that children whose first language is not English use the ICT equipment compared to other children is:

☐ more

less

the same

44. All children in the centre/service, regardless of ethnicity, use the ICT equipment the same amount of time.

☐ True

☐ False

45. Only children who are over 2 years old use the ICT equipment.

☐ True

False

The centre/service does not cater for under-2's

Since the beginning of the programme, there have likely been many instances in which children in your centre/service have been actively engaged with some form of ICT equipment. Where applicable, for Questions 46-51 please describe a situation where a child/ren were doing the following:

46. Using a piece of ICT equipment independently or with some assistance:

47. Using a piece of ICT equipment as a tool to follow their learning interests:

48. Using a piece of ICT equipment for communicating with others (locally, nationally, internationally):

49. Using a piece of ICT equipment as a tool to re-visit previous experiences and learning:

50. Using a piece of ICT equipment as a tool to enhance early literacy:

51. Teaching others (children and/or adults) to use a piece of equipment or software:

52. Since your centre/service has been involved in the programme, have you noticed any changes in parents' levels of engagement in their children's learning involving ICT?

☐ Yes, it has increased

No, it has stayed the same

If you ticked 'no', skip to Question 54.

53. If parental involvement has increased, please tick all the ways you have noticed:

- [ ] Borrowing the equipment
- [ ] Contributing more to their child's portfolio
- [ ] Taking a more active role in seeking funding for ICT
- [ ] Staying longer to watch or engage with their children using ICT
- [ ] Other (please specify)

54. Do you have any further comments about children's use of ICT?

Part 6. The PL Programme Design and Implementation

55. Please list any ADVANTAGES of working in your cluster group:

56. Please list any CHALLENGES of working in your cluster group:

57. If applicable, what training/support did you receive in helping you to implement the Action Research project?

58. Was this training/support sufficient?

- [ ] Yes
- [ ] No

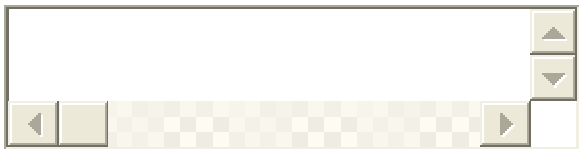
59. If it wasn't sufficient, then what would you change?

60. The ECE ICT PLP programme is a pilot programme. We are interested in finding out which Programme components should continue to be made available to ECE services on an ongoing basis. Please identify all the components you have had some experience with, and rank them, from 1=most important through to least important.

	I have had some experience with this:	The importance of this component to the programme:
ULearn		
iLead		
Regional cluster hui		
Workshops		
Facilitator visits		
On-line component/website		
Action research		
Self-review		
Dissemination of findings		
Centre/service milestone reports		

61. In your experience, what factors have supported you and your service to achieve the programme outcomes to this point in the programme?

62. In your experience, what factors have made it more challenging for you and your service to achieve the programme outcomes to this point in the programme?



63. Is there anything else you wish to tell us about the ECE ICT PLP?

****

Thank you very much for the time you have taken to provide comments on this survey. Your contribution will go a long way in helping to provide a thorough evaluation of the ECE ICT PLP.

For all of you who are NOT Lead Teachers, please scroll to the bottom of this page and click on the 'Done' button to submit your survey.

For LEAD TEACHERS, we would appreciate it if you would also complete the following questions. When you are finished, click on the 'Done' button to submit your survey.

****

64. Using the data for your 2008 RS61 form, please tell us the ethnic make-up of the children in your centre/service (we're using summary groups for brevity):

NZ Māori:	
Pacific Island:	
Asian:	
NZ European/Pākeha:	
Other European (e.g. British, Greek):	
Other (e.g. South American, African, Middle Eastern):	

65. Has the increased use of ICT in your service/centre facilitated transitions of children and their families INTO your service?

☐ Yes

☐ No

66. WITHIN your service?

- ☐ Yes
- ☐ No
- ☐ Not applicable

67. And/or FROM your service to school or another service?

- ☐ Yes
- ☐ No

68. How much progress have you made with your centre/service Action Research project to date?

- ☐ Less progress than hoped for
- Meeting expectations
- ☐ Exceeding expectations

69. If applicable, how has the use of Action Research facilitated or hindered the use of ICT to improve pedagogical practices within your service? Please provide examples:

70. Are there processes or procedures in place to induct new staff into the ECE ICT PL programme?

- ☐ Yes
- No

71. Are there processes or procedures in place to induct new staff into the use of ICT within your service programme?

- ☐ Yes
- No

72. Our ICT strategic plan has been very useful in supporting our centre/service to develop a sustainable approach to ICT.

- ☐ Disagree strongly
- ☐ Disagree somewhat
- ☐ Agree somewhat
- ☐ Agree strongly

73. The programme's approach of collaborating with other centres/services has been very useful in building our centre's/service's use of ICT.

- ☐ Disagree strongly
- ☐ Disagree somewhat
- ☐ Agree somewhat
- ☐ Agree strongly

74. How confident do you feel that your centre/service will be able to maintain the practices developed in this programme after the conclusion of the programme?

☐ Not confident ☐ Somewhat confident ☐ Confident ☐ Very confident

75. What on-going support do you think you may need to maintain the use of ICT beyond the end of the ECE-ICT-PLP?

76. Please tell us one challenge and one benefit of having a lead teacher in this ICT programme.

Thank you for taking the time to complete this final part of the survey. Please click 'Done' (below) to submit your survey.

