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Partnerships in ICT Learning Study

Full report

OCTOBER 2007

John Pegg, Chris Reading, Michelle Williams

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Disclaimer

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The Recommendations Committee also included Mr Will Morony (Australian Association of Mathematics Teachers), Associate Professor Lyn Schaverien (University of Technology Sydney).

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We appreciate greatly these efforts and will do our utmost to ensure that this report leads to significant and effective action.

Ralph Leonard (PICTL Study Chair)

John Pegg

Chris Reading

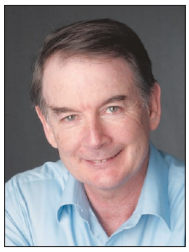
Katherine Schoo

Michelle Williams

October, 2007

PICTL Study Management Team

Ralph Leonard (PICTL Study Chair)
President
Australian Council for Computers
in Education (ACCE)



John Pegg
Director
SiMERR–National Centre
University of New England

Chris Reading
Associate Director–ICT Education
SiMERR–National Centre
University of New England

Katherine Schoo
Executive Director
Australian Curriculum
Studies Association (ACSA)

Michelle Williams (PICTL Study Project Manager)
Immediate Past President
Australian Council for Computers
in Education (ACCE)

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Executive summary

Introduction

Partnerships in ICT Learning (PICTL) was a project funded by the Department of Education, Science and Training (DEST). The tender was awarded to a consortium comprising the Australian Council for Computers in Education (ACCE), the Australian Curriculum Studies Association (ACSA), and the National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England. The research program (Leonard, Schoo, Pegg & Reading 2005) was designed to meet the objectives and deliverables of the tender.

The purpose of the PICTL study was *to demonstrate good-practice approaches to embedding Information and Communication Technology (ICT) throughout the educational experience of pre-service teachers, teachers and teacher educators*. To address this, the research program investigated ICT partnership approaches in a variety of Australian contexts through developing, trialling and evaluating forms of partnerships among universities, education authorities (government and non-government) and schools.

The PICTL study involved eight small-scale Professional Development (PD) projects, one in each state and territory. These projects brought together pre-service teachers, teachers and teacher educators within partnership arrangements that sought to transform learning environments and teaching practices through more considered applications of ICT. This context also facilitated the exploration of approaches to professional learning that enabled strong links to be forged among pre-service teachers, teachers and tertiary educators. At the same time as working to achieve these outcomes, the PICTL study also focused on using the data from state and territory projects to have a broader national focus that would support new initiatives in embedding ICT in learning as well as offer potential pathways for Australia to follow in the future that would help achieve more global and sustainable reforms.

Design and implementation

The PICTL study was designed to explore innovative processes for enhancing the ICT capability of pre-service teachers, teachers and teacher educators by creating a situation in which these groups could work collaboratively and hold professional conversations. The notion of working partnerships among these three groups offered opportunities to strengthen the strategic relationships between teacher-training institutions and schools.

The partnerships aimed to improve student-learning outcomes through the use of technology-rich approaches for students by pre-service teachers, teachers and teacher educators. It was expected that bringing together these three groups would transform teaching, learning environments and practice. A professional dialogue amongst stakeholders that enables them to reflect more deeply on existing practices and experiences would accompany these changes.

The central research theme for the PICTL study was:

> How can classroom-based professional learning projects be collaboratively designed among pre-service teachers, teachers, and teacher educators to focus on quality student uses of ICT within new curriculum reforms and pedagogical agendas, and which influence designs for professional learning for all stakeholders?

The PICTL study was designed to address 11 research questions. These questions have been organised into four themes. While some questions are able to inform more than one theme, to simplify the reporting process, questions have been allocated to the theme that is most relevant.

1. Evidence of success and innovative approaches

RQ 1 What does the evidence of relative success of the state and territory projects, based on the feedback of participants, mean for responding to the broad research theme?

RQ 6 What innovative approaches were used, and how successful were they?

2. Strategic partnerships

RQ 2 To what extent do the various groups (schools, universities, government/non-government authorities) succeed in working together to achieve the desired outcomes?

RQ 3 What are some of the challenges in trying to implement successful partnerships between differing levels of educational bureaucracy (e.g., governance issues, organisational issues)?

RQ 7 To what extent was it possible or necessary to transform teaching and learning environments and practice?

RQ 8 What were barriers and critical success factors impacting upon the success of the strategic PD partnerships?

3. Towards sustainable professional learning

RQ 5 To what extent is effective professional development in this area dependent on whole-school or system-wide reform? What change management issues were faced in trying to achieve these reforms? What cultural change was/is necessary?

RQ 10 What are possible strategies for sustaining the partnerships beyond the life of the project?

RQ 11 What are recommendations on ways to develop innovative professional development projects on a wider scale?

4. Effective management

RQ 4 What are key project management issues (e.g., importance of defining scope, methodology)?

RQ 9 What are the advantages and disadvantages of using online networking tools (e.g., online communities of practice, closed discussion groups, extranets) to support these partnerships?

The PICTL study involved eight projects, one from each state and territory. At the local level, the study involved selected university teams applying action-research methodologies to individually-designed projects. These projects investigated the durability, efficacy and sustainability of variations to a general professional development framework aimed at helping pre-service teachers have a quality experience with ICT in the classroom as an important transition from them being pre-service teachers to in-service teachers.

Nationally, the PICTL Management Team's responsibility was to manage the eight state and territory projects, facilitate the associated activities and synthesise the results to develop national recommendations.

The PICTL study had four distinct stages.

Stage 1 Developing a national study plan and timeline, establishing the national research agenda and setting up the consultative and management mechanisms for the project.

Stage 2 Facilitating the design of state and territory projects.

Stage 3 Supporting state and territory project leaders as they implemented their projects including conversations through online events, teleconferences, and site visits.

Stage 4 Conducting a National PICTL Forum and collating data from the state and territory projects into a final report.

A broad *Professional Development Framework* underpinned the planning of the projects within the study. This was offered as a possible basis for activity development within state and territory projects. Within these projects, the framework varied and was situated in different contexts, dependent upon the capacity to co-locate practice teaching and other in-school projects within the project timeline.

There were four variations to the *Professional Development Framework*. These were:

- The perceived or diagnosed need for a professional learning program to raise awareness of ICT in learning within new curriculum and pedagogical reforms.
- The role and experience of the person responsible for implementing the curriculum in the school. Whether it was a pre-service teacher, teacher or a partnership involving both.
- The depth of reflective experiences built into the their project design.
- Whether practice teaching was the setting for the in-school experiences of pre-service teachers.

These variations tempered contributions to the data provided through state and territory reports and interviews. However, both the interviews and the National PICTL Forum provided an opportunity for synthesised comments and conclusions across all the variations to the *Professional Development Framework* within the contexts and partnerships surrounding the state and territory projects.

Principal findings

What does the evidence of relative success of the state and territory projects, based on the feedback of participants, mean for responding to the broad research theme?

Collaborative partnerships in ICT learning projects, based around real teacher professional work, were a productive context for a model of professional learning for innovation because they provide a proactive opportunity for reflective dialogue rather than having participants react to other's issues. The projects provided an opportunity for pre-service teachers, teachers and teacher educators to rethink aspects of their teaching and learning, especially program design.

Quality planning led to quality implementation and the chance for quality learning. Clear starting points for projects were underpinned by beliefs and pedagogy. Careful choice of focus ensured that higher-order activities were used in the projects. The mentoring and development of new knowledge for teachers, about what to do with ICT in a pedagogical framework, were essential parts of improving the quality of planned ICT use.

A focus on pedagogical change provided the critical momentum needed to involve all stakeholders in a conversation about professional learning. Clarifying and affirming the partnership required the roles for each stakeholder: personal/institutional/industry. The reflection process embedded into the professional learning, assisted teachers to assess the quality of their curriculum and pedagogical ideas. Disseminating the professional learning was important for individuals, school communities and systems. The professional learning process is assisted when ICT pedagogy is given a central focus in pre-service education programs, including embedding ICT into teaching and learning. The current nature of the practicum complicated the project implementations. In particular, the assessment paradigm had an inhibiting effect on the nature of the partnership and ultimately the level of innovation.

What innovative approaches were used, and how successful were they?

It is important to realise that 'innovation' can be a relative term. What is innovative for one community that has issues with resources and staffing may be different from what is innovative for a well-resourced and well-established professional learning community. However, there might also be implementations that are considered innovative across many, perhaps even all contexts. While there was some mention of the use of online tools and digital portfolios, the focus of the innovation findings was on the nature of the professional learning.

Teachers and pre-service teachers were learning together about new pedagogical approaches and using their personal, learning and pedagogy beliefs to interpret the use of ICT. The intense activity that resulted during the action learning helped to target ICT leadership and to place a focus on student learning.

To what extent do the various groups (schools, universities, government/ non-government authorities) succeed in working together to achieve the desired outcomes?

Partnerships were established through collaborative groups calling on expertise and infrastructures with the potential to enhance a sense of local community. Professional learning within a clearly defined structure that had the flexibility to solve problems was beneficial to all participants.

Formal structures such as management teams and steering committees or existing relationships provided a strong basis for partnerships. However, where they existed, local, less-formal relationships also supported partnerships. The partnerships allowed teachers to renew their commitment to working with universities and pre-service teachers, and the benefits of the partnerships extended beyond those involved in the project activities.

What are some of the challenges in trying to implement successful partnerships between differing levels of educational bureaucracy (e.g., governance issues, organisational issues)?

The most significant challenges in achieving successful partnerships related to the incompatibility of bureaucratic processes. Project management teams were able to negotiate bureaucratic processes when sufficient time was allowed and the relevant education authorities provided support. The bureaucratic process was streamlined when formal agreements were negotiated between institutions. Partnerships supported by steering committees with clear terms of reference and expertise in ICT innovation had better capacity to solve practical and bureaucratic problems.

To what extent was it possible or necessary to transform teaching and learning environments and practice?

The need to activate pedagogical reform around the use of ICT was evident. A whole-school approach and focus on local issues facilitated adoption of ICT in learning and teaching in schools. However, a deeper level of change was achieved by improving the quality of professional learning and setting pedagogical reflection as a context. Many technical challenges were encountered by the various projects, including poor access to ICT and relevant networks, and lack of connectivity between the different jurisdictions' networks.

What were other barriers and critical success factors impacting upon the success of the strategic professional development partnerships?

