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

SUMMARY REPORT
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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.

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. 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 (including one A'oga Amata and one Māori Immersion service), one hospital-based service and one playcentre.

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
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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.

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?
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    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?

Evaluation Methodology

Evaluation Framework

To address the evaluation questions we developed a framework using an adapted version of Guskey's model (2000, 2002). The **first level** of the evaluation focused on *participant learning* along two dimensions (Shaha, Lewis, O'Donnell & Brown, 2004): *attitudinal impacts and learning impacts*. At the **second level** in the evaluation process, attention shifted to *organizational support for change,* focusing on the *process and implementation* of the programme. At the **third level** of evaluation our focus was on the *participants' use of their new knowledge and skill w*hilst at the **final level** of evaluation *student learning outcomes* provide the focus of investigation.

Evaluation Process

A literature review was prepared to assist in the development of the evaluation tools, and with the analysis of the results. The literature review is included in the full report. We used a mixed-method approach (Greene, 1998) that included both qualitative and quantitative data gathering procedures and analyses to address the four levels described.

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 an analysis of key documents. These documents included:

- Milestone reports 3 – 8 from the ECE ICT professional learning provider (covering the period from December 2006 through to March 2008)

- The CORE Baseline Survey Analysis and Report (Ham, August 2007) and the CORE Midpoint Project Survey Analysis and Report (Ham, July 2008), and
- A MOE cross-analysis of Milestones 2, 3 and 4 (June 2008)

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 MOE personnel and representatives from CORE to discuss possible questions and themes that should be addressed in the evaluation in order to accurately respond to the six key evaluation questions posed by the MOE. These ideas and notes were then developed into an evaluation matrix in order to tabulate the key themes, evaluation questions and proposed data collection methods.

PHASE THREE: 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 in-depth on-line survey was conducted.

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. Full ethical approval was gained for the survey, which was then uploaded to Survey.Monkey.com for participants to access.

The final survey included 45 quantitative and 18 qualitative questions. The Lead Teachers in each service were asked to fill out an additional 13 questions, three of which were qualitative. The survey was completed by 178 respondents (60.4%) from at least 51 of the 59 services currently enrolled in the programme.
The survey was organised into the following sections:

1. Information about the survey.
2. Background information.
3. Professional learning experiences/opportunities
4. Pedagogical practices.
5. Children's use of ICT.
6. The PL programme design and implementation.
7. Lead Teachers Section.

PHASE FOUR: Telephone Interviews

The fourth phase of the evaluation process involved semi-structured telephone interviews with the five facilitators of the ECE ICT PL programme and the National Team Leader. Pre-prepared questions were used to guide each interview with a number of follow-up questions identified to enable the interviewers to probe the initial responses and ensure that views were gathered on a wide range of issues.

The final interview schedule sought the respondents' views on a number of areas based around the evaluation questions. In addition to gaining the views of the facilitators about the programme, the interviewees were able to confirm the focus of each Action Research project being conducted by the services in their cluster and provide demographic details about each service so that we could 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.

PHASE FIVE: Case Studies

For the final phase of the evaluation project case studies of six ECE services were undertaken, one from each cluster group in the ECE ICT PL programme. Whilst we wanted

to include a broad cross-section of services in the case study phase, we were concerned about the maintenance of confidentiality for these services, especially given that there were four services who each were single representatives of their service type. These services were not automatically included as case study services and instead the six participating centres were selected in order to reflect a mix of 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.

As the data for the case studies were collected it became quite evident that the highly individualised work occurring in each participating service meant that their identification by others involved in the programme (i.e., other participating services, CORE personnel, and MOE officials) would be a simple matter. To address this, the data have been presented as a single case study rather than as six individual studies. Identifying features, including reference to geographical features or local events that might identify services have also been deleted or altered.

The main purpose of the Case Studies was to observe how ICT use was occuring within these early childhood environments and to gain the perspectives of teachers, Lead Teachers, children and parents about the use of ICT in their ECE service. Each case study service was visited by an evaluator who undertook observations of how teachers and children were using ICT in the centre, conducted semi-structured interviews with parents, children and Lead Teachers, completed frequency counts of who accessed technology, and completed environmental and document analyses.

The evaluation matrix, survey instrument, telephone interview schedule and case study protocol are available as appendices within the full report.

Results and Discussion

This section presents the key results gathered from the document analysis, survey, interviews, and case study for each of the evaluation questions, together with a discussion of the key findings.