Appendix C: Survey Information Letters/Emails

Kia ora koe,

I would like to take this opportunity to introduce myself and the evaluation team who have been contracted by the Ministry of Education to undertake an evaluation of the effectiveness of the ECE-ICT professional learning programme. One of our first tasks is to conduct an online survey of all teaching staff working in the Centres that are part of this programme. After liaising with CORE and the MOE, we are aware that you and your staff have already been invited to participate in a number of surveys! With this in mind we have developed a survey that asks participants about the programme itself rather than just their use of ICT.

We will of course be sending you more detailed information about the project within the next few days, however while we are waiting on ethical clearance we thought we would try to obtain the individual email addresses of all potential participants.

The reason we would like individual addresses is to ensure that all potential participants are able to complete the survey at a time which is most convenient to them. You will see that the survey has a number of questions and may take participants at least half an hour to complete. Therefore, we were wondering if you would mind providing us with the individual email addresses of all teaching staff in your centre.

We do appreciate that this may of course be a very busy time in your calendar, particularly if you are affected by school holidays, however if there is any chance of you providing this information within THE NEXT 48 HOURS! Then we may be in a position to provide participants with the email link to the survey before the holidays, on the off-chance that they may be able to complete it within the coming month.

Once again we really appreciate your consideration of this request.
Naku noa na

Susan Davidson

on behalf of the evaluation team, College of Education,
Victoria University of Wellington

Sue Cherrington
Lisa Oldridge
Vanessa Green
Sonja Rosewarne
Carmen Dalli
Deborah Wansbrough

Information sheet to be sent electronically to participants in survey

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

COLLEGE OF EDUCATION

7 July, 2008

Kia ora, Hello

Below is information about an online survey we are doing. We will send this information sheet to each teacher participating in the online survey.

Project Title: An evaluation of the early childhood education information and communication technology professional learning programme

We have been contracted by the Ministry of Education to undertake an evaluation of the effectiveness of the ECE ICT professional learning programme.

Our project team is being led by Sue Cherrington (Project Director), Lisa Oldridge and Associate Professor Vanessa Green. In addition the following individuals will be assisting with data collection; Associate Professor Carmen Dalli, Sonja Rosewarne, Deborah Wansbrough and Dr Susan Davidson.

Evaluation Process
As a first phase in the evaluation we are inviting all teaching staff working in Centres/Services that are currently part of the ECE ICT PLP to participate in an on-line survey. We are aware that you have already been invited to participate in at least two on-line surveys (Baseline and Mid-Project). Therefore we have designed the current on-line survey with these in mind. In this survey we will be focusing on your perceptions of the ECE ICT PLP, its design and implementation and the ways in which it may or may not have influenced your pedagogical practices to date.

Although you are under no obligation to complete the internet survey your completion of this survey is important to us. A good response rate will assist in achieving a representative sample of viewpoints and allow for the analysis of possible variables between centre/service types as well as regional and urban/rural variations.

Ethics
The evaluation plan has received approval from the Victoria University College of Education Ethics Committee (No. SECTE/2008/25). In addition, discussions about the content of the survey have been held with Ministry of Education personnel.

Confidentiality
You will note in the demographic section of the questionnaire that we have asked you to provide the name of your centre/service. This will enable us to gauge potential variations in professional learning that exist within the centre/service teams. Your identity, as the person completing the questionnaire, remains entirely anonymous. Your centre/service will not be identified and the confidentiality of your responses is guaranteed, as only aggregated data will be used in reporting results.

The survey will be administered through a registered company (Survey Monkey). The company has a strict security policy (copy of which can be obtained on request). The returned online questionnaires will only be accessible to through the use of passwords by select members of the research team.

Reporting/Dissemination
The evaluation will be reported to the Ministry of Education in a formal report due at the end of March 2009. It is also anticipated that the results will be reported in presentations at conferences and seminars and in articles published in research and/or professional journals.

If you would like to receive a summary of the results of this survey, complete the form below and send to Dr Susan Davidson.

Completing the Survey
To complete the survey, please click on the following link. The survey link will be open from July 9th till August 22nd. If you have any difficulties accessing the survey please do not hesitate to contact one of us. The survey will take approximately 30 minutes to complete.

[the actual live link will be inserted here]

Thank you again for taking the time in considering this request. Your involvement will help to make this an in-depth evaluation and contribute to the future policy work of the Ministry of Education in the provision of professional development.

Yours sincerely

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A/Professor Vanessa Green
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(04) 463 9574
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☐ Yes, I would like to receive a summary of survey results.

Name: _____

Contact details: _____ (w) _____ (h) _____ (m)

Email: _____

Return to: Susan Davidson
Research Coordinator
Jessie Hetherington Centre for Educational Research
College of Education
Victoria University of Wellington
PO Box 17-310, Karori
Wellington.

Information sheet to be sent electronically to participants in survey

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

COLLEGE OF EDUCATION

23 July, 2008

Kia ora, Hello

Below is information about an online survey we are doing.

NOTE: The survey link below will allow multiple people to go into the survey, but you must complete the survey IN ONE SITTING – you cannot exit the survey and come back, or all your responses will be gone. The first page of the survey says that you can go back in as many times as needed, etc, but this is only for people who are receiving the survey at an individual email account. (Let me know if you would prefer an individual survey link.)

Project Title: An evaluation of the early childhood education information and communication technology professional learning programme

We have been contracted by the Ministry of Education to undertake an evaluation of the effectiveness of the ECE ICT professional learning programme.

Our project team is being led by Sue Cherrington (Project Director), Lisa Oldridge and Associate Professor Vanessa Green. In addition the following individuals will be assisting with data collection; Associate Professor Carmen Dalli, Sonja Rosewarne, Deborah Wansbrough and Dr Susan Davidson.