Barriers that impacted on the success of the partnerships were related to issues affecting people, the availability of time, and access to resources. Many of the issues were resolved given sufficient planning time. Pre-service teachers, teachers and teacher educators needed planning time to work collaboratively using a list of perceived constraints as a focus agenda and to establish a consensus about achievable outcomes for the project in the light of local conditions. Poor access to school and system level tools and networks significantly reduced the productivity of the partnerships.

Alongside the barriers a variety of success factors were identified. There was a number of contributing factors that strengthened partnerships but all success factors did not operate within the one context. Contexts differed within and across states and territories, and partnerships comprised not only the people involved, but also the support structures. A professional learning community was fostered through appropriate recognition of the needs of pre-service teachers, teachers and teacher educators and by structuring factors external to people, such as the professional experience, technical support and timetabling, to meet the needs of individuals. As a core concept for partnerships, collaboration contributed to sustainability over time and beyond the individuals involved.

To what extent is effective professional development in this area dependent on whole-school or system-wide reform? What change management issues were faced in trying to achieve these reforms? What cultural change was/is necessary?

System-wide reform must address policy as well as recognition of the contribution of teachers in supporting pre-service teacher professional experiences. Managing the change necessary for such reform impacts significantly on universities, through staff workload commitments, research centre resources and technical provisions for pre-service teachers. Critical to these reforms are cultural changes from the perspective of pre-service teachers, teachers and teacher educators. Most importantly, teachers must be prepared to allow pre-service teachers to experiment with ICT innovation in the classroom.

What are possible strategies for sustaining the partnerships beyond the life of the project?

A clear purpose and the opportunity to share the outcomes related to that purpose sustained partnerships beyond the limits of the project. Partnerships developed a stronger profile when enough time was allowed for relationships to evolve, communication was nurtured, ownership was established and benefits for all participants could be identified. Although brokerage of partnerships by universities was the preferred option, the choice of project focus was best left to the schools. Facilitation of sustainable partnerships was enhanced through collaboration with unions, university faculties and education authorities.

What are recommendations on ways to develop innovative professional development projects on a wider scale?

Major impediments to reproducing, on a wider scale, the models of professional development trialled in state and territory projects, were the time and workload implications for pre-service teachers, teachers and teacher educators. The more activities and management responsibilities that could be built into normal workload for participants the more sustainable the project became.

What are key project management issues (e.g., importance of defining scope, methodology)?

Sufficient time had to be factored into the life of the project to allow for contractual and other procedural matters. This planning time allowed for resolution of issues related to the length of the project to ensure quality outcomes and that the individual requirements of all partners could be met. When time-release and recognition for commitment to projects fostering professional learning were built into standard procedures in both schools and universities, teachers and teacher educators were more predisposed to become involved.

What are the advantages and disadvantages of using online networking tools (e.g., online communities of practice, closed discussion groups, extranets) to support these partnerships?

Although the disadvantages appeared to outweigh the advantages, all partnerships valued the opportunity to use online communication. The many disadvantages, especially in relation to culture and accessibility, were frustrating for those concerned and not always under the control of the individuals or institutions concerned. Improved "conversations" at the systemic or institutional level are needed to contribute to equality of access for all participants. However, the strengthening of a school communication culture to include the use of online tools needs to be promoted from within schools or school systems.

The PICTL professional learning model

In the PICTL study a core *Professional Development Framework* was offered as an initial platform upon which to develop a collaborative culture among pre-service teachers, teachers and teacher educators.

Given the experience from the PICTL study the phases of core framework proposed as a guide for the collaborating partnerships have been revised to become the PICTL *Professional Learning Model*:

Phase 1 *Explore new knowledge* — Involve partners in direct awareness-raising events about ICTs, curriculum frameworks, pedagogy or other relevant subject matter.

Phase 2 *Select a learning experience for students* — This might be a unit of work, task, project or series of lessons where ICT is used to enhance the learning experience.

Phase 3 *Plan the learning experience* — Develop the learning experience detail including the underpinning pedagogy.

Phase 4 *Implement the learning experience* — This might occur in a range of environments and should involve the pre-service teachers working with the students.

Phase 5 *Reflect and share* — This reflection should occur on the data, findings and collaboration.

The context in which the model is placed will be critical to its success in creating successful partnerships to produce effective and sustainable professional learning for our educators and innovative changes in the use of ICT in our schools.

There were several features about the *Professional Learning Model* that were appealing to the PICTL Management Team. The starting point was explicit and it involved identifying underpinning beliefs about ICT and pedagogy practice. The model allowed the focus to be set on pedagogical change and the importance of involving all stakeholders in a conversation about professional learning. Opportunities were made available to clarify and affirm the partnership and in particular the roles for each stakeholder, participants, schools, system and universities and where appropriate industry.

Finally, four points are worth restating. First, there were aspects within the model that were seen as advantageous to all projects. Second, the model was generic and seemed highly likely to be applicable to the variety of any future projects that might be expected to emerge. Third, the model was sufficiently tight to provide a strong structure for projects as well as allow a clear progression. Finally, and as balance to the above, the model was loose enough to allow project team leaders sufficient degrees of flexibility.

Project management recommendations

The following seven recommendations concerning managing partnership projects are framed at a general level.

Recommendation PM1: A project-based approach involving pre-service teachers, teachers and teacher educators should be used to establish a positive and productive culture of professional learning aimed at improving ICT-mediated approaches in the classroom. Such projects should:

- offer continuing and relevant learning for participants that contribute to the renewal of commitment to using ICT-mediated learning;
- be based around real issues and exploring authentic learning experiences;
- include more than one person representing each stakeholder group;
- be based on a core model of professional learning that includes careful planning, and a project design, implementation, reflection and documentation cycle.

Recommendation PM2: Projects should have ICT pedagogy as a central focus and pedagogical reflection set as a context for the widespread adoption of ICT learning. This focus should address:

- teacher beliefs about ICT-mediated learning within a context of improving student learning outcomes;
- teacher pedagogical practices;
- how to embed ICT into teaching and learning.

Recommendation PM3: Projects should be planned to include:

- clear terms of reference that take into account the level of adoption of ICT in the participating schools;
- formal agreements between institutions, schools and education systems to help streamline bureaucratic processes;
- aims that provide similar parameters for all partners;
- aims that are 'innovative' (as they relate to participants' backgrounds), creative and extend the boundaries of current practice.

Recommendation PM4: Projects should have a strong management structure including:

- a project Team Leader who may require the support of a Project Officer;
- a project Management Team including representatives from each of the partner groups and supported by the relevant education authority;
- a project Steering Committee including relevant representatives drawn from school systems and sectors, universities and teacher registration with expertise in ICT innovation with capacity to solve practical and bureaucratic problems. The purpose of this committee is to support the work of partnerships.

Recommendation PM5: Project Team Leaders and Management Teams should ensure:

- sufficient planning time is set aside for pre-service teachers, teachers and teacher educators to work collaboratively;
- attention is given to perceived constraints on the project as a focus agenda to establish a consensus about achievable outcomes for the project in the light of local conditions;
- elements that sustain the momentum of change are articulated clearly and supported by realistic levels of resourcing;
- sufficient time allocation is factored into projects to account for bureaucratic processes;
- professional learning communities are fostered through appropriate recognition of the needs of pre-service teachers, teachers and teacher educators;
- supporting factors external to people, such as the practicum, technical support and timetabling, are structured to meet the needs of individuals.

Recommendation PM6: To maximise the benefits of the partnerships there should be:

- a focus on roles expected of participants, including those that are to take a leadership position;
- ICT leaders or champions should be utilised where possible to enhance motivation and school capacity;
- protocols that nurture equal status of all participants and that highlight the nature and importance of genuine collaboration among partners;
- a culture of inclusiveness and equal status is to affirm to all groups and facilitate a sense of ownership of the project;
- time allocated for professional dialogue and contact to develop the professional nature of the learning community established.

Recommendation PM7: The transformation of the teaching and learning environment and practice involves both the level of adoption of ICT in schools and the pedagogy to support the adoption. To facilitate an extensive and sophisticated level of adoption, partnerships should:

- be consistent with a whole-school approach to ICT-mediated learning;
- focus on new pedagogical frameworks, potentially proposed at a state, territory or education jurisdiction level;
- celebrate the contributions made by partners;
- proceed cautiously if the pre-service teachers involvement in partnership activities coincides or includes the practicum experience;
- ensure that approaches are evaluated and the findings promoted by partners in appropriate forums.

Seven principles underpinning ICT in learning

This section outlines seven basic principles that underpin future recommendations concerned with embedding ICT in learning. These principles seek to take into account international trends as well as those from the discussions with project teams, at Advisory Committee meetings and at the National PICTL Forum.

Principle 1

That there needs to be a re-invigoration of a national commitment to, and realistic adoption of embedding ICT in learning in Australia. At the centre of this work:

- are approaches that mainstream ICT both in schools and within teacher education faculties of universities so that the use of ICT becomes an accepted part of work culture;
- is the involvement of all stakeholder groups including key personnel from state, territory and national education jurisdictions, tertiary institutions and the ICT in Schools Taskforce; and
- is facilitation of the process by a National ICT Framework for pre-service teachers, teachers and teacher educators.

Principle 2

That there needs to be a serious investment of thought and research within Australia into addressing difficult education concerns in embedding ICT in learning. Such investment must include education professionals, ICT champions and strong advocates of ICT uses in learning and teaching. In particular there needs to be a focus on:

- understanding and enacting innovation in Australia in embedding ICT in learning;
- acknowledging teacher efforts, particularly with respect to student-learning gains on such dimensions as improved understanding, higher learning outcomes, higher retention and class involvement; and
- collecting evidence concerning changes that have taken place in learning for students and teachers and whether these have been sustained over time.

Principle 3

That technical connectivity needs to be improved nation-wide to produce more open access, for relevant personnel, to system networks and tools generally in education and specifically for individual projects. There needs to be:

- improved suite of online tools for school systems;
- improved access to school and system level ICT tools and networks;
- improved network services delivering at a relevant speed;
- improved technologies linking facilities among schools, school districts and university partners; and
- improved access for pre-service teachers to obtain privileges in relevant education jurisdiction systems.