EVALUATION QUESTION ONE: ***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.

The ECE ICT PL programme brings together a greater number of components than do other Ministry of Education funded professional development programmes. More detail on these components, drawn from the provider milestone reports, provide a context for readers to understand the results from the survey, interviews, and case study phases of the evaluation.

Programme components

Centre visits:
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.

Cluster workshops and regional hui:
An emphasis on technical aspects has dominated the cluster workshops and regional hui at this point in the programme, although workshops 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.

Lead Teachers:
Lead Teachers are the key people within each service responsible for maintaining the ongoing momentum of the programme. Lead Teachers are supported by regular hui that are also characterised by a flexibile and responsive approach to Lead Teachers' needs.

PLP Online:
There has been growing involvement by teachers in using PLP Online over the life of the programme 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.

Programme content

Action research investigations:
The mechanics of getting services up and running with their action research investigations, rather than the content and direction of their projects, has been a dominant theme within milestones. The complexity of identifying a worthwhile, yet manageable research question has been challenging for many teams, especially when they were simultaneously exploring ICT possibilities.

Service accountabilities

Milestone reports:
Each participating service is required to furnish regular service milestone reports to CORE as part of their accountability requirements. Considerable support has been 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.

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.

Dissemination:
As part of the programme teachers are expected to disseminate the findings from their ICT action research investigations. At the mid-point of the programme, 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 National Coordinator and the facilitators working with the programme were asked about the effectiveness of the overall model, including each component. Overwhelmingly, they felt that the flexibility that they had to tailor the programme to the needs of individual services and participants was a critical element of the programme's effectiveness. In addition to varying the mode (e.g., face-to-face or Skype), timing and duration of visits facilitators worked with participants in varying ways including one-on-one sessions out of the programme and working alongside teachers with the children to model pedagogical practices. The availability of relievers was, at times, a determining factor in how the facilitators organised their visits and worked with the teachers.

The PLP Online, ULearn conferences, workshops and regional hui were identified as important components, especially for networking with services exploring similar ICTs and for maintaining the momentum of the programme. Several other points concerning the design and content of the ECE ICT PLP programme also emerged 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.

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

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. Forty-eight percent 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 The mid-point survey identified changes in teachers' use of ICT and increases in their confidence and capability, including the following:

- Significant increases in teachers' professional use of ICT.
- Increases in teacher confidence in using ICT from about 60% of teachers being "confident" or "very confident" in the beginning to 80% feeling "confident" or "very confident" after eighteen months.
- Increases in teachers' technical skills, across a wider range of ICT types.
- Less concern from teachers 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 at the beginning of the programme. However, teachers are 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.
- Increased use by teachers of ICT for teaching and learning "with or by children", particularly in helping children document their ideas and thinking, finding or developing their own resources, and for creative activities.
- "Substantial" increases in teachers' 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.

We asked respondents to our survey 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. Table 1 below gives the results for four programme components: Hui, workshops, ECE ICT PLP Online, and facilitators. 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.

Internet Safety

Awareness of cyber safety issues and the development of centre policies and practices to ensure children's safety was an important aspect identified in the evaluation matrix. Facilitators noted 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. The survey data supports these views as almost all respondents indicated that they had gained knowledge about internet safety from the programme through workshops, their facilitator and Netsafe resources.

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

When asked what changes, if any, had been implemented in their respective services with regard to internet safety, survey respondents identified 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%). Some facilitators 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 acknowledged as an important catalyst to developing cyber-safety policies and practices for the service.

Discussion

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, in order to meet the varying needs of the participant early childhood services. Most participants in the programme had experienced the components of attending hui and workshops, working with their facilitator in their service, and visiting the PLP Online site. Their ratings of these components consistently identified *facilitators, workshops, hui,* and *PLP Online*, in that order, as the most useful components in developing their knowledge, skills, and confidence. 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 accounts for the especially high ratings given to the facilitator component of the programme.

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. 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. 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 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.

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. 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 a number of areas. Significant shifts have also occurred in teachers' use of ICT "with or by children" across a range of indicators.

Almost all respondents to the online survey indicated that they had gained knowledge about cyber-safety as a result of participating in the programme. Progress in adopting cyber-safe practices has been variable. Management have an important role to play in facilitating or hindering the establishment and implementation of cyber-safety policies and practices, and so 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.