Evaluation Process
As a first phase in the evaluation we are inviting all teaching staff working in Centres/Services that are currently part of the ECE ICT PLP to participate in an on-line survey. We are aware that you have already been invited to participate in at least two on-line surveys (Baseline and Mid-Project). Therefore we have designed the current on-line survey with these in mind. In this survey we will be focusing on your perceptions of the ECE ICT PLP, its design and implementation and the ways in which it may or may not have influenced your pedagogical practices to date.

Although you are under no obligation to complete the internet survey your completion of this survey is important to us. A good response rate will assist in achieving a representative sample of viewpoints and allow for the analysis of possible variables between centre/service types as well as regional and urban/rural variations.

Ethics
The evaluation plan has received approval from the Victoria University College of Education Ethics Committee (No. SECTE/2008/25). In addition, discussions about the content of the survey have been held with Ministry of Education personnel.

Confidentiality
You will note in the demographic section of the questionnaire that we have asked you to provide the name of your centre/service. This will enable us to gauge potential variations in professional learning that exist within the centre/service teams. Your identity, as the person completing the questionnaire, remains entirely anonymous. Your centre/service will not be identified and the confidentiality of your responses is guaranteed, as only aggregated data will be used in reporting results.

The survey will be administered through a registered company (Survey Monkey). The company has a strict security policy (copy of which can be obtained on request). The returned online questionnaires will only be accessible to through the use of passwords by select members of the research team.

Reporting/Dissemination

The evaluation will be reported to the Ministry of Education in a formal report due at the end of March 2009. It is also anticipated that the results will be reported in presentations at conferences and seminars and in articles published in research and/or professional journals.
If you would like to receive a summary of the results of this survey, complete the form below and send to Dr Susan Davidson.

Completing the Survey

To complete the survey, please click on the following link. The survey link will be open from July 9th till August 22nd. If you have any difficulties accessing the survey please do not hesitate to contact one of us. The survey will take approximately 30 minutes to complete.

https://www.surveymonkey.com/s.aspx?sm=pgTDXmZkCiHGi34WyrzpwA_3d_3d

Thank you again for taking the time in considering this request. Your involvement will help to make this an in-depth evaluation and contribute to the future policy work of the Ministry of Education in the provision of professional development.

Yours sincerely

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☐ Yes, I would like to receive a summary of survey results.

Name: _____

Contact details: _____ (w) _____ (h) _____ (m)

Email: _____

Return to: Susan Davidson
Research Coordinator
Jessie Hetherington Centre for Educational Research
College of Education
Victoria University of Wellington
PO Box 17-310, Karori
Wellington

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

COLLEGE OF EDUCATION

7 July, 2008

Kia ora, Hello

Last week I sent you an email about our upcoming online survey. We have now received Ethic Committee clearance to do the evaluation, and below is information for you about this. Attached, for your information, is the information sheet we will email to all your centre teachers (including you) tomorrow, with the link to the online survey (however, the link in the attachment is an example only and will not work). If you have not sent me the email addresses of your centre's teachers, please do so as soon as possible.

Project Title: An evaluation of the early childhood education information and communication technology professional learning programme (ECE-ICT-PLP)

We have been contracted by the Ministry of Education to undertake an evaluation of the effectiveness of the ECE-ICT professional learning programme. Our project team is being led by Sue Cherrington (Project Director), Lisa Oldridge and Associate Professor Vanessa Green. In addition the following individuals will be assisting with data collection; Associate Professor Carmen Dalli, Sonja Rosewarne, Deborah Wansbrough and Dr Susan Davidson.

We are providing you with the attached **information sheet** about the evaluation project as we will be inviting all teaching staff working in Centres that are currently part of the ECE-ICT PLP to participate in an on-line survey. The survey will include questions such as participants' rating of their technical skills (before involvement in the PL programme and to date), their reasons for using ICT with children, their attitudes about ICT including issues surrounding their confidence and self-perception of their ICT skills, and the impact of ICT on their preferred pedagogical practices. This evaluation will help inform the Ministry's ongoing provision of the ECE ICT PLP.

Responses to the survey are **confidential** and although we will be asking respondents to indicate the name of their centre this is only to enable analysis of variations within centres. No one will be able to identify the individual's responses to the survey. Only aggregated data will be used in reporting results. We are interested in overall patterns of ICT practices and attitudes, the effectiveness of the professional learning programme, and the enablers and barriers that individuals and centres experience. In addition to the survey we will be interviewing the facilitators of the ECE-ICT Professional learning programme. As a final phase of the project we will be inviting a small sample of Centres to allow us to undertake an on-site visit in order to conduct Case Studies. If your Centre happens to be chosen you will receive additional information about this part of the evaluation project.

If you have any questions please feel free to ring or email or use the toll free number 0800 842864 to contact us.

Yours sincerely

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Appendix D – Interview protocol for ECE-ICT-PL programme evaluation

1. The ECE ICT PLP model combines a number of components (e.g., online community, visits, hui, AR, cluster) for the delivery of the programme. What are your views about the effectiveness of the overall model and the individual components in achieving the programme outcomes?