Principle 4

That care needs to be exercised in utilising the practicum as a professional learning activity to improve the ICT-mediated learning contexts within schools. This may be possible with some pre-service teachers in some contexts but there were concerns about generalisability. The issues are to:

- balance the need to assess teaching performance with action-research investigations that may be undertaken concurrently;
- encourage combined professional learning activities that avoid the conventional assessment paradigm of practicums as this would have an inhibiting effect on innovation;
- create a situation where exploration of ICT uses in learning is encouraged; and
- create opportunities for pre-service teacher explorations, if different from that of the pre-service teacher's supervisor's practice, that do not impact adversely on their teaching grades.

Principle 5

That there needs to be a revised view of pre-service teachers, not only as future users (leaders) of ICT-rich provision in schools, but also as sources of ideas and enthusiasm for change. To achieve this:

- schools and universities should cooperatively manage the pre-service teachers' professional experience;
- universities should expect pre-service teachers to have the potential to become joint developers of ICT with experienced teachers, and eventually leaders of ICT-rich learning designs in schools;
- care must be taken not to expose pre-service teachers to expectations beyond their practical, theoretical or competence range, e.g., undertaking significant leadership roles in what is a difficult and demanding area of school development.

Principle 6

That as a matter of urgency a policy consensus needs to be established, informed by leading-edge ideas about learning, of what constitutes strong student-learning outcomes within the context of ICT uses in learning. Additionally, there is a need:

- for a more concerted effort both to understand and to enact highly innovative educational approaches of worth in this domain;
- to lead principled educational development in technologically-rich contexts; and
- to equip educators with an available, state-of-the-art underpinning theoretical framework so that they are better placed to guide teaching and learning efforts, to convert hunches and intuition into demonstrable student gains and, genuinely, to innovate.

Principle 7

That ICT uses in learning need to be interrogated specifically for their underlying learning models and theories. While curriculum and pedagogic frameworks are useful they are different to learning models and theory. There is a need to:

- recognise and describe learning when it occurred;
- evaluate gains or progress;
- draw conclusions about the educational power of ICT-mediated learning opportunities;
- design principles for future ICT-rich learning opportunities and thereby gain control of the educational quality of such environments.

Recommendations

There are 20 recommendations emerging from the PICTL study. These can be considered under five broad headings.

Creating ICT partnerships

Recommendation 1

That DEST initiate a strategic funding program in which collaborative teams of pre-service teachers, teachers (within schools or school clusters) and teacher educators, and of professional associations, and industry and community groups can seek funding for projects to improve the application of ICT in student learning. Guidelines for the program include:

- proposals be competitive and assessed according to established criteria;
- projects be funded in each state and territory;
- a national coordination process/person oversee all projects;
- a project officer be appointed to record, monitor and evaluate project elements that contributed to success at the local level;
- funding complement existing resources provided to universities to pay for in-school experiences for pre-service teachers;
- funding, either included in projects or through other means, be provided to increase the opportunity for university staff to be involved in professional activities with schools;
- schools or school clusters applying for funding have varying levels of ICT resourcing and staff skills;
- projects be established for a two-year period, and 'on application' extension funding be offered to accommodate proposals to continue where they have achieved distinction — particularly, if they can address the need for strongly innovative, theoretically sound and demonstrably effective directions with respect to students', pre-service teachers', teachers' and teacher educators' learning;
- projects be designed as collaborative partnerships involving pre-service teachers, teachers and teacher educators;
- special consideration be given to projects involving remote schools, schools with high Indigenous enrolment, and schools in disadvantaged areas;
- specified contributions be made by pre-service teachers, teachers, and teacher educators;
- participants in projects contribute to the sharing of elements of success through nationally coordinated events; and
- participants be required to specify an appropriate theoretical framework to describe, analyse and understand student learning in ICT-mediated contexts and by which to formatively and summatively evaluate student-learning outcomes.

Recommendation 2

That all stakeholder groups ensure that any future activities directed at investigating ways of embedding ICT in learning incorporate a research component focusing on the benefits for school students of the learning activities, including:

- student-achievement outcomes;
- student-management outcomes; and
- student-affective outcomes.

Sustaining professional learning partnerships

Recommendation 3

That education authorities fund professional learning partnerships between universities and schools in the area of embedding ICT in learning. For professional learning to be sustainable:

- professional learning partnerships with universities must be promoted to schools as a model for professional learning of teachers and a strategy to mentor schools to develop a focus and direction for ICT pedagogy; and
- promotion must include the sharing of success stories and good practice in the professional communities of ICT leaders, professional learning coordinators and principals, and the building, thereby, of sound theories of professional learning that then guide future professional learning, including learning design, curriculum and assessment structures.

Recommendation 4

That tertiary institutions negotiate with education authorities to play their part in sustainable professional learning by:

- developing long-term partnerships with clusters of schools, districts or regions with formal agreements;
- establishing coordination positions, and sharing facilities, expertise and opportunities to circumvent the need for universities to seek permissions, obtain ethics clearances, and negotiate intellectual property rights constantly for each partnership activity;
- providing pre-service teachers with opportunities to be in schools through flexible program structures; and
- encouraging teachers to take advantage of pre-service teachers' activities in schools to develop new knowledge, trial new approaches and conduct action research into ICT pedagogy ideas.

Recommendation 5

That tertiary institutions, specifically those servicing the needs of rural and regional areas, take targeted steps to build continuity in their relationships with clusters of schools, so as to overcome the difficulties of transient teaching populations by:

- rotating short-term projects amongst school communities;
- having continuously available remote schools to meet pre-service teachers' needs; and
- building relationships amongst teams of administrators and teachers over time.

Supporting professional learning

Recommendation 6

That education authorities with cross-sectoral representation establish policies and procedures that enable cycles of professional activities to be designed and implemented so that sufficient time is factored into the life of the project without excessive need for permissions and clearances at each iteration.

Recommendation 7

That education authorities and tertiary institution partners ensure equity of access to ICT systems for all participants and equity of school access to tools used in activities. All participants should be requested to strengthen the culture within schools concerning the use of online tools. This is achieved by:

- making use of the services of Education Networks of Australia (EdNA) as a common ground for collaboration for administrative, professional and curriculum use;
- developing strategies to provide pre-service teachers and teacher educators with access to their computer networks and services, and technical support, without undue bureaucratic process and at no cost;
- continuing to promote the use of online tools, networking and real-time communication tools for professional work at every opportunity possible;
- modelling efficient and effective online processes as a way of changing the culture of communication in schools;
- continuing to use online tools and videoconferencing, where appropriate, to communicate with pre-service teachers; and
- supporting teachers by modelling contemporary professional practice and encouraging people to develop knowledge and experience of these tools through the activities of school-university partnerships.

Recommendation 8

That education authorities provide a system of incentives to schools to encourage participation by a critical mass of teaching staff, as appropriate to school size and staff experience profile, in powerful ICT learning experiences. Incentives include:

- teaching relief (i.e., teacher time release);
- ICT resource allocation to schools for successful project completion; and
- an annual recognition/award scheme for schools that demonstrate excellence in ICT use as a result of participation in the activity or as a result of what has been achieved.

Recommendation 9

That education authorities provide formal recognition for teachers who participate in powerful activities that seek to embed ICT in learning:

- as contributing towards the attainment of ICT professional teaching standards; and
- as evidence of innovative practice in teachers' professional learning portfolios.

Recommendation 10

That professional associations support their membership by in their participation in partnership projects by:

- modelling the state-of-the-art with respect to ICT-mediated business transactions in their communications with members and with other education, community and corporate sector organisations;
- nurturing the growth of diverse partnerships and forums for teachers, schools and school systems to collaborate in suggesting, discussing, prototyping, trialling and improving ICT-rich learning environments across a range of disciplines, fields of practice and educational levels;
- initiating, and assisting in resourcing and sustaining research and teaching connections with organisations including education authorities, other professional associations, and the ICT industry likely to lead to the regeneration of members' knowledge with respect to ICT-rich learning and teaching opportunities;
- mentoring ICT leadership by providing those involved with networks to share and explore ideas on technological and pedagogical issues and by publishing results of research and professional activities; and
- mentoring pre-service teachers by encouraging their participation in all association activities and advocating amongst teachers the need for involvement of pre-service teachers in all levels of school activity.

Recommendation 11

That tertiary institutions negotiate with project Team Leaders with a view to recognising the school professional experience of pre-service teachers involved in using ICT in learning activities in schools. Where appropriate, tertiary institutions must:

- allow realignment of professional experience dates and specifications to suit activities;
- include aspects of activity participation in students' assessment requirements for related courses;
- develop ICT learning courses around participation in powerful ICT learning activities in schools and school systems;
- develop ICT leadership specialisation courses around managing the ICT learning process in schools; and
- promote, within universities, ICT learning activities as a pedagogical approach and a strategy to improve the use of ICT throughout faculty programs, for example, by using findings from various activities as relevant data for designing learning programs.

Supporting effective management

Recommendation 12

That DEST and education authorities be formally recognised as activity partners and provide system support for project management as well as support for collaboration with partners. These partners provide:

- input into the scope and focus of projects;
- system support to participating schools;
- procedural support to university partners seeking permission for the research component of projects;
- administrative support with regard to pre-service teacher authorisations;
- a liaison person who has developed knowledge of the potential of projects as a professional learning approach for supporting ICT in learning; and
- support for initiatives to have education authorities recognise successful teacher participation in the ICT activities.

Recommendation 13

That tertiary institutions encourage teacher educators to take on several roles including:

- lead project team to take major responsibility in writing proposals and subsequent reports;
- liaise with pre-service teachers and teachers;
- coordinate with education authorities concerning formal system support; and
- encourage wider use of school-based action learning among faculty members at their university and perhaps more widely through research publications and other professional activities.

Recommendation 14

That tertiary institutions compensate teacher educators for their professional leadership by the research dimension of activities, by the contribution of work with schools towards professional service, and by appropriate workload allocation. These activities if carefully planned and implemented should be seen to increase the research quantum for the academic and his/her institution. Tertiary institutions must provide teacher educators with:

- a reasonable formal workload allocation to encourage involvement in partnership activities using ICT in learning, and particularly recognising their roles as leaders;
- time and opportunity to distil the complex mix of theoretical and practical ideas in these projects; and
- relevant resources to address the obviously taxing pragmatic demands posed by a collaboration across different stakeholder groups.

Recommendation 15

That tertiary institutions encourage pre-service teachers by providing them with opportunities:

- to participate in powerful ICT related professional learning experiences by formal recognition from universities, e.g., course credit for activities; and
- to undertake a range of ICT-focused studies, either formally offered within their universities, by appropriate further-education providers, or as independent, self-taught studies.