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

A number of indicators were identified in the evaluation matrix to help assess whether the ECE ICT PL programme was achieving the intended outcome of transforming pedagogical practices. These indicators included:

- 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 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)

Teacher attitudes

The first three indicators sit under the broad category of teacher attitudes. The provider milestone reports track shifts in teacher attitudes with teachers becoming more trusting of children and increasingly willing to enable them to have independent access to ICT equipment.

During their interviews, all facilitators were able to describe numerous examples where teacher practices had shifted during the course of the programme. The knowledge and attitudes that teachers brought to the programme varied considerably. Interviewees felt that, although the pace of change was variable amongst services, the changes occurring in those services where attitudes around children's competency and access to ICT were shifting were as important as the more innovative changes that were occurring in other services.

Supervision of Children

A related facet to teacher attitudes and the earlier data on internet safety is the supervision of children when they use ICT. When we asked teachers in the survey how children were supervised with ICT equipment, 60% indicated that they had a flexible approach to supervision depending on individual children's expertise. Nearly 22% 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. Parents interviewed as part of the case studies had noticed a change in the ICT use in their service, with teachers generally allowing children to independently use equipment.

A different picture emerged when we asked about supervision of internet use. The overwhelming majority (88%) indicated that the internet 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.

Children had free access to computers in two of the six case study services and to digital cameras in three services. In services where the access was heavily supervised, children could request to use the equipment and the teachers would then make the decision whether to grant access. In one of the services that allowed children free access to the cameras, children were restricted to taking only four photographs because of the cost of printing.

Reflective Practice

Data on the extent to which teachers were actively using ICT to support and enhance reflection on their practices was gathered through the survey, telephone interviews with facilitators, and during the case study visits. Almost all survey respondents indicated that they used ICT as a tool to reflect on practice, predominately with learning and teaching stories (93%) or with photographs (89.9%). 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.

Four facilitators 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 reflect on their practices.

Data gathered during the case study phase suggests that the requirements of writing of service milestone reports and engaging in a shared action research focus had provided teachers with an opportunity to engage in deep reflection about their ICT journeys. The shared action research focus appears to have fostered dialogue and cohesion within teams.

Using ICT with Children

How teachers participating in the ECE ICT PL programme were using ICT with children was an important focus of both the survey and the case study as this would assist in evaluating

how effectively the programme was supporting the transformation of pedagogical practices. We asked respondents to the survey to indicate which of six listed reasons for using ICT were children were the most 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*.

During the visits to the case study centres, evaluators looked at how teachers were using ICT in the programme with young children, including observing how ICT was integrated into the learning programme. The following example illustrates how teachers' are drawing on ICT resources to offer an extention to the learning progamme.

> *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…. 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).*

One area that stood out in sharp contrast to the evaluators was the lack of integration evident when children were using computers with pre-loaded educational software. In all of the case study services children had access to a computer with pre-loaded educational software which was available for use in the main playroom at different times throughout the day. However, in each centre, teachers rarely worked alongside children at these computers – of 78 instances where children were using computers with pre-loaded educational software, teachers engaged with children's learning at this activity on only seven occasions across the case studies. 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 case study evaluators also looked for broad and innovative uses of ICT in the programme of learning during their visits. The most frequently observed instances of innovative use of ICT were: the use of a blog site, email or Skype to communicate with the wider world; using videos/DVDs and photos to capture and revisit learning or to ease transitions; following children's interests through using DVDs; accessing information on the internet; and using ICT in art or musical experiences The innovative practices that were noted tended to be strongly focused around the services' action research projects.

Links with the community

Almost all our survey respondents indicated that they were using ICT to collaborate and form links with the wider community, including through emailing (N=58), using blogs (N=39), and using Skype (N=17). A number of respondents 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.

During the case study visits parents who were asked if they had "noticed any changes in the service's use of ICT and what this might look like?" often commented that ICT was being used to connect with their child's home life and experiences. Parents were also 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 case study centres computers were available for parents to be able to log onto and check the service's blog. In one centre this access was supported by a parent workshop whilst in another centre teachers had developed an introductory book to blogging to aid parents in navigating the service blog site.

There was clear evidence in three of the case study centres of teachers using ICT to make links with the wider world. In one such example,

> *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. … The company in California returned an email answering each question.(CS4-CL-1).*

During their interviews, facilitators were asked how effective they thought the ECE ICT PL programme was 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 participating 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.