    - Probes (including asking for examples to illustrate):
        i. Specific comment re success of cluster model and usefulness of action research component.
        ii. Impact of self review guidelines on AR component
        iii. What is it about this programme that makes it effective/not effective at increasing capability?
        iv. Effectiveness of programme in developing collaborative practices within and beyond services
        v. Cyber safety

2. To what extent are you seeing shifts in teacher attitudes towards, and practices around children using ICT?

    - Probes:
        i. seeing children as competent and confident with ICT
        ii. children's independent access to ICT
        iii. power issues around use of ICT
        iv. spill-over of attitudinal changes into other aspects of curriculum
        v. teachers using ICT to engage in reflection upon their practices

3. To what extent are services ensuring that all children have access to ICT?

    - Probe extent to which access might be different for children of different ages, ethnicities, learning needs, gender, and access to ICT outside the service.
    - Is the digital divide (between those children who have access and are using ICT and those who do not/are not) being reduced or widened?

4. What developments are you seeing in terms of children engaging confidently and competently with ICT?

    - Probes:
        i. using the equipment,
        ii. ICT as tools for learning,
        iii. ICT for communicating with others
        iv. children as teachers for both other children and for adults

5. How is the programme supporting services to engage parents more actively in their children's learning?
    - Probe – Use of ICT to support transitions into, within and beyond service

6. What evidence do you see of services in your cluster developing sustainable practices (both management and pedagogical) that will enable the outcomes of the programme to be maintained beyond the duration of the programme?

    What helps teachers to shift from "how to use ICT" to "ICT as pedagogy"?

7. The ECE ICT PL programme is a pilot programme. From your experience, what issues do you see if the programme were to be made available to ECE services on an ongoing basis?

8. Within the range of services what do you see as the enablers that have supported them to achieve the programme outcomes to this point in the programme?

9. What do you see as the barriers that have made it more difficult for services to achieve the programme outcomes to this point in the programme?

10. The evaluation team will invite a service from each cluster to participate in a three day site visit in order that we might develop a set of case studies. The information from each centre that participates in the case study phase of the evaluation will be treated as confidential. We are intending to select a range of services so that we can gain some understanding of the issues that impact, either negatively or positively, upon how successful the programme is across diverse services. In order to select a range it would be very helpful if you could give me a brief summary of how each service in your cluster is progressing with the programme.

    - Probes for each service – successes, challenges faced, any unique circumstances; rural/urban; flyers/slower starters; those that have a lot of ICT equipment and those that don't (digital divide).

Appendix E: Case Study Protocol

MOE-ICT-PLP Evaluation

Background information

Foundations for Discovery provides the framework for the early childhood education sector to inform effective ICT development, use and investment. The Framework outlines the principles for implementation and strategic focus areas for each of the partner in early childhood education (government, educators, parents, families and communities).

Supporting teachers to build their professional capability is a key focus for the framework. A pilot professional development programme (available to licensed and chartered ECE services) was established in 2006. It is being delivered by CORE Education Ltd and is due to finish in December 2009.

There are fifty-nine services involved in the programme. Thirty three are kindergartens, twenty four are education and care centres (one hospital based) and one is a playcentre. The services have been grouped into six regional clusters to deliver the PL (professional learning) programme. The clusters are based in:

- Auckland/Northland x2
- Central North Island
- Wellington/Napier
- Canterbury/Nelson
- Dunedin/Invercargill

The PL programme has the following components:

- individual service visits by facilitators
- regional cluster meetings and workshops
- virtual communications
- ongoing access to an online environment providing targeted discussion, information, workshops and professional networking opportunities
- each service is required to undertake action research.

The overarching goal of the ECE ICT PL programme is to increase teacher capability (with particular emphasis on ICT capability) that leads to transformation and the development of a community of practice, which, in turn, contributes to enhanced learning outcomes for children.

The goal translates into three desired to three outcomes from the professional learning programme:

1. increased ICT capability
2. transformation of pedagogical practise (linked to ICT) that leads to enhanced community of practice
3. enhanced learning outcomes for children.

Aim of the project

The aim of this evaluation is to assess whether, and how, the design and implementation of the ECE ICT PL programme is meeting the intended outcomes of the programme. The evaluation will inform decisions on the structure of the ICT PL programme post 2009. We need to be mindful also that this is not a review of the delivery of the programme by CORE Education Ltd.

This evaluation project has several phases:

Phase 1:
In the first phase a document analysis was undertaken to get an overview the ECE ICT PL programme.

Phase 2:
Consisted of a survey of all of the centres involved in the ICT ECE PL programme to gain an accurate understanding of how the design, content and implementation of the ECE ICT PL programme has been perceived by all participants across the participating centres.

Phase 3:
In phase three semi-structured interviews with the facilitators of the ECE ICT PL programme and the lead facilitator were conducted. During these interviews the facilitators were asked to identify the level of success achieved with the programme achieved in each of the centres in their clusters. This assessment process has enabled the research team to identify centres which differed by levels of programme success, service types and geographical location. Six centres were then chosen for case study analysis during Phase 4.

Phase 4:
The case study visits to six individual centres (one from each cluster group in the programme) will have a three-fold purpose:

1. To obtain a visual perception (i.e. direct observation and pictures) of ICT use as it is happening in the ECE environment, and to document best practice as evidenced by ICT use that supports effective ECE pedagogy. An observation schedule has been specifically designed for this purpose (information attached) in order to increase the reliability of data collection across observers and centres.

2. To conduct an analysis of centre reports and pedagogical documentation of children's learning (including videos, photos).

3. To gain the perspectives of the recipients of the programme. While this will necessarily include the teaching team and management, it is envisaged that parents and children may also contribute to the case studies through semi-structured interviews (appendix 2 & 3). Prior to visiting the centre parental consent will have been sought for children to engage in these informal discussions. Therefore you will need to liaise with your point of contact over this.