Planning ICT learning activities and innovation

Recommendation 16

That DEST convene a forum to discuss critical issues facing embedding ICT in learning. The focus of the forum would be:

- theoretical bases of ICT learning in terms of viable learning theories or models;
- what constitutes innovation in ICT learning;
- forms of information needed to establish the benefits of ICT learning accruing to students;
- approaches needed to seed, support and sustain genuine ICT in learning innovation at all levels of educational systems' provision; and
- synthesis of information on ICT learning approaches that describe more clearly the nature of expected learning outcomes for students, teachers and pre-service teachers and hence assist in the crucial research-based development of valid and reliable assessment rubrics.

Recommendation 17

That DEST fund strategically targeted research studies, arising from the above forum, aimed at:

- exploring, in operation, those theoretical learning frameworks considered viable;
- targeting genuine system innovation in ICT learning in schools, school systems and teacher education programs, both pre-service and through professional development;
- addressing ideas about what constitutes strong student-learning outcomes, interrogating those assessment rubrics that hold the greatest promise for assessing the impact on student learning outcomes of the embedding ICT in learning; and
- piloting significant alternative visions for pre-service teacher education and professional development to support and enhance Australia's leading edge, technologically mediated educational provision for diverse educational populations throughout the lifespan into the future.

Recommendation 18

That DEST, while encouraging stakeholder groups to mainstream ICT activities into their programs as appropriate, initiate projects to research professional learning models and theories, program designs and partnerships in order to inform:

- new models and theories of professional learning partnerships;
- innovative, future-oriented educational activities, with appropriately rigorous, well-theorised assessment structures behind them, that give power and meaning to the use of new learning technologies in schools; and
- university faculties', teacher professional groups' and education jurisdictions' refinement, in theory and practice, of using ICT in learning.

Recommendation 19

That education authorities and professional associations ensure that the most recent developments in ICT learning are being considered and acknowledged, by using the findings and recommendations from major ICT research initiatives to inform the development and review of:

- teacher professional standards, including registration requirements;
- statements of learning for students; and
- curriculum and pedagogy statements or frameworks.

Recommendation 20

That DEST and education authorities work together to improve the accessibility and quality of ICT learning exemplars by:

- developing a central repository, or at least links to different databases, so that current collections are not fragmented;
- including detail about how these practices might be adapted or adopted by teachers; and
- developing frameworks, possibly based on national ICT pedagogy statements or statements of learning, to review exemplars and decide which are to be included.

The advent of the development of new technologies and what we know about this generation's familiarity with new technologies represent a serendipitous set of circumstances. It has the potential to provide a legitimate opportunity to rethink teaching in much the same way as the professions of medicine, nursing or health, engineering and architecture have done.

Through the PICTL study we now have data to confirm that partnerships are most likely to be successful if they involve:

- formalised arrangements;
- agreed outcomes;
- incentives for pre-service teachers, teachers and teacher educators;
- commitments from schools, education jurisdictions and universities;
- long-term relationships;
- proposals from school and university staff but managed by universities;
- collation and dissemination of knowledge managed by academics in collaboration with school partners; and
- long-term sustainability through collaboration with unions, tertiary faculties, education authorities and DEST.

Clearly, we are at a time in the use of ICT in learning when the focus must be on teachers' learning, and their beliefs and teaching approaches, as well as students' needs and learning outcomes. ICT is a tool that has strengths and weaknesses depending on the context and the manner of use. Facilitation of activities with a clear learning orientation will help provide valuable insights that will aid sustainability. Future activities that explore ICT uses in learning should explicitly target:

- the nature of innovation;
- an intensive focus on teacher and student needs;
- the degree of improvement of learning outcomes for teachers and students; and
- the setting of project plans and leaning goals grounded in theory.

A developmental perspective is critical to the success of this work. Furthermore, the core PICTL Study parameter — the notion of collaborative partnerships — highlights the worth of a targeted focus on collaborative, community-focused learning as a way of thinking about system reform and renewal. These ideas are urgent and timely, and should now be debated nationally. Importantly, the actions of embedding ICT in learning should be subjected to high standards of evaluation. Information is needed on the benefits accrued for students' learning. We need information on approaches that describe both students' and teachers' work more clearly and in terms that recognise and build on those sound, newly available ideas about how learning occurs as part of a lifelong journey.

Overall, there is a need for broader and more thoughtful debate about using ICT in learning in our culture as a way of seeding much more radical and relevant ideas into learning and teaching. The level of discussion of ICT-rich and ICT-appropriate learning in education needs to become far more holistic, sophisticated and subtle. Clearly, further system renewal is dependent on the provision of a firm and educationally powerful theoretical basis for such learning, and a context for discussion and rigorous research investigation that prioritises future-oriented learning designs and organisational structures in schools. Given the urgent social and environmental challenges currently confronting future generations, there needs to be a much more concerted effort to encourage people's imaginative and rigorous thinking about viable alternative educational ideas and strategies.

ICT applications in learning have the potential to act as a positive force for addressing many challenges facing communities in education. Partnerships in ICT learning might well hold the most promising long-term solution for many of these challenges.

Introduction to the PICTL study

1.1 Overview

The *Quality Teaching Programme* Project funded by the Department of Education, Science and Training (DEST) offered a tender for the provision of advice to the Federal Government under the title: *Strategic Partnerships in ICT Development*. The tender was awarded to a consortium comprising the Australian Council for Computers in Education (ACCE), the Australian Curriculum Studies Association (ACSA), and the National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England. The research program (Leonard, Schoo, Pegg & Reading, 2005) designed to meet the objectives and deliverables of the tender was titled *Partnerships in ICT Learning* (PICTL).

The purpose of the PICTL study was *to demonstrate good-practice approaches to embedding Information and Communication Technology (ICT) throughout the educational experience of pre-service teachers, teachers and teacher educators*. To address this, the research program investigated ICT partnership approaches in a variety of Australian contexts through developing, trialling and evaluating forms of partnerships among universities, education authorities (government and non-government) and schools.

Eight small-scale Professional Development (PD) projects involving ICT comprised the study. There was one project in each state and territory, and each of these brought together pre-service teachers, teachers and teacher educators within partnership arrangements that sought to transform learning environments and teaching practices through more considered applications of ICT. Underpinning projects was the notion that rich uses of ICT in Australian classrooms would benefit student-learning outcomes.

The approach taken by projects, which appeared most relevant to Australia, was to create 'meeting places' where pre-service teachers, teachers, and teacher educators were able to draw upon and share their expertise while developing deeper understandings of the possibilities and potential of ICT-rich curriculums. This context also facilitated the exploration of approaches to professional learning that enabled strong links to be forged among pre-service teachers, teachers and tertiary educators. At the same time as working to achieve these outcomes, the PICTL study also focused on using the data from state and territory projects to identify ways of achieving more global and sustainable reforms that would impact at the education jurisdiction level and the course program requirement level within universities, and not just on piecemeal changes to teacher professional growth, teaching practices, or university programs of study.

1.2 Background

In 2002, DEST published a report entitled *Making better connections: Models of teacher professional development for the integration of information and communication technology (ICT) into classroom practice*. Of particular relevance to the PICTL study was a finding that arose out of two apparently conflicting observations concerning the degree to which ICT has become a widespread and mainstream activity in schools.

It was noted that teacher education providers reported that many schools were inadequately prepared for ICT delivery (in terms of resources, expertise and classroom practice) for pre-service teachers to undertake their professional experience. This under-preparedness meant that schools did not provide rich opportunities for pre-service teachers to develop skills to integrate ICT successfully into the curriculum as part of their classroom practice.

Balancing the above, school systems reported that from their perspective many newly qualified graduates often did not have the necessary ICT skills and understandings required for effective teaching in their classrooms. Schools noted that often pre-service teachers were disinclined to consider any ICT initiatives in their teaching. Further, there were other pre-service teachers with high technical competence but who were unable to use that knowledge for teaching across or within subjects. Also, there were others who had many ideas about ICT applications within the curriculum but lacked the personal technology skills to carry out their plans in the classroom.

Interestingly, it appears that both of these differing perceptions are true. Consequently, the writers of *Making better connections* suggested that, as a practical way of addressing these two positions, there was a critical need to develop stronger links between pre-service teacher education and the continuing professional development of teachers. Restating this, Australian education systems and teacher education providers need to improve ICT usage in the curriculum by creating stronger partnerships in which each supports and draws upon the skills and knowledge of the other.

This focus on cooperation is also becoming evident in, and has been a catalyst for, important moves in the United Kingdom and the United States to reform teacher education over the last few years. Among key education agendas in these countries are trends that focus on:

1. reforming teacher education programs simultaneously while reforming the schools they serve; and
2. developing partnerships between schools and teacher education programs so that pre-service teachers benefit from close alliances and extensive in-school experiences.

One outcome of these reforms in the United States, for example, has been the steady development of Professional Development (PD) Schools. These schools are intended to model good practice associated with achieving high standards for student learning. They provide opportunities where teachers and teacher educators can combine their expertise for the benefit of both students and pre-service teachers. The programs run by these schools do not seek isolated changes to school or university activities. Rather, they seek to achieve broad and sustainable reforms.

While the notion of PD Schools has not been tried in Australia, more general partnership experiences with ICT could work well in the Australian context. In such a scenario, pre-service teachers, teachers and teacher educators could share information and ideas, and undertake projects on effective integration of ICT across the curriculum. These groups could also collaborate in ways that further develop the knowledge and understandings of all participants. This approach appears promising because it has the potential to:

3. address known principles of effective professional development;
4. address the system reform needed at the school and the teacher education institution levels; and
5. focus on improvements in learning outcomes for all students using ICT.

1.3 Setting the context

All school education systems in Australia have an extensive history of developing policies, strategies and resources to provide their students, teachers and schools with access to a range of ICT activities. After many years of sustained efforts to provide infrastructure, Australia now appears among the forefront of countries in terms of the quantity of ICT resources provided and the expanse of Internet connectivity. In comparison to other countries surveyed for the *Programme for International Student*

Assessment (PISA) by the Organisation for Economic Co-operation and Development (OECD, 2000), Australia's median ratio of 15 year-old students to computers was one-to-five, equalling that of the United States. Further, 80 per cent of computers in Australian schools were connected to the Internet.

Significantly more ICT resources have been allocated across the country since the 2000 PISA report. Despite current concerns regarding the lack of broadband access in certain areas of Australia, the OECD data imply that Australian classrooms are sufficiently equipped to enable students and teachers to gain benefits from ICT integration into the learning and teaching processes. Although positive, these findings do not mean that efforts to improve infrastructure can be relaxed in the future.