Evaluating and critiquing the use of ICT

We were interested in the extent to which teachers were evaluating and critiquing the use of ICT as part of their pedagogical practices, and explored this with the Lead Teachers during the case study component of the evaluation. Data from these interviews, together with evaluator observations, suggest that engaging in the evaluation and critique of the use of ICT varied across the services: none of the six case study centres had a formal system for evaluating the use of ICT, although half the services indicated that they engaged in informal discussions.

Lead teachers were also asked about the criteria they used when making decisions about purchasing ICT equipment. Only one service appeared to have established a clear set of criteria for any ongoing purchases, although more than half the lead teachers interviewed indicated that considering how the technology could be used to support children's learning was an important criterion. In one case study centre the criteria was focused around ICT that had 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 much of the equipment sits in the cupboard until they received professional development so that they were competent to use it (CS3-LTI-1).*

Parents interviewed as part of the case studies reflected a range of views about the use of ICT in ECE, including some concerns about its use by young children who they felt might be "rushed" to learn ICT skills at a young age. Other parents 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, and they wanted their children to be able to share in the same learning opportunties that they had experienced in their own childhood, e.g. outdoor play and art.

Discussion

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. 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.

We were concerned at the apparent avoidance by teachers of working with children with pre-loaded educational software in each of the six case study centres. 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 indicates 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 we 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.

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. 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).

The data clearly reveal that participants in the programme are using ICTs to form links and collaborate with the community (both within and beyond the ECE service community). Parents in the case study services were positive about the way in which ICT was supporting continuity between home and ECE service. However, the results in this section suggest that generally the communication between the service and the community is not focused on children's specific learning interests at this point in the programme.

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. As children become more familiar with the ICT tools themselves, technologies such as Skype are being integrated more fully into the programme. Data from the case study services indicated that teachers were using ICTs in an integrated manner to support and spark children's learning interests.

There is some evidence of informal evaluation and critique of the use of ICT by participants. Evaluatory discussions tend to focus 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. 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.

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

A number of indicators were identified in the evaluation matrix to help assess whether the ECE ICT PL programme was achieving the intended outcome of *enhancing learning outcomes for children*. These indicators included:

- 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.
- Children are confident and capable with ICTs, including:
  - using ICTs as tools for learning
  - using ICTs for communicating with people beyond the service.
- Children act as "experts" with adults and other children who are "novices" in using specific ICTs.

- 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.
- Children's use of metacognitive strategies is supported by their engagement with ICTs.
- Parent's perspectives on their children's learning are supported and enhanced through the use of ICTs.

Specific references to the programme goal of enhancing learning outcomes for children first appear in provider milestone reports from mid-June 2007 (six months into the programme). 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.

Equitable use of ICT by children

We explored issues around whether children had equitable access to, and use of, ICT and teachers' awareness of and responses to trends in children's useage through the survey, interviews and case study components of the evaluation. 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.

Frequency counts of the useage of ICT undertaken in each of the six case study settings were weighted to reflect the overall numbers of children enrolled in the centres. The results showed that there were only slightly more instances of boys than girls involved in the use of ICT but that there were differences in the types of ICT they used and with whom. For example, boys were more likely to use computers with pre-loaded educational software than girls; girls were more likely to use computers for purposes other than playing pre-loaded games than boys; girls were more likely to work with teachers than boys; boys were more likely to work independently or with same gender peers than girls.

Facilitators were mixed in their views about whether all children in the participating services had equitable access to ICT, with some expressing a tension between ensuring equitable access and giving children choices about engaging with ICT. They indicated that few services were actively monitoring which children were (or were not) using 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 facilitators retold examples of ICT proving to be a powerful bridge in building communication and relationships between children and teachers.

Facilitators noted that services were much more aware of the potential for a digital divide within children's home contexts, with some services surveying their families to see what ICT equipment was available at home (including whether families had broadband access), and then tailoring 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.

How children are using the ICT equipment

We were interested in how children were using ICT in the learning programmes, and gathered examples through the internet survey, the inteviews with facilitators, and in the case study centres. In the survey we asked respondents for examples of how children use ICT equipment under six pre-determined categories, with a wealth of examples being provided.

(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. Respondents indicated that the children used cameras often completely independently to take photos of themselves, friends and to record what they had been working on at the service. Other respondents described episodes of children making movies, finding a game on the internet and using digital microscopes independently.

> *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.*

(2) *As a tool to follow the children's learning interests*. One hundred and fifty respondents gave examples of children using ICT as a tool, including digital cameras, the internet, digital microscopes, and making movies.