Guidelines for Observations

As an evaluator we will be asking you to undertake three days of observation in your allocated centre (approx six hours). On your first day you will need to liaise with the head teacher/supervisor to establish:

- your hours of attendance at the centre
- the most appropriate time to talk with parents (as you may need to stagger start and finish times)
- if there are any children whose parents have not given consent for them to be part of the study
- an agreed time to interview the lead teacher.

Also request a copy of the centres action research focus and questions.

Observations to be undertaken

Over the three days in the centre you are asked to undertake a range of observations (see below) and these are discussed in more detail in the body of this paper.

- Two narratives on how ICT is integrated into the programme (appendix 1)
- One narratives on broad and innovative use of ICT (appendix 1)
- One narratives of ICT (or artefacts) being used as a tool for reflection (appendix 1)
- One narratives of teachers engaging in evaluation and/or critique (appendix 1)
- One narratives of a community of learners (appendix 1; see page 5 for a definition of community of learners)
- Three semi-structured interviews with parents (appendix 2)
- Three semi-structured interviews with children (appendix 3)
- Three checklists of possible innovative uses of ICT (appendix 4)
- One analysis of environment & ICT (appendix 5)
- One document analysis (appendix 6)
- Two frequency counts of who accesses the technology (appendix 7)
- Three reflective question sheets (appendix 8; one per day)
- One semi-structured interview with the lead teacher (appendix 9; on day 3)

At the end of the data gathering phase you are allocated a further two days of which one and a half days should be used to write a 1500 hundred word (approx) summary of your overall impression of the centres use of ICT. Some of the points that you should address in your summary include:

- some background information about the centre (location, rolls, teachers etc)
- a typical description of the centres use of ICT
- your perception of the progress the centre has made and future directions
- identifying any particular challenges the centre has experienced e.g. internet access
- the parent's response to the use of ICT in the centre
- children's response to the use of ICT in the centre.

Finally the remaining half day should be used to load your information into NVivo. Susan Davidson will work to set up NVivo with predetermined criteria (you will be informed of this closer to the time) although this can be added to. Susan has agreed to provide one on one training (approx thirty minutes) if you are unfamiliar with this programme and then the loading of your data should only take a further three hours. If you are not familiar with this programme please arrange a time to meet with Susan as soon as your data gathering week has been confirmed and ensure that you arrive with information to insert into at **least one category**.

Please remember all of the data should be typed (except the plan) and collated in the indicated sections of your folders. Please **insert the centre name & location, the date and your name as the evaluator in the header of these documents**. These folders should then be delivered to **Susan Davidson** in the Jessie Hetherington office by the Monday of the following week after you have been in the centre. A digital copy should also be saved in the Contract work ECE folder by following this path
M:\WCE-Administration\Hetherington Centre\Contract Work\ECE ICT Evaluation.

Save your work **in the folder showing the name of the centre** you visited. Should any unforeseen issues arise during your site visit please contact Sue Cherrington.

Observation schedule

Narratives

A range of narrative observations will be required each day to assist in identifying transformed pedagogy and enhanced learning for children. Each of these should be a maximum of one typed page which includes an interpretation of what you have seen. Please use the observation sheets provided and these have also been sent to you digitally.

You have been asked to conduct **6 narrative observations** (appendix 1) over the three days in the areas identified below. Please indicate on your observation sheets the category that the observation relates to e.g. innovative use. While you may choose to undertake more than the requested number please select the most typical of these to submit.

The areas for observation are identified below along with some prompts of what you could be looking for. The required number of narratives for the entire three days of data gathering is identified in each area.

On each narrative ensure you identify what it links to e.g. community of learners etc.

How ICT is being integrated into the ECE programme

(Two narratives)

- Children integrating the use of ICT (suggesting information could be found on web)
- ICT used creatively (incorporated into dramatic play/artwork)
- Children engaged in problem solving (software, positioning of a camera)
- ICT is used indoors and out

To highlight broad and innovative uses of ICT in the centre

(One narrative)

- Centres are communicating with other services through the use of Skype.
- Creating a DVD to assist in transition to school
- Following children's interests to create a silent movie.

How ICT (or artefacts) has been used as a tool for reflection

(One narrative)

- Using video as a tool for reflection
- Conversations that may occur when teachers draw on ICT artefacts e.g. photos, video, Presentations (PowerPoint, Photo story etc)
- Children using ICT artefacts to share information with others and/or to inform their work.

When teachers engage in evaluation and critique of the use of ICT

(One narrative)

- Discussing issues of supervision/gender balance/innovative approaches
- Evaluating an ICT experience
- Discussing the criteria for purchasing ICT resources for the centre?

Community of learners

(One narratives)

- Children rearranging the environment to collaborate.
- Asking peers for assistance in the use of the equipment.
- Solving a problem together.
- Children teaching teachers/adults.

Semi-structured interviews with parents (Appendix 2)
The interviewer should begin by introducing themselves and explain the purpose of the visit to the centre and invite the parent/s to participate in the interview.

The aim of the interview is to gain the perspective of the parents' regarding the use of ICT with their children and their perceived changes that the centre may have undergone since commencing on the ICT PL programme. It is envisioned that these "interviews" will be more like a conversation with parents while using the pre-set questions as a guide. A set of interview questions have been provided (appendix 2). Try to ensure that you interview a parent from the management committee (if applicable) and a non-committee member.

1. How long has your association been with the centre?
2. Are you on any of the management committees?
3. Have you noticed any change in the use of ICT (type, frequency, use) since the centre began the ICT programme?
4. What might some of these changes be? (Prompts – sharing of information with parents, assessment, supporting children's learning)
5. How have you been invited in/encouraged to use ICT in the centre with your child?
6. Do you think this current approach is sustainable? Why or why not?