One example of new developments at the national level is the work of *The Le@rning Federation*. This group has begun to offer digital content and associated management structures to cater for present and future e-learning environments. This initiative is complemented by interesting developments in each state and territory. However, even with high standards of resources, there is still a compelling need to ensure that the ICT capabilities of the teaching workforce are sufficiently developed to enable the expected educational benefits to materialise.

Nevertheless, while ICT resources are adequate, a project (Angus et al., 2004) examining the resourcing of Australian primary schools, found numerous complaints that ICT support is seriously under-resourced. For example, schools generally did not have staff with appropriate expertise when networks or servers failed – this affected teaching programs adversely. Furthermore, these necessary support services "are not always available locally, especially in the case of rural schools", and hence "delays of several weeks during term time are common and longer periods are not uncommon" (Angus et al., 2004, p. 33).

Two issues are emerging that demand a rethink of current practices. The first concerns the need to attract and retain quality teachers who are competent in ICT and the second relates to the nature of the link between ICT and learning.

The *Review of Teaching and Teacher Education* chaired by Professor Kwong Lee Dow has highlighted the growing need to address concerns about attracting and retaining teachers. The Review's report, titled *Australia's Teachers: Australia's Future* (DEST, 2003), referred to the fact that a potentially high proportion of Australia's government sector teachers may decide to retire within the next ten years. The need to replace a substantial number of teachers in the coming decades focuses attention on processes for preparing new teachers and providing beginning teachers with necessary skills and abilities to compensate for their lack of experience in the classroom. Furthermore, the *Review* noted high attrition rates for new teachers, "possibly as high as 25 per cent within the first five years of teaching" (DEST, 2003, p. 87). It is therefore likely that all education jurisdictions and teacher training institutions will be seeking improvements in the methods, structures and partnerships associated with pre-service teacher education.

This *SiMERR National Survey* (Lyons, Cooksey, Panizzon, Parnell & Pegg, 2006) addressed this issue further. The survey found that ICT teachers in provincial areas were about twice as likely, and those in remote areas about four times as likely, as those in metropolitan areas to report that it was 'very difficult' to fill vacant teaching positions in those subjects in their schools. In addition the survey reported the highest need indicated by ICT teachers was for support personnel to help them manage ICT resources and assist teachers and other staff to use these resources effectively. ICT teachers in non-metropolitan schools had a higher unmet need for a range of resources and support, particularly for addressing student diversity and managing ICT resources.

The second emerging issue centres on the fact that 'the ICT in Learning' movement has itself undergone transformation. There has been a shift from a focus on developing student competence with ICT in the 1980s to integrating ICT into curriculum in the 1990s to, more recently, considering that ICT may play an integral role in curriculum interpretation and implementation. There is now a change in emphasis and language from looking at the role of ICT in curriculum, to adopting the tone,

language and meaning for an ICT pedagogical approach, placing the use of ICT as an integral part of the way teachers teach and how they facilitate learning. Such a shift is about using ICT as a vehicle to transform teaching.

These two emerging trends require the education community to nurture training opportunities for beginning teachers. The ICT in Learning agendas provide one possible opportunity for the newest members of the teaching profession to be valued and show leadership on their appointments to schools. New teachers and pre-service teachers may be able to bring fresh perspectives about how ICT can assist the implementation of curriculum reforms through technologically-influenced curriculum interpretation and as an "enabler of good pedagogy". Both of these perspectives highlight "issues for consideration when planning for the integration of ICTs in the learning environment" (MCEETYA, 2005, p. 3).

Making better connections also addressed these trends associated with the development of an appropriately skilled teaching profession and ICT learning initiatives in schools. The conclusions in the report identified as paramount the need for the continuing professional development of teachers and the pre-service training of new teachers in utilising ICT into classroom instruction. The report suggested that learning systems in a modern technological age demanded four broad dimensions (DEST, 2002, p. 29) to the use of ICT in schools. These were:

- assisting students to develop digital skills throughout their schooling;
- integrating ICT processes into existing curriculum to improve student learning;
- reforming curriculum by changing curriculum and pedagogy; and
- changing the nature of schooling itself through changes in organisational and structural features.

As systems and statutory authorities focus on improved curriculum and schooling structures, it is appropriate for the education profession to revisit its understanding of the third and fourth dimension. This way, tenets of curriculum reform might influence better how and what students learn within more cohesive and integrated developments.

The message to the profession seems clear: the use of ICT is expected in classrooms and professional work, and what is taught and learned could be strongly influenced by technological innovations and thinking. It is also becoming increasingly evident that "changing the nature of schooling itself", identified in *Making better connections* as a fourth and possibly idealistic future dimension is at the heart of many current curriculum reforms.

This transformative reality sees teacher professional development in ICT provide the opportunity for teachers to improve greatly their acceptance of, and capabilities in, using ICT. This focus has the intent of allowing teachers to experience uses of ICT as part and parcel of their own learning experiences and those that they offer students. The implication is that ICT has an integral part to play in pedagogical approaches as well as potential to transform learning environments. Critical in any implementation of such a new focus is that the end product, improved student-learning outcomes, occurs.

1.4 Establishing the PICTL study

Making better connections did not extend its influence to suggesting ways of learning for individual partnerships nor system-wide approaches for managing institutional partnerships. However, the report suggested that professional learning partnerships between teachers and pre-service teachers would provide fertile ground for the rich dialogue necessary to improve the nature of schooling and learning in a modern technological age.

Further, the report identified that ICT innovation in education might not necessarily be the sole province of the experienced teacher. This view offers potential opportunities for pre-service teachers to link with experienced practitioners in helping take some responsibility for integrating ICT use into

mainstream classroom activities. Such a partnership may be a realistic way to shift the focus of classroom practice closer towards the high expectations of ICT use held by the community and by students.

Many universities now offer specialisations in ICT for primary and secondary trainees because of the growing demand for ICT in curriculum leadership in schools. This is done so that these new teachers are better equipped for the complexities associated with an ICT role in a school. One implication is that new teachers could be expected to undertake stronger roles in a school's ICT in curriculum design, rather than concentrate on technical responsibilities. However, seeking high-calibre environments for these future teachers during their practice-teaching sessions is often problematic.

A proactive way forward for these pre-service teachers could be through the development of genuine partnerships between schools and universities in their training. It is likely that the synergy of experienced classroom teachers with fresh creativity of pre-service teachers would be a fertile context to accelerate the personal professional developmental pathways of both groups of individuals. Further, there was an expectation that professional learning practices in the PICTL study would influence the development, content and practices of pre-service teacher education programs. The end result for all participants is their expected immersion in state and territory curriculum reforms as well as a growing ability for them to contribute to debates about the value of various innovative approaches associated with ICT.

Thus the PICTL study provided an opportunity to consider different ways that a partnership form of professional development might evolve. In particular, interest was on ways to support the professional learning of pre-service teachers, teachers and teacher educators simultaneously on how pedagogies can embed ICT into state and territory curriculum implementation in ways that would improve student-learning outcomes.

1.5 Scope of the PICTL study

The PICTL study was designed to explore innovative processes for enhancing the ICT capability of pre-service teachers, teachers and teacher educators by creating a situation in which these groups could work collaboratively and hold professional conversations in school settings. The notion of working partnerships among these three groups offered opportunities to strengthen the strategic relationships between teacher-training institutions and schools.

For universities, this approach involved programs that transform the teaching and learning process in teacher education by embedding ICT throughout the entire educational experience of all future teachers, in partnership with schools and education jurisdictions. Further, universities in this context had the opportunity to focus research, test theoretical perspectives and develop contemporary case studies for use in teacher education programs.

For schools, this approach involved integrating ICT into teaching practices possibly by applying innovative approaches to curriculum and pedagogical reforms, and/or through providing pre-service teachers with opportunities to take stronger roles in trying new ideas in classrooms. This approach broadened the professional communities in schools to include teacher educators and pre-service teachers as co-learners and co-researchers in the quest to improve student use of ICT.

In summary, the research agenda was therefore to explore partnership approaches in the Australian setting concerned with embedding ICT throughout the educational experience of students. The partnerships aimed to improve student-learning outcomes through the use of technology-rich approaches for students by pre-service teachers, teachers and teacher educators. It was expected that bringing together these three groups would transform teaching, learning environments and practice. A professional dialogue amongst stakeholders that enables them to reflect more deeply on existing practices and experiences would accompany these changes.

The scope of the PICTL study can be considered under three headings — contexts of activity, partnerships, and a professional development framework underpinning the projects within the PICTL study.

Areas of activity

Broadly speaking, the PICTL study had two main contexts of activity:

1. National *PICTL professional community* — a professional community of stakeholders sharing their knowledge and experience to draw conclusions about the potential of partnerships between universities and schools to improve teacher education and use of ICT in schools.
2. Local *state and territory projects* — a partnership between schools, a university and often an education system to develop and address ICT agendas at a local level.

From the PICTL Management Team's perspective, the activities of the PICTL study included:

- developing state and territory project designs to explore variations on the 'core' professional development framework in local contexts;
- identifying a National Study Evaluator;
- working with a PICTL Project Officer to manage the study;
- conducting Steering Committee meetings to add national perspectives to project designs;
- developing an interim report to capture the project designs and partnership purposes;
- developing a website for the project;
- conducting online events as a catalyst for discussions on project issues;
- collecting data from each state and territory project team on the outcomes of the project;
- hosting a National PICTL Forum to identify and discuss issues related to ICT; and
- developing a final report.

From a state and territory project team's perspective, the activities of the PICTL study included:

- designing a state or territory project to develop, implement and evaluate a 'local' model for pre-service and in-service professional development;
- establishing partnerships or extending existing partnerships;
- developing local advisory committee;
- conducting the project;
- hosting the PICTL Project Officer during visits to state/territory;
- preparing an interim project report;
- participating in online events;
- preparing an issues paper;
- participating in a National PICTL Forum;
- developing a final project report; and
- hosting a project-level evaluator who was mentored by the National Study Evaluator.

Partnerships

The areas of activities listed above can also be described in terms of the notion central to the study — partnerships. Partnership is described for the PICTL study as a 'collaborating community of practice' because reflective activities and conversations were a hallmark of the interactions. This concept underpins the design, and can be considered at four levels:

- Partnerships at the national management level consisted of three professional groups that made up the PICTL Management Team. This group involving the ACCE, ACSA and SiMERR were in constant communication with one another and the PICTL Project Officer.