> *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. The most frequently used ICT tool for communicating beyond the service was email, including sending photos to family members by email, and using Skype and blogs for communication purposes.

> *Children who have gone on overseas 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.*

(4) *ICT as a tool to re-visit learning experiences*. One hundred and fifty respondents provided examples of children using ICT as a tool to re-visit previous experiences and learning including the use of photos in portfolios, e-portfolios, wall displays, Photostory

formats, and slideshows; watching movies and DVD's that the children and teachers had made; and, using Skype and the internet to re-visit learning.

> *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*. One hundred and thirty eight respondents identified examples of how children used ICT as a tool for enhancing early literacy, including children typing; using computer programmes that target literacy; exposure to print via the internet; and, the development of oral and/or visual literacy when children narrated their stories or told teachers what to write.

> *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.*

(6) *Teaching others to use ICT*. One hundred and thirty one people provided examples of children teaching others, whether children or adults, to use a piece of ICT equipment or software. Examples shared involved the use of equipment such as cameras, computers, (e.g., how to use the mouse) and digital microscopes, showing others to use software such as Kidpix and Photostory, and computer games.

> *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.*

The results above are supported by the interview and case study results. 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 using ICT 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 equipment and software; communicating with others; and engaging in more complex experiences.

In each of the case study centres observations were undertaken to ascertain how children were engaging with the use of ICT and, again, a rich array of examples were collected. Having ready access to ICT aided the integration of the technology into the learning programme. Children were observed engaging with ICT to support or extend their learning in areas of interest; to communicate with others; to revisit learning; and to engage in peer tutoring. We also had informal conversations with children in the centres, using photographs, to see which equipment they were familiar with, how they used it, and what they did if they had problems with the technology.

Transitions

The case study data revealed how ICT was being used as a tool to ease the transition of children between home and the service and school. This example is indicative of how photographs / visual images are being 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).*

Similarly, when lead teachers were asked in the survey about how ICT use may have influenced transitions 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.

Parental Involvement

In the evaluation matrix we had identified *Parent's perspectives on their children's learning are supported and enhanced through the use of ICTs* as an important aspect of enahnced learning outcomes for children. When we asked the survey respondents if they had noticed any changes in parental involvement or engagement in their children's learning using ICT during the programme, 85% of respondents indicated that they had seen an increase. The main ways in which parental involvement had increased was through *parents contributing more to their children's portfolio* and *parents staying longer to watch or engage with their children using ICT*.

Facilitators were also asked about how the programme was supporting parents to engage more actively in their children's learning. 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. 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

Discussion

The data around teachers' perceptions of children's equitable use of ICT equipment showed concerning patterns. In contrast with these results, however, were many additional comments provided by survey respondents that described the positive impact of ICT on children who had English as a second language, who were shy, who had special educational needs, or who were finding the settling in process challenging. 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. Given 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.

Throughout the evaluation we gathered 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 teachers. 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. Children in four case study services shared how they peer tutored other 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".

These results 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.

Children's transitions into, within, and from the early childhood services have been strengthened through the use of ICT. A number of services in the programme have focused on supporting children's transitions for their action research investigations and within the case study services, several innovative projects were observed, particularly around transitions into and from the service. 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. Evaluators in the case study sites observed that services were providing parents with opportunities to engage with ICT with their children. Similarly, the facilitator interviews noted services are using a range of ICTs to invite parental engagement in a number of areas. 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.

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

The analysis of the milestone reports, participant survey, and facilitator interviews revealed three main 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.

More than eighty percent of survey respondents had engaged with colleagues in other ECE services within their cluster. Almost all respondents strongly agreed or agreed that the experience had increased their knowledge about the way in which ICT can be used to enhance learning, that engaging with colleagues in the cluster had been useful, and that the cluster experience had increased their confidence in using ICT.

Survey respondents described the advantages of working in a cluster group as including sharing and gaining new ideas; learning how others are doing things; being able to network with peers at other services; and getting support from peers and facilitators. These advantages were echoed by the milestone reports which identified that the clusters were valuable because they:

- provided opportunities for professional networking, especially for some rural services where such opportunities are seldom available
- provided the opportunity for relationships and interactions between teachers and/or services to develop over time
- built confidence and develop motivation to try out new practices back in their centres
- assist with developing dissemination skills.
- acted 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. 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 had drawn on their close geographical location with a number of cross-cluster activities and collaboration not evident in the other clusters.