The parent is not asked to identify themselves however the interview sheet does ask questions such as how long has your child been at the centre, is this your first child to attend the centre etc. This is done in order to establish the longevity of the relationship that the parent has with the centre therefore the changes that they may have seen occur over time. Parents could be approached individually or may choose to participate in small groups. If they choose to contribute in groups please only complete one interview sheet and identify the number of parents that participated.

You are asked to conduct **three semi-structured interviews with parents over the course of the three days**. As indicated previously you may choose to conduct more during your time in the centre however you are asked to only submit three of the most typical examples.

How the data will be used

Parents may enquire how this information will be used and you should reassure them that they (or their children) will of course not be identifiable in the completed evaluation. The information gathered will be used to inform the Ministry of Education about the ongoing design and implementation of the ECE ICT PL programme.

Finish the interview by asking the parent/s if there is anything further they would like to add/say and thank the parent/s for participating.

Semi-structured interviews with children (10 mins each)
Interviews will be conducted in the main play area (inside or out) at the early childhood centre where the researcher will adhere to all of the centre policies regarding the supervision of children. These semi-structured interviews (or conversations) will last approximately ten minutes, although children are of course free to leave the interview at anytime.

We advise you to spend the first day getting to know the children so that they may feel more comfortable in your presence and therefore may feel more at ease when you are involved in conversing with them.

A predetermined set of questions are to be used with children with a range of further prompts to encourage participation. Researchers will record the information on the interview sheets provided (appendix 3) and are expected to document a **maximum of three of these interviews over the three days**. As indicated previously you may choose to conduct more during your time in the centre however you are asked to only submit three of the most typical examples.

All data gathering would be undertaken with the consent of participants which will be organised prior to your arrival at the centre. You should liaise with the contact person at the centre over who has agreed to participate in the project.

In some instances you might find that the best opportunity to talk with children about ICT is when they are engaged in its use, exploring its artefacts (photos, videos etc) or through the use of the photographs that we will have provided.

The questions for the interview are as follows:

When referring to documentation (learning stories, wall displays, centre made books, videos, PowerPoints etc).

- Do you help the teachers to write these stories (in your portfolio) on the computer?
- Can you tell me about what is happening in this photo/story?

The photographs provided are of a range of ICT equipment do endeavour to draw on ones that most resemble the ones that children may be most familiar with.

Using photographs as prompts (Appendix 3)

- Do you use any of these pieces of equipment?
- How did you learn to use this piece of equipment?
- Do you use it with anybody else?
- What sorts of things do you do with it (can you show me?)
  What do you do if you have a problem with it?
- Have you shown others children (mum, dad, teachers) how to use the equipment?

The purpose of such props is to create an environment where children can talk freely. An additional prop that you may choose to use to create space for this dialogue to occur is the use of art activities e.g. drawing.

At the completion of the interview the interviewer should thank the child for participating.

Checklist

A checklist has been provided for you to identify possible innovative uses of ICT. Although this list is as comprehensive as possible you will need to remain alert to other approaches used in the centre and this is where you may find it helpful to draw on the knowledge that you have gained through the briefing that we held. There is also room on the checklist for you to add items not already identified.

You are expected to complete the checklist (appendix 4) each day **(three in total)**.

Analysis of the environment

You are asked to write an analysis of the environment **once** during the three days that you are in the centre. You may find it useful to undertake this task on the first day of your centre visit part way through the morning as it will help you to become familiar with the environment,

types of ICT used and where they are physically placed (as sometimes you they could be in a cupboard etc). I have suggested part way through the morning as if the equipment was going to be made "freely" available you would expect it to have been done so by then. Therefore you will need to ask your contact person in the centre about what they have available and where it is kept.

In your analysis record the location of the ICT for example is the computer backed against the wall, is the hook for the camera at the child's level or up high? Are the laptops in the storeroom etc? Also identify any advantages or disadvantages around this of where the ICT is situated. For example; the glare from windows on a screen, placed in a doorway, trailing cords etc.

An example of what is expected is provided in appendix 5.

Document analysis

An analysis of the centre environment should be undertaken **once** over the three days (appendix 6). This can be achieved through looking at the ICT artefacts that are evident e.g. wall displays, children's portfolios, centre documentation etc. You should also look to identify the progressions of technical ability in these artefacts e.g. layout of portfolios, photos, boarders, design, books.

Many centres have engaged in making their own books about their programme etc and these along with videos/power point presentations etc would be valuable to explore. Again you are looking for the progression of technical ability and how often an item like this may be created (the amount that is evident).

Also looking at the way the centre shares information with parents about the centre e.g. electronic whiteboards as a notice board, images scrolling on a computer and how centres share information about the use of ICT in the centre e.g. newsletters, electronic whiteboards etc.

Please also look at the wall displays to examine the balance of ICT artefacts with that of children's original work. It would be helpful if you could provide some data on the approximate percentage of wall space that is covered by ICT artefacts and children's work etc.

Examine centre policies regarding ICT use and cybersafety and ask for copies as these may be helpful to refer back to when you write up your analysis. Note down where this information was made available e.g. in the office, on a very busy notice board, in a folder on the wall etc.