- Partnerships at the national level consisted of the PICTL Management Team working with the state and territory project teams, members of the Steering Committee, the National Study Evaluator, and participants at the National PICTL Forum.
- Partnerships at a state and territory level occurred among a university, cooperating schools, and (often) an education authority. These partnerships are best considered to be functioning at a regional level.
- Partnerships within state and territory projects involved teams of pre-service teachers, teachers and teacher educators. These partnerships formed a learning team to work together with an ICT focus to improve learning for students while allowing reflection on the participants' own learning.

Professional Development Framework

As indicated previously, the PICTL study design was inspired by recommendations from *Making better connections* that suggested both pre-service and in-service teacher professional development were significant factors in improving ICT use in schools. Also, there were obvious synergies to be explored by investigating models of learning that met the needs of different groups simultaneously. This study sought to develop a framework referred to as the *PICTL Professional Learning Model* that was informed by the different state and territory models.

To establish an initial platform, a collaborative approach referred to as a *Professional Development Framework*, for pre-service teachers and teachers involving situated learning, was suggested. It centred on using the practicum or other school experience opportunities of pre-service teachers as an opportunity for collaborative planning, implementing and reflecting on the use of ICT in classrooms. It also provided the opportunity for the pre-service teachers to learn and work collaboratively with teachers and teacher educators.

There were five phases in the suggested *Professional Development Framework*. Throughout all five phases of the *Framework*, mentoring and deep reflection were to aid the professional learning process.

Phase 1 Involving partners in direct awareness-raising events about ICT, curriculum frameworks, pedagogy or other relevant subject matter.

Phase 2 Selecting a specific student learning experience to plan and implement. This might be a unit of work, task, project or series of lessons where ICT would be used powerfully within a curriculum program.

Phase 3 Developing the curriculum unit plan including the detail of the pedagogical philosophy that would underpin implementation.

Phase 4 Implementing the plan in classrooms.

Phase 5 Reflecting on the experience.

There was a strong element of reflection embedded within project designs and implementation cycles. The scope and nature of such reflection were expected to vary. Data collection was also expected to vary as project teams chose to use strategies appropriate for their project including surveys, interviews, reflection circles, diaries or reflective journals and oral and written structured narratives. The variation in the state and territory projects would provide considerable data for the national report, and an opportunity to draw conclusions about partnerships and professional learning situations that met the varying needs of stakeholder groups.

It was this *Framework* that became the staring point or basis for the planning of how the partnerships would go about their operation for each of the state and territory projects. Project leaders and their teams were free to change this 'core' framework in any way that best suited their project. As a result each project emerged with a different framework and these are referred to as Project Professional Development models. The *PICTL Professional Learning Model* presented and discussed in Chapter Eight of this report represents a synthesis of these separate project models in the light of the data obtained from all projects.

1.6 Structure of the report

The following chapter provides the research methodology for the PICTL study. It outlines the main elements involved in designing and implementing the study, including the research framework; design, timeline and participants; rationale for state and territory project selection; state and territory projects — initial design and preparation for research; national forum; and data analysis. The chapter concludes with discussion of the three approaches used to assist quality assurance.

Chapter Three describes the state and territory projects. Provided are brief but detailed summaries that present an overview of each project from numerous perspectives including contexts, nature of partnerships, purpose of professional learning, classroom activities generated, research questions and uses of on-line technologies.

Chapter Four is the first of four chapters that address the PICTL study research questions. This chapter considers the research findings related to the two themes 'innovation' and 'evidence of success'.

Chapter Five concerns the research findings directed at the theme 'strategic partnerships'. Among issues canvassed is the extent of collaboration, the challenges for partnerships, how the project has transformed the context, and the nature of barriers and factors that contribute to success.

Chapter Six reports the research findings concerning the possible implications for future pre-service teacher education and the professional learning of teachers. Of interest are strategies for sustaining learning partnerships, developing wider-scale professional development projects, and context needed for change.

Chapter Seven explores the research findings concerning 'management issues'. Of interest are the management perspectives at the national level in coordinating the state and territory projects and at the local level in coordinating the partnership arrangement and the participants' involvement.

Chapter Eight presents a summary of the findings of the projects framed in response to the 11 research questions. A core framework referred to as the PICTL Professional Learning Model is proposed. Also included are recommendations framed at a general level that emerge from the findings concerning managing partnership projects.

Chapter Nine is the final chapter and ties together the issues and ideas that have developed in the PICTL study. In the first instance a context is established for general recommendations before seven basic principles underpinning ICT in learning are provided. Finally, recommendations are proposed concerning creating ICT partnerships, sustaining professional learning partnerships, supporting professional learning, supporting effective management and planning ICT learning activities and innovation.

A condensed version of this report is available in *Partnerships in ICT Learning Study: Report* (Pegg, Reading & Williams, 2007).

CHAPTER TWO

Research methodology

2.1 Introduction

The central theme behind the PICTL study concerned the development and evaluation of good-practice models for simultaneous professional development for pre-service teachers, teachers and teacher educators. This theme was addressed by eight projects, one in each state and territory, to develop, trial and evaluate forms of partnerships among universities, education jurisdictions (government and non-government) and schools.

It was anticipated that by working together, pre-service teachers, teachers and teacher educators might be able to provide advice on areas such as reform of school teaching programs, teacher education programs and the continuing professional development of teachers, especially as it relates to the use of ICT. Also, the study was expected to showcase different ways to increase the exchange of professional knowledge between schools and universities.

Further, it was expected that the evaluation of the projects as a group and individually would identify examples of worthwhile ICT pedagogy as it relates to curriculum and pedagogical frameworks in different states and territories. By exploring these professional partnerships, professional learning strategies may be identified that can be employed by schools, universities and systems for integrating and embedding ICT into and across the curriculum in varied and sustainable ways.

This chapter discusses seven aspects of the methodology. These are the research framework; design, timeline and participants; rationale for state and territory project selection; state and territory projects — initial design and preparation for research; national forum; data analysis; and quality assurance.

2.2 Research framework

The central research theme for the PICTL study was:

> How can classroom-based professional learning projects be collaboratively designed among pre-service teachers, teachers, and teacher educators to focus on quality student uses of ICT within new curriculum reforms and pedagogical agendas, and which influence designs for professional learning for all stakeholders?

The PICTL study was designed to address 11 research questions. These questions have been organised into four themes. While some questions are able to inform more than one theme, to simplify the reporting process, questions have been allocated to the one theme that is most relevant.

1. Evidence of success and innovative approaches

RQ 1 What does the evidence of relative success of the state and territory projects, based on the feedback of participants, mean for responding to the broad research theme?

RQ 6 What innovative approaches were used, and how successful were they?

2. Strategic partnerships

RQ 2 To what extent do the various groups (schools, universities, government/non-government authorities) succeed in working together to achieve the desired outcomes?

RQ 3 What are some of the challenges in trying to implement successful partnerships between differing levels of educational bureaucracy (e.g., governance issues, organisational issues)?

RQ 7 To what extent was it possible or necessary to transform teaching and learning environments and practice?

RQ 8 What were barriers and critical success factors impacting upon the success of the strategic PD partnerships?

3. Towards sustainable professional learning

RQ 5 To what extent is effective professional development in this area dependent on whole-school or system-wide reform? What change management issues were faced in trying to achieve these reforms? What cultural change was/is necessary?

RQ 10 What are possible strategies for sustaining the partnerships beyond the life of the project?

RQ 11 What are recommendations on ways to develop innovative professional development projects on a wider scale?

4. Effective management

RQ 4 What are key project management issues (e.g., importance of defining scope, methodology)?

RQ 9 What are the advantages and disadvantages of using online networking tools (e.g., online communities of practice, closed discussion groups, extranets) to support these partnerships?

These questions required responses from state and territory project teams using evidence obtained from their projects. These findings were synthesised to provide a national perspective.

2.3 Design, timelime and participants

Study design

The PICTL study involved eight projects, one from each state and territory. At the local level, the study involved selected university teams applying action-research methodologies to individually-designed projects. These projects investigated the durability, efficacy and sustainability of variations to a general professional development framework aimed at helping pre-service teachers have a quality experience with ICT in the classroom as an important transition from them being pre-service teachers to in-service teachers. The PICTL study's premise was that if pre-service teachers, teachers and teacher educators worked together to employ improved uses of ICT within a school's curriculum and pedagogical framework, all partners in the activity would leave the program with improved skills and understandings.

The approach advocated involved participants in a professional learning process to develop an idea, or some aspect of curriculum planning, implementation and reflection. Such a situated learning sequence also provided a professional learning environment for cooperating teachers and developed an awareness of possibilities for other teachers in the school. The approach also provided teacher educators with opportunities to renew their knowledge of curriculum frameworks and the use of ICT in schools, to develop new and relevant content for lectures and units of study, and to have evidence and experience to reconsider the ICT components of programs conducted at their university.

Nationally, the PICTL Management Team's responsibility was to manage the eight state and territory projects, facilitate the associated activities and synthesise the results to develop national recommendations.

The PICTL study had four distinct stages.

Stage 1 Developing a national study plan and timeline, establishing the national research agenda and setting up the consultative and management mechanisms for the project.

Stage 2 Facilitating the design of state and territory projects.

Stage 3 Supporting state and territory project leaders as they implemented their projects including conversations through online events, teleconferences, and site visits.

Stage 4 Conducting a National PICTL Forum and collating data from the state and territory projects into a final report.

As indicated in Chapter One, a broad *Professional Development Framework* underpinned the planning of the projects within the study. This was offered as a possible basis for activity development within state and territory projects. Within these projects, the framework varied and was situated in different contexts, dependent upon the capacity to co-locate practice teaching and other in-school projects within the project timeline.

There were four variations to the *Professional Development Framework*. These were:

- The perceived or diagnosed need for a professional learning program to raise awareness of ICT in learning within new curriculum and pedagogical reforms.
- The role and experience of the person responsible for implementing the curriculum in the school. Whether it was a pre-service teacher, teacher or a partnership involving both.
- The depth of reflective experiences built into the their project design.
- Whether practice teaching was the setting for the in-school experiences of pre-service teachers.

These variations tempered contributions to the data provided through state and territory reports and interviews. However, both the interviews and the National PICTL Forum provided an opportunity for synthesised comments and conclusions across all the variations to the *Professional Development Framework* within the contexts and partnerships surrounding the state and territory projects.