The cluster model was not without challenges, however. When asked to identify any challenges that they had faced in working in the cluster model, survey respondents identified a number of issues, including lack of time (to attend meetings with others or to do all the other work required in addition to cluster meetings); the distance between them and other centres in their cluster (including the pressure of travel time); and the differences between centres with different levels of ICT skills and knowledge, resources, focus, and philosophies. Other challenges included 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 respondents found the lack of a facilitator due to a staff vacancy challenging.

The wide geographical spread of some clusters emerged as a major issue for the programme provider and facilitators. 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 and there is concern about the amount of travel required by programme participants in order to attend cluster meetings. In addition, teachers and services participating in these geographically spread clusters have fewer opportunities to be exposed to a wide diversity of practices and ideas, and reduced collegial support and motivation because participating services are so far away from each other.

One interviewee 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)

Discussion

Data from the internet survey show that the clusters are most effective in developing participant knowledge ahead of skills and confidence. Clusters also rate behind the facilitator, workshops, and hui, but ahead of the PLP online component in terms of effectiveness in developing participant knowledge, skills and confidence.

The key advantages of working in cluster groups reported by participants were 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 cluster model was also reported to have assisted with the development of dissemination skills and to be an effective device for engaging teachers who have stayed on the periphery of the programme. The ability of the programme to use the teacher release funding in a flexible manner has been a factor in the success of Saturday cluster hui.

Five key issues emerge as disadvantages of cluster groups: 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 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.

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

The data 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. Whilst almost all the survey respondents agreed that participating in the action research component had been very useful in transforming their pedagogical practice, the milestone reports and the facilitator interviews suggest that success in engaging in the action research investigation has been variable across services. Similarly, 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.

Challenges faced by services to date have included:

- lack of understanding of action research
- identifying an appropriate research question
- difficulties for some services in following the action research cycle
- identifying relevant data to collect
- 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.

Facilitators did identify 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.

When asked in the survey to indicate the ways in which the use of action research had facilitated or hindered them to use ICT to improve pedagogical practices within their service/centre, Lead Teachers said that it helped improve their pedagogical practices; increased their knowledge and use of ICT; made them more reflective in their teaching; and encouraged them to think about the direction of their teaching programme. Those Lead Teachers who felt the action research component had not been helpful highlighted time constraints and attention to ICT taking away from teaching practices as the main issues.

We were interested in participants' views about the training and support they had received to help them implement their service's action research project. The most common source of support was through their facilitator; in addition, survey respondents identified attendance at workshops; support from co-workers and Lead Teachers; attendance at hui; the PLP Online café; and funded Teacher Release days as supportive.

The majority of respondents indicated that the training and support was sufficient. Those who would have like more support indicated the need for more time and help from their facilitator; more hands-on training/workshops; more release time to train and do the research; and, more help in general.

Both the milestone reports and facilitator interviews indicate several factors that appear to impact on the success or otherwise of the action research component, many of which are outside of the control of the programme or individual facilitators. They include the following:

- Poorly functioning teams without a commitment to collaborative approaches
- Existing team culture has not included attention to investigating team practices
- Lead Teachers not providing leadership or administrative organisation to ensure ongoing progress.
- Teams distracted by other developments (e.g., implementation of 20 hours Free ECE, service re-organisation, staffing changes) or coping with daily life in the service
- Teams lose interest or become frustrated, because initial question was not pitched at an appropriately challenging level
- No existing strong culture of systematic data collection and evidence-based change in ECE, upon which the action research methodology can be built
- Teachers expressing a fear of research or belief that research is not part of their role.
- Teachers doubt the validity of their data collection – manageability versus sample size.
- Intensity of combining learning in terms of understanding and using ICT, alongside engaging in learning about and undertaking an action research investigation.

Suggestions made for addressing some of the issues outlined above include modifying the programme for those services struggling with the action research component and focusing more on the exploration of ICT possibilities or delaying the introduction of the action research component until year two of the programme to enable participating teachers to broaden their understandings of ICT and how they might make use of it within their programmes before they establish questions for their investigation.

Discussion

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 results suggest that it is not the quality of professional development that is impacting on the rate of progress. Rather, 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.

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.

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

We gathered data on this question from the provider milestone reports, internet survey, facilitator interviews and case study. The milestone reports and interview data report considerable variability amongst services in terms of attention to developing sustainable practices, and suggest that many participants did not see the importance of this issue until well into the programme. The requirement that services include their ICT strategic plans in their service milestone reports appears to have been an effective device for raising the profile of sustainability, with the quality of these strategic plans developing over time. Almost all Lead Teachers agreed that the requirement to develop their strategic plan had been useful in helping them to develop a sustainable approach to ICT. Developing sustainable practices requires commitment from both teaching staff and management personnel and some facilitators noted that the commitment was not always there from both groups.