You may choose to take photographs of the environment to jog your own memory in your analysis but **please delete these from your computer** upon completion. **Please note do not hand in any of the photographs that you have taken.**

Frequency counts

Over the course of the morning (9am to 11am) using fifteen minute intervals you are asked to conduct a frequency count of which children and teachers are engaged in using the technology. On the form provided some technologies have been added however you will need to amend this as required (appendix 7). You are asked to identify the gender of the children that uses the ICT and if they have they have any identified special learning needs. Please also indicate whether the children are working individually, with their peers and/or with a teacher. At the top of the page you are also asked to identify how many boys and girls attended that day. You are asked to submit **two** of these observations.

Reflective question sheet

At the end of every day **(three in total)** you are asked to answer the reflective questions posed on the reflective sheet (appendix 8).]

The questions posed include:

- In what you have observed does ICT appear to be integrated into the programme?
- Over the course of the day how frequently did you hear teachers engage in evaluation or critique of ICT?
- What is your overall impression of supervision limits of ICT use by children?
- Any final comments/things that stood out for you at the end of the day.

Please ensure you add a comment under each question.

Lead teacher interviews

Arrange a time to talk with the lead teacher **(once)** on your third day in the centre to conduct one semi-structured interview which will last for no longer than thirty minutes.

The questions for the lead teacher are as follows and are to be recorded on the interview sheet (appendix 9).

1. How do you evaluate the effectiveness of your approach to using ICT in your centre?
2. What criteria do you use for selecting ICT resources for the centre?
3. How far have you progressed in your ICT journey?
4. To what extent are teachers aware of children's engagement with ICT at home and how does this influence their practice?

Completion of the data gathering phase

Please remember to type up all information (except the plan) and deliver to Susan Davidson and place in the shared ECE folder by the Monday of the following week.

The full data should comprise the list below.

- Two narratives on how ICT is integrated into the programme (Day 1, D2 or D3)
- One narratives on broad and innovative use of ICT (D1, D2 or D3)
- One narratives of ICT (or artefacts) being used as a tool for reflection (D1, D2 or D3)
- One narratives of teachers engaging in evaluation and/or critique (D1, D2 or D3)
- One narratives of a community of learners (D1, D2 or D3)
- Three semi-structured interviews with parents (D2 or D3)
- Three semi-structured interviews with children (D2 or D3)
- Three checklists of possible innovative uses of ICT (1 per day)
- One analysis of the environment and ICT in it (D1)
- One document analysis (D1)
- Two frequency counts of who accesses the technology (D1 & D2)
- Three reflective question sheets (1 per day)
- One semi-structured interview with the lead teacher (D3)
- 1500 hundred word summary of your findings (D4 & D5).

The data gathering tasks are laid out below in table form for ease of reference:

Day 1	Day 2	Day 3
- checklist of possible innovative uses of ICT (1 per day) **- Analysis of the environment & ICT** **- Document (display) analysis** **- Frequency count 1 of who accesses the technology** **- reflective question sheets (1 per day)**	**- checklist of possible innovative uses of ICT (1 per day)** **- Frequency count 2 of who accesses the technology** **- reflective question sheets (1 per day)**	**- checklist of possible innovative uses of ICT (1 per day)** **- One semi-structured interview with the lead teacher (D3)** **- reflective question sheets (1 per day)**
Day 1, 2 & 3	**Narrative observations** **- 2x Integrated use of ICT** **- 1x Broad and innovative use of ICT** **- 1x ICT or artefacts being used as a tool for reflection** **- 1x Teachers engaging in evaluation or critique** **- 1x Community of learners**	
D2 and/or D3	**- Three semi-structured interviews with parents** **- Three semi-structured interviews with children**	

If centres have not already returned the permission forms (centre and children) please collect these and put them into the plastic sleeve provided in your folder.

Should any unforeseen issues arise during your time on site please call Sue Cherrington.

Narrative Observation

Date…… Time……Observer……

Centre……..

Interpretation

Parent Interview

1. ***How long has your association been with the centre?***

2. ***Are you on any of the management committees?***

3. ***Have you noticed any change in the use of ICT (type, frequency, use) since the centre began the ICT programme?***

4. ***What might some of these changes be? (Prompts – sharing of information with parents, assessment, supporting children's learning)***

5. ***How have you been invited in/encouraged to use ICT in the centre with your child?***

6. ***Do you think this current approach to using ICT is sustainable? Why or why not?***

7. ***Any further comments?***

Children's interviews

When referring to documentation (learning stories, wall displays, centre made books, videos, PowerPoints etc).

1. Do you help the teachers to write these stories (in your portfolio) on the computer?

2. Can you tell me about what is happening in this photo/story?

Using photographs as prompts

3. Do you use any of these pieces of equipment?

4. How did you learn to use this piece of equipment?

5. Do you use it with anybody else?

6. What sorts of things do you do with it (can you show me?)

7. What do you do if you have a problem with it?

8. Have you shown others children (mum, dad, teachers) how to use the equipment?

Checklist

Innovative use of ICT	Yes
Following children's interests to create a movie/DVD.	
Centres communicating with others through Skype.	
Creating DVD's to ease transitions for children.	
Using an overhead projector to create shadow puppets.	
Communicating with peers and teachers (on holiday) via email.	
Using a digital microscope	
Using the editing software on the digital microscope	
Digital voice recording being used to ease transitions	
Children sharing DVD's from home e.g. scan of baby	
Videos connected to a TV so children can watch themselves perform.	
Videos' to revisit/celebrate prior learning.	
Digital portfolios	
Computer software used to follow children's interests e.g. art/editing images of oneself	
Creating an e-book	
Mobile phone texting (teachers who are overseas)	
Electronic whiteboards to communicate with parents	
Overhead projectors in art experiences	
Roamers (floor robots)	
Teachers reviewing the programme through video	
Data show projecting an images to enhance dramatic play e.g. café	
Supporting children's interests through accessing information on the internet	
Blogs to build links with the community	
Tablet PC	
iPods (audiobooks, creating podcasts)	
Online discussion forums	
Using excel to graph the growth of plants etc	
Using bilingual artefacts to support the use of Te Reo Māori	
Using cameras and software to challenge children's views of gender etc	
Google earth to locate different places around the world	
Children composing music on the computer	
Children narrating their own stories using a microphone	
PDA's to keep track of children's routines	
Displaying daily photos on a digital photo frame	