Despite these differences, each state and territory team designed a project based on a core *Professional Development Framework* that each team had modified to suit their context. This provided a rich data set, often with deep insights into adaptations of the *Professional Development Framework*, the issues that arise in local contexts and the complex conditions of partnerships. Also elaborated were future expectations of new professional learning projects that simultaneously address the learning needs of pre-service teachers, teachers in schools and teacher educators, who chose to work together to improve the pedagogical uses of ICT in Australian classrooms.

Timeline

Initial planning for the PICTL study commenced with the *Application for Tender* in August 2004. During this time team leaders in each state and territory were identified and some initial planning begun. The PICTL study began officially in late May 2005. Eight state and territory projects were designed, conducted and evaluated between June 2005 and May 2006. The national PICTL Forum was conducted in late April 2006 in which teams reported on their progress. State and territory reports were developed and refined from June to September 2006.

Project timeframes ranged from being over a fixed term (from five months) to being extended beyond the life of the PICTL study. It is important to emphasise that some of the project partnerships were in place prior to the commencement of the PICTL study. Some projects were able to co-locate a practicum period within the timeframe of the project and others could not. Some had a single cycle of a curriculum planning and implementation, while others had ongoing complex webs of activities that provided all participants in the project with many opportunities to try ICT activities in classrooms.

Participants

University staff involved in teacher education, whose charter includes both pre-service teacher programs and teacher professional development, facilitated the implementation of the state and territory projects. These staff had responsibility to drive the projects and in particular the research elements. State and territory teams were encouraged to amend the five-phase *Professional Development Framework* to meet local professional learning needs and ICT in Learning agendas.

Projects were conducted in each state and territory by one university per state/territory. The number of pre-service and practising teachers varied widely from two pre-service teachers and one teacher to groups of 20 pre-service teachers and 20 teachers. In one project there were extensive activities in schools undertaken by an entire cohort of pre-service teachers.

A PICTL Project Officer was employed to facilitate the design of state and territory projects, conduct research, facilitate professional dialogue between project teams and conduct the day-to-day management of the project.

2.4 Rationale for state and territory project selection

Universities in Australia have an interest in the in-service education of teachers because of their community service charter, desire to improve schools that influence pre-service teachers, and genuine interests in the quality of education in their state/territory.

A recommendation from *Making better connections* suggested that a framework for simultaneous professional learning of pre-service teachers and teachers could really only be instigated by universities through partnerships at two levels: partnerships between the university and target schools supporting learning; and partnerships between small teams of pre-service teachers, teachers and teacher educators.

In selecting the eight state and territory project leaders the emphasis was to capitalise on already existing school-university relationships and take advantage of relevant 'community' strengths. The PICTL Management Team used local influences and local knowledge to approach university faculty members who had a record of innovation, were seen to be experienced in providing in-service support for teachers, worked in diverse communities and were available to conduct a project in the timeframe offered.

Also of importance were differences in the nature of project contexts. The notion of partnerships needed to be explored in areas other than the large urban universities and local city schools. Further, the contractual arrangements of the PICTL study specifically required diversity in the sites chosen in order to seek broader ways of building partnerships to support professional learning across Australia.

2.5 State and territory projects — initial design and preparation for research

In the design of state and territory projects, the PICTL Project Officer visited each state/territory project leader and university team to establish the research agenda for the project and to support the development of the project design. The 11 research questions underpinning the PICTL study provided a basis upon which to begin discussion, research design and project design. Project leaders participated in a structured conversation organised around the following protocols.

Planning the project — To help the state and territory project leaders plan their project, a proforma (see Appendix A) was used. Linked to this proforma were the PICTL study's research questions. In addition, an 'Inspiration' mind map was used to collect notes and organise responses. This was converted to a word document and provided to project leaders to assist them to complete their planning process.

Interim report — State and territory project leaders were asked to complete an Interim Project Report proforma to identify any issues that may contribute to the agenda for the National PICTL Forum (see Appendix B).

Interview protocol — The PICTL Project Officer visited all states (except the Northern Territory) to conduct interviews about the final project report. This structure provided information for both project reports and the *PICTL Study Report*. This protocol is reproduced in Appendix C.

Final report — All state and territory project leaders were provided with a Final Report structure (see Appendix D). State and territory project reports are available in *Partnerships in ICT Learning Study: Case studies* (Reading, 2007).

PICTL Forum — The National PICTL Forum, titled *Partnerships in ICT Learning Forum 2006: Sustaining Partnerships in ICT Learning*, was held on the 26th and 27th April 2006 at the National Museum of Australia, in Canberra. The report on this forum is available in *Partnerships in ICT Learning Study: Case studies* (Reading, 2007).

2.6 National PICTL Forum

The purpose of the National PICTL Forum was to enable state and territory project teams to share the results of their work and their responses to the research questions underpinning both the national study and the state and territory projects. These presentations formed the basis of the professional dialogue about the key issues and findings of the PICTL study. The PICTL Forum was, in some sense, a conversation in draft, to enable new ideas and syntheses to emerge and be debated. It was designed to inform the PICTL study.

To benefit from diverse experiences and perspectives, a range of people were invited to attend the National PICTL Forum. Some were drawn from the state and territory projects including teachers, pre-service teachers, and teacher educators, while others were drawn from staff supporting pre-service teacher education and those with extensive academic experience in pre-service teacher education and professional learning models.

The National PICTL Forum involved:

- reports from each state and territory project;
- reports from evaluation and research teams as previews to workshops;
- workshops on key findings to draw on ideas from the audience of experts; and
- conclusions drawn from the evidence provided and the resulting discussion.

On the first day of the National PICTL Forum project leaders shared the preliminary results of their projects and highlighted emerging issues. Day two of the National PICTL Forum was designed to analyse these issues further and consider possible national implications. A summary version of the National PICTL Forum report is included in the accompanying volume.

2.7 Data analysis

Data were collected in multiple ways. Project leaders submitted a project plan and an interim report that provided complementary data highlighting changes to project designs brought about during implementation. They were also interviewed to illuminate outcomes and to help identify issues. These data were presented at the National PICTL Forum and processed in discussion groups and follow up e-mail conversations. A report from the National PICTL Forum, including discussions, was also a valuable source of data on a range of ideas drawn from the views expressed by the Forum participants.

Reports, interviews and the National PICTL Forum were structured to facilitate comparisons, analysis and synthesis. The reports from state and territory projects submitted at the end of the project were important sources of information. The report format required project teams to complete the descriptions of their activities under specified headings (see Appendix D).

The 11 research questions, organised into four major themes, were used to organise data, stimulate debate and assist in the process of drawing conclusions and recommendations.

Theme 1 Evidence of success and innovative approaches encompassed RQ 1 and RQ 6.

Theme 2 Strategic partnerships encompassed RQ 2, RQ 3, RQ 7 and RQ 8.

Theme 3 Towards sustainable professional learning encompassed RQ 5, RQ 10 and RQ 11.

Theme 4 Effective management encompassed RQ 4 and RQ 9.

2.8 Quality assurance

There were four approaches taken to monitor, support and report the development of the PICTL study. This involved the establishment of a Steering Committee, a Recommendations Committee, a Report Writing and Coordination Group and a PICTL study evaluation process.

Steering Committee

A National Steering Committee was selected to place the PICTL study within localities, provide advice to the consortium partners managing this project, and promote debate and discussion leading to recommendations. Members were:

- *Ralph Leonard (PICTL Study Chair and PICTL Management Team)* — Australian Council for Computers in Education (ACCE)
- *Katherine Schoo (PICTL Management Team)* — Australian Curriculum Studies Association (ACSA)
- *John Pegg (PICTL Management Team)* — National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England
- *Chris Reading (PICTL Management Team)* — National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England
- *Michelle Williams (Project Officer)* — Australian Council for Computers in Education (ACCE)
- *Toni Downs (National Study Evaluator)* — Charles Sturt University (CSU)
- *Jillian Dellit* — The Le@rning Federation
- *Denis Goodrum* — Australian Council of Deans of Education (ACDE)
- *Louise Hanlon* — Department of Education, Science and Training (DEST)
- *Kathryn Moyle* — National Institute for Quality Teaching and School Leadership (NIQTSL)
- *Louise Wells* — Department of Education, Science and Training (DEST)
- *Heather Woods* — ICT in Schools Taskforce Secretariat.

Recommendations Committee

The Recommendations Committee was drawn from the PICTL Management Team, Steering Committee and attendees at the National PICTL Forum. This group met for an intensive two-day workshop in Canberra on 7th and 8th August 2006.

- *Ralph Leonard (PICTL Management Team)* — Australian Council for Computers in Education (ACCE)
- *Katherine Schoo (PICTL Management Team)* — Australian Curriculum Studies Association (ACSA)
- *John Pegg (PICTL Management Team)* — National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England

- *Chris Reading (PICTL Management Team)* — National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England
- *Michelle Williams (Project Officer)* — Australian Council for Computers in Education (ACCE)
- *Kathryn Moyle (Steering Committee)* — University of Canberra
- *Will Morony* — Australian Association of Mathematics Teachers
- *Lyn Schaverien* — University of Technology Sydney.

Report Writing and Coordination Group

The group charged with the final drafting and presentation of the *PICTL Study Report* were:

- *John Pegg (PICTL Management Team)* — National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England
- *Chris Reading (PICTL Management Team)* — National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England
- *Michelle Williams (Project Officer)* — Australian Council for Computers in Education (ACCE).

Assisting this group was Associate Professor Lyn Schaverien. Also providing support were members of the National SiMERR Centre: Dr Terry Lyons (Post Doctoral Research Fellow) and Dr Greg McPhan (Research Fellow) who provided advice on the findings and recommendations; and Professor Ross Thomas (Honorary Professorial Fellow) and Ms Terry Wright (Project Officer) who took on editing roles.

Study evaluation process

The key goal of the evaluation component of the PICTL study was to analyse critically the procedures and outcomes of as many aspects as possible. As with the study design, there were two contexts of the project evaluation — a state/territory and a national component. This dual focus increased the possibility that any benefits or features evident at either level would be documented and reported.

There were other reasons why a dual focus for evaluation was important. While the national study had a beginning, end, and a relatively short time span, actions and activities at the state and territory level were often situated within ongoing partnerships. It was important that there was an independent person familiar with the local context and who could provide advice as well as document occurrences. Hence, the evaluation process included a component of site-level evaluation that facilitated self-improvement through cycles of evidence-based assessment and possible actions beyond the life of the PICTL study.