Lead Teachers and parents interviewed during the case study visits identified that the integration of ICT into the wider programme of learning was an important factor in ensuring sustainable pedagogical practices. Several Lead Teachers from the case study centres queried the programme's focus to date on capability rather than on pedagogy and identified a stronger pedagogical basis as an important component for ensuring the transformation of practice.

Comments made by facilitators during their interviews focused predominately on the maintenance and on-going provision of ICT equipment, rather than on pedagogical practices. Facilitators had faced disappointment from services that the funding for leasing and/or purchasing equipment was not the same as for the compulsory sector, and noted that the opportunities for purchasing and replacing ICT equipment through charitable grants have reduced. Whilst they were encouraged by those services that were using leasing arrangements for laptops and desktop computers, facilitators also acknowledged that the purchasing and upgrading of other ICT hardware such as digital cameras and microscopes could be difficult, especially where theft or damage to equipment was not covered by insurance or where excesses were too high.

Whilst Lead Teachers were confident (60%) or very confident (32%) about their ability to maintain the practices developed after the conclusion of programme, they identified that they would like ongoing training/professional development in ICT; continued interactions with other ECE centres using ICT, either as an online community or in face-to-face meetings such as hui; on-going technical help, either a telephone help desk or online; and to continue with the in-person, individual help provided by facilitators in order to support them to maintain the use of ICT after the conclusion of the programme.

A number of issues that may negatively impact on sustainability were identified through the milestone reports, interviews and case studies, 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 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
- teachers' access to broadband at home when time constraints at the workplace mean that teachers have to access the PLP Online component at home in their own time, rather that at the service
- the amount of time demanded from staff to sustain the ICT focus

In addition the important role that management plays in either supporting or working against sustainability was identified. 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 also 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.

Inducting Staff

Given the high turnover of staff in many ECE services (and in the participating services, as noted earlier in this report), a key aspect of developing sustainable practices is the induction of new staff into the service's ICT practices. Almost two-thirds (63%) of Lead Teachers identified that processes or procedures were in place to induct new staff into the ECE ICT PL programme, with 69% identifying that there were processes or procedures in place to induct new staff into the specific use of ICT. In a twist on induction, facilitators commented that as children's access to and use of ICT equipment becomes embedded within the service, such practices become commonplace and develop their own on-going momentum.

Discussion

The importance of this 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.

Lead teachers are confident that their services will be able to maintain sound ICT practices after the completion of the programme, and the provider milestone reports note that ICT usage is becoming embedded in centre practices. Thus, it may well be that as a culture of ICT usage becomes more common-place that these practices remain embedded despite changes within the teaching team. However, despite their confidence that their services will maintain sound ICT pedagogical practices after the completion of the programme, Lead Teachers 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, the emerging barriers discussed in a later section of this report highlights issues around inadequate equipment; developing on-going funding streams; and insurance costs for equipment that will continue to impact on the sustainability of ICT pedagogy.

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

In order to answer this question, we drew from the document analysis of the milestone reports, together with data from the facilitator interviews and the internet survey of programme participants. Whilst the milestone reports were not designed to respond to this evaluation question, our analysis of the reports highlights 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 report that suggests that the level is too demanding for all ECE services. For example, some centres chose to withdraw from the programme because the remuneration was too low and the commitment demanded too high; there were high levels of anxiety amongst services concerning the preparation of their centre milestone reports; the amount of release time required to enable participants to prepare for their first dissemination sessions was substantial; and a small number of services continued 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.

We asked the survey respondents to rank the programme components that they felt were most important through to least important if the programme were to be made available to all ECE services on an ongoing basis. Overwhelmingly, respondents ranked the *facilitator* component as the most important aspect of the programme whilst w*orkshop*s and the *regional clusters* were the next most highly ranked components. 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.

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.

Programme facilitators identified the following key issues if the programme were to be made available to ECE services on an ongoing basis:

- Beginning the programme with commitment from the whole service team.
- Having a base level of ICT equipment and resources was critical.
- Having teaching teams that were robust enough to cope with the intensity of the programme over a three year period.
- Ensuring that the physical size and geographical spread of clusters was workable for both facilitators and participating services.