Analysis of the environment and ICT (example)

The ECE centre was an old villa and was separated into three rooms for children according to age. Each room had a camera available to the teachers and was usually stored on a shelf or away in a drawer. Laptops were also available in each of these rooms (babies and toddlers room) used only by the teachers and in the older children's room it was set up on a table by the teacher and looked at only by children. These of course were portable however on a number of occasions I notice issues with cords lying across the ground.

A datashow (on the dining room bench) and screen (attached to the wall) were available in the dining area. This was an area where the overhead projector (two) were made available to the children to use in their artwork.

The office had a teacher laptop and the staff room had a fax, computer and printer and digital voice recorder. Wireless internet access was also available in the centre and could be used in the surrounding veranda area.

In the two to three and half year old room a PC was available to children with pre-loaded software. This was pushed against the wall in the corner of the room (alleviating issues with cords).

Document analysis

1. *Wall displays*

2. *Children's portfolios*

3. *Centre programme books*

4. *Videos/PowerPoint/Photostory presentations*

5. *How does the centre share daily information with parents about the programme and/or the use of ICT in the centre?*

6. *Centre policies*

Number of boys attending
Number of girls attending

Appendix 7

Frequency count – children/teacher use of ICT

	9am						9.15					
Technology	**B**	**G**	**SLN**	**T**	**I**	**WP**	**B**	**G**	**SLN**	**T**	**I**	**WP**
Video camera												
Digital microscope												
Desktop Computer												
Tablet PC												
DVD Player												
Overhead Projector												
Digital voice recorder												
Electronic whiteboard												
Educational software & Kidsdesk												
Laptop												
Camera												

Key

Boys – B **Children with identified special learning needs – SLN……Individual - I**

Girls – G **Teachers – T** **Working with peers -WP**

Frequency count – children/teacher use of ICT

	9.30						9.45					
Technology	**B**	**G**	**SLN**	**T**	**I**	**WP**	**B**	**G**	**SLN**	**T**	**I**	**WP**
Video camera												
Digital microscope												
Desktop Computer												
Tablet PC												
DVD Player												
Overhead Projector												
Digital voice recorder												
Electronic whiteboard												
Educational software & Kidsdesk												
Laptop												
Camera												

Key

Boys – B **Children with identified special learning needs - SLN…….Individual - I**

Girls – G **Teachers – T** **Working with peers -WP**

Frequency count – children/teacher use of ICT

	10.00						10.15					
Technology	**B**	**G**	**SLN**	**T**	**I**	**WP**	**B**	**G**	**SLN**	**T**	**I**	**WP**
Video camera												
Digital microscope												
Desktop Computer												
Tablet PC												
DVD Player												
Overhead Projector												
Digital voice recorder												
Electronic whiteboard												
Educational software & Kidsdesk												
Laptop												
Camera												

Key

Boys – B **Children with identified special learning needs – SLN……Individual – I**

Girls – G **Teachers – T** **Working with peers – WP**

Frequency count – children/teacher use of ICT

	10.30						10.45					
Technology	**B**	**G**	**SLN**	**T**	**I**	**WP**	**B**	**G**	**SLN**	**T**	**I**	**WP**
Video camera												
Digital microscope												
Desktop Computer												
Tablet PC												
DVD Player												
Overhead Projector												
Digital voice recorder												
Electronic whiteboard												
Educational software & Kidsdesk												
Laptop												
Camera												

Key

Boys – B **Children with identified special learning needs – SLN……Individual – I**

Girls – G **Teachers – T** **Working with peers – WP**

Frequency count – children/teacher use of ICT

	11.00						
Technology	**B**	**G**	**SLN**	**T**	**I**	**WP**	**Key**
Video camera							**Boy – B** **Girl – G** **Children with identified special learning needs – SLN** **Teacher – T** **Individual – I** **With Peers – WP**
Digital microscope							
Desktop Computer							
Tablet PC							
DVD Player							
Overhead Projector							
Digital voice recorder							
Electronic whiteboard							
Educational software & Kidsdesk							
Laptop							
Camera							

Reflective question sheet

1. In what you have observed does ICT appear to be integrated into the programme?

Not at all	Emerging	Well	Extremely well
1	2	3	4

Comments:

2. Over the course of the day how frequently did you hear teachers engage in evaluation or critique of ICT?

Not at all	Rarely	Frequently	Very frequently
1	2	3	4

Comments:

3. What is your overall impression of supervision limits of ICT use by children?

No access	Children freely access	Flexible dependent on the child	Heavily supervised
1	2	3	4

Comments:

4. Any final comments/things that stood out for you at the end of the day.

Lead teacher interviews

1. *How do you evaluate the effectiveness of your approach to using ICT in your centre?*

2. *What criteria do you use for selecting ICT resources for the centre?*

3. *How far have you progressed in your ICT journey?*

4. *To what extent are teachers aware of children's engagement with ICT at home and how does this influence their practice?*

5. *Is any information provided to you during the PL visits or at Hui/workshops about evidence based practice/theoretical frameworks etc?*

6. *Other comments?*