The evaluation team comprised the National Study Evaluator and state/territory project evaluators. At the state and territory level, each project team selected a suitable academic to be their state/territory project evaluator. This person was drawn from the same university as the project leader and was familiar with the context of the state/territory project.

At the national level, the National Study Evaluator collected data and documentation from management/steering committee meetings, the PICTL website, regular discussions with the PICTL Project Officer, two sets of interviews with the PICTL Management Team, and discussions at the National PICTL Forum. The National Study Evaluator also led a number of teleconferences with state/territory project evaluators where data were discussed, and trends and patterns identified.

The National Study Evaluator, in conjunction with state/territory project evaluators, collected, organised and analysed data and report findings with regard to the key and subsidiary evaluation questions.

The key evaluation question for the PICTL study (and each of the state and territory projects) was: What did the PICTL study (and each state/territory project) achieve in terms of its stated outcomes? To address this broad question seven questions were posed. These were:

EQ 1 What have been the critical moments within the PICTL study (state/territory project)?

EQ 2 How effective has the framework for the PICTL study (state/territory project) been? How has the PICTL study (state/territory project) been steered and managed? How did consultative mechanisms operate? How effective has the infrastructure been?

EQ 3 What methodologies of practice have the PICTL study (state/territory project) adopted and were they appropriate to the PICTL study's (state/territory project's) objectives?

EQ 4 What is the likely 'legacy' of the PICTL study (state/territory project)?

EQ 5 How sustainable is the PICTL study (state/territory project)?

EQ 6 How will this PICTL study (state/territory project) relate to other like projects?

EQ 7 What advice, if any, should be given about future actions, initiatives and partnerships?

Summary of state and territory projects

3.1 Introduction

The PICTL study explored the nature of partnerships that were attempting to improve student-learning outcomes by transforming teaching and learning environments using ICT. This was to be achieved through the use of technology-rich approaches by pre-service teachers, teachers and teacher educators.

This chapter provides brief descriptions of the state and territory projects presented using seven sections. These provide descriptions, surrounding contexts, nature of partnerships, purpose and strategies for professional learning, innovative classroom activities generated, local research questions, and uses of online technologies. In each section in this and following chapters the state and territory projects are discussed in the order Australian Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia.

3.2 Descriptions

Initially the state and territory projects were expected to focus upon providing opportunities for pre-service teachers to use ICT in classrooms while on practice teaching experiences. The delayed implementation of the PICTL study resulted in the timeframe being adjusted to span a financial, rather than a school year. As expected this caused variations in the use of scheduled practice teaching periods. While not the most desired timeframe, working within this period did provide some benefits. For example, data were collected about school-based experiences involving pre-service teachers outside of practicum periods. This offered the chance for pre-service teachers to be involved on more of an 'equal footing' with teachers and university staff in collaborative ways without the pressure of the assessment process associated with course-related professional experience in schools.

The following provides a brief description of the projects undertaken in each state and territory. Additional details of the projects complementing these summaries are included throughout this report and in *Partnerships in ICT Learning Study: Case studies*.

Australian Capital Territory — description

The partnership in this project was between teachers at three schools and the University of Canberra staff, with pre-service teachers as the audience.

This project involved exploration of applications of interactive Web 2.0 technologies as communication and knowledge creation tools by teachers and pre-service teachers within a redevelopment of the Secondary Teaching Studies unit offered by the university. This work exemplifies how new insights and understandings need to be generated before exemplars of good practice are available for use in coursework or professional experience. Although the Australian Capital Territory curriculum redevelopment is not complete, early drafts indicated the use of collaborative technologies and application of collaborative tools are akin to that suggested in the National Pedagogy framework. It was this framework that provided the rational and impetus for the project design. It is expected that the project will be a catalyst for future activity in schools and the university.

The project is ongoing and is not being implemented in a practicum situation. Pre-service teachers believed its experimental nature did not support their vision of a practicum goal of obtaining high grades based on their actions in the classroom. The project design and inherent research focus did not address questions of sustainability, assuming that "there is no turning back" once the pedagogical conversation has been started around collaborative technologies.

New South Wales — description

The partnership in this project had two levels. The first was among the Country Area Program (CAP) regional network team, schools in the CAP network and the SiMERR National Centre at the University of New England. The second level involved a professional learning partnership of a teacher, pre-service teacher and university lecturer for each of eight schools.

The focus for the collaboratively designed classroom projects was to promote the synergy of using ICT with Learning to Learn strategies (being implemented in CAP schools) to achieve higher-order thinking in students. Teachers and pre-service teachers undertook a 'learning and sharing' program and collaboratively planned a curriculum unit. Teachers implemented the ideas because pre-service teachers could not be in schools in this timeframe, though many visited the schools. For those working with teachers from remote areas this involved drives of up to seven hours.

The teachers and pre-service teachers in this project only experienced one project cycle, though the relationships among the institutional groups enabled further projects to be considered. Teachers who did not transfer have volunteered to work with future cohorts of pre-service teachers. Pre-service teachers have developed a culture of accepting remote practicum sessions and begun lobbying for financial support to undertake remote placements.

This project's contribution to the national study was to devise measures for ICT embeddedness that identify the extent of higher-order thinking in student work. This project was an example of how the core *Professional Development Framework* may need to be adapted to support pre-service teacher experiences in regional and remote areas.

Northern Territory — description

The partnership in this project was between the Department of Employment, Education and Training and Charles Darwin University. Two schools were selected to accept pre-service teachers trying collaborative technologies and online spaces to develop digital portfolios.

The learning paradigm in these two schools did not always accommodate open-ended pedagogies that portfolio-driven learning requires. However, one remote Indigenous school valued the opportunity to explore the technologies and associated ideas, and extended their local use of such into part of the school's 'transition' program. The teachers and pre-service teachers participated in workshops to raise awareness of the technologies. Pre-service teachers and teachers were then expected to plan (remotely) a unit that would be implemented by pre-service teachers during the practicum.

This project generally reported issues and concerns that were in sharp contrast with similar projects in other states and territories. Nevertheless, it provided valuable detail on the conditions that need to be addressed when implementing a partnership form of professional learning.

Queensland — description

The partnership in this project involved two clusters of 'New Basics' schools and James Cook University. The relationship between the two clusters of schools, pre-service teachers, and university staff enabled pre-service teachers to be mentored as they used a project management approach while drawing on the expertise of school-based champions of ICT use.

This project provided a context for pre-service teachers to show leadership in improving the breadth and depth of ICT in student work within the Rich Task structure of the Queensland syllabus. It used the productive pedagogies approach to deepen the design of learning experiences. The project also aimed to initiate a 'Professional Development College' for New Basics schools, including development of a database of resources, professional learning events and a basis for future research. In this approach pre-service teachers did not rely on teachers as role models but sought to be entrepreneurial and exploratory, pushing the school beyond its everyday practice to deal with new technologies and new curriculum applications.

The project is an example of using partnerships with schools to foster an innovative culture in the use of ICT where pre-service teachers are not expected to accept low levels of ICT use. It is also an example of a hands-on in-school approach by pre-service teachers in remote areas, although it was difficult to sustain after 16 of 18 teachers transferred to different schools at the end of the school year.

The project moved beyond practicum experiences to involving pre-service teachers in university coursework, community-centred projects and practicum segments. This project illustrates the potential of school-based learning to bring about changes to traditional pre-service teacher education.

South Australia — description

The project involved a partnership between the University of South Australia and cooperating schools, which was enacted by the pre-service teachers and teachers, but with considerable hands-on involvement of university lecturers and a Technology School of the Future (TSoF) project officer and support staff. The partnership included leadership involvement by the TSoF and commitment of a project officer to ensure there was "regular sustained exchange of people, ideas and projects".

The pre-service teachers received intense training in the use of a new online learning system and were supported as they constructed curriculum applications of the system. They tested the system by embedding pedagogical principles that would result in classroom experiences that shifted the perspective of their supervising teachers and helped the South Australian Department of Education and Children's Services develop exemplary cases for further professional learning about the new system. The pre-service teachers received intensive support as they planned a classroom experience including a number of 'just-in-time' sessions (instructional and curriculum design) as TSoF staff realised technical training alone was not sufficient to bring about pedagogical change.

This project is an example of pre-service teachers taking on the role of innovators for new system-wide initiatives through their exploration and practice in classrooms. The project also highlights the importance of cooperation in supporting university efforts, and of the system's capacity to value contributions pre-service teachers can make in adopting new technologies as a matter of course and for taking that message into schools through their practice.

The project model involved an intensive pre-practicum and in-school experience, raising questions about the sustainability of such an intense model for large cohorts in the current university funding environment. The project indicated that pre-service teachers could have a positive effect on ICT pedagogical change in schools, especially when new technologies are being implemented.

Tasmania — description

The partnership in this project involved providing resources for pre-service teachers and teachers to jointly plan classroom activities, which would be implemented by pre-service teachers in a practicum situation. A previous agreement between the University of Tasmania, the State Department of Education and the Australian Education Union was not sufficiently robust to provide a framework for this project.

This project was located in a state where supply of teacher graduates considerably outstrips demand. This meant that teachers do not feel obligated to accept pre-service teachers. It also meant that pre-service teachers not only compete for employment, they compete for practicum placements. Pre-service teachers reported a strong sense of the need to conform to current practices.

The project provided an example of the application of the core Professional Learning Framework in primary, secondary and college settings, suggesting that in-school joint planning may be a practical alternative to professional learning that 'extracts' teachers from the school. The teachers and university staff shared mentoring responsibilities. Mentoring of the pre-service teachers' plans provided the opportunity to exert quality control, particularly with respect to the State Education Department's information literacy across the curriculum approach, within the Essential Learnings Framework.

This project also provided indications of the applicability of an approach to professional learning for teachers who are mainstreaming or 'catching up' on implementing ICT. The impact of the model on the university is beginning to ripple outwards, although the ratio of pre-service teachers to teachers in the state creates a complex situation. The project provided a strong analysis of pre-service teachers' attitudes to using ICT in schools and their professional learning program.

Victoria — description

The partnering organisations for this project were the Australian Catholic University — Ballarat Campus, the Catholic Education Office Ballarat and the Department of Education Victoria. The research team and participants were drawn from the School of Education at the University, and Catholic and