Facilitators 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 that could impact on progress. Respondents also felt that programmes needed to be longer than one year and of sufficient depth and intensity, and that adaptations to the action research component could be made so that this component began part-way through the programme.

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).

Discussion

The data identifies aspects that impact on the usefulness of the ECE ICT PL programme across all ECE service types. Most critically, being able to sustain momentum within a complex, intense programme such as this requires a robust service and team who are all committed to the programme and who are 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.

Case study services that functioned well and had a high level of management support were looking for a greater level of pedagogical challenge within the ECE ICT PL programme. The influence of external issues and service-specific constraints (such as being a sessional service and not being able to have teachers leave the session to observe in other services) impacted on the effectiveness of the programme for some services. Other important aspects to address if the programme is extended beyond the pilot include services 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.

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

Barriers

The milestone reports, facilitator interviews, and internet survey provide evidence of the barriers that may make the difference between success and disappointing implementation and outcomes, as indicated below:

- 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.
- Tensions 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. Some survey respondents felt that a lack of funding toward ICT equipment was a barrier and that the MOE requirements were a burden
- The difficulties in working with old ICT equipment or not being able to access equipment, and a lack of technical support were all barriers identified by survey respondents and facilitators.
- Participants and facilitators identified that a lack of broadband access to the internet created 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.
- Survey respondents identified that the major challenge to achieving the programme outcomes were time constraints, an issue reiterated by facilitators especially where there were also staff in training.
- Lack of skills or knowledge by either the respondent his/herself or other team members
- 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 and kindergarten diversification) 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.
- The availability of relievers (especially qualified, registered relievers) to release staff to attend workshops and to work with the facilitators during their centre visits.

- Staff turnover within services is an issue impacting on their ability to achieve the programme outcomes and threatens the sustainability of practices.
- Small teams identified having difficulty in fulfilling the administrative and reporting aspects of the programme.
- Large teams experienced challenges when team members were at widely different places in their knowledge and skill, together with the difficulties in coordinating people to get things done.
- Poor leadership, negative teacher attitudes towards the use of ICT in ECE and disharmony between members of the teaching team or between the team and management were seen by facilitators as barriers.
- The geographical spread and travel demands within some clusters were identified as a barrier by some facilitators.

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 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. 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.

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.

Enablers

The following enablers were identified from the milestone document analysis, internet survey, and facilitator interviews:

- The level of professional development and ongoing support provided to the facilitators delivering the programme.
- The flexibility with which facilitators are able to deliver the centre visits, together with the provision of workshop follow-up that is tailored to the needs of individual services.
- The programme funding, including teacher release payments available within the programme which 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.
- Services that have broadband access to the internet were more easily able to access the web for teaching and learning purposes.
- The help and motivation provided by facilitators.
- Specific programme components such as workshops, hui, conferences, Lead Teachers and sponsorship to the ULearn conference.
- Networking with other centres and parents/whānau.
- Participant factors such as having a positive and enthusiastic attitude, learning new skills, seeing the benefits for the children, enhancing their pedagogical practices and increasing their confidence in using ICT.
- Services being accountable to the MOE through the milestone reporting process.
- The empowerment for teachers that emerged through the dissemination processes.
- Service issues, 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:

Discussion

Overwhelmingly, the key programme enabler identified by participants was the assistance and motivation provided by their facilitator. The ability of facilitators' 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 programme demands. The identification of various other components of the programme as enablers by participants suggests that the mix of programme components created opportunities for participants to find a match with their own preferred delivery modes. In addition, the higher level of funding available for this programme, together with the ability for it to be used flexibly to meet service needs, was another 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 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 both in delivering professional development and in pedagogical use of ICT.

Conclusion

In concluding this report we want to highlight several overarching points that are important to keep in mind when considering the findings from this evaluation.

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: There were significant 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 above we were concerned at the high levels of staff turnover, and the impact of this 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 ECE 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 evaluation gathered 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. These data provide clear examples of how it is possible for ICTs to support children's learning in early childhood settings.

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 data clearly indicates that this application of a flexible approach has been an important factor in maintaining teachers' commitment to and engagement in the programme.

Suggestions for the remainder of the programme: We suggest the Ministry of Education and the programme provider consider incorporating into the remaining delivery of the current pilot programme the following: 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.

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 a dual model that allows services to select from the current intensive model or from a scaled back one with fewer accountability demands 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, leading then to increased issues of equitable access for those teachers and, more particularly, children.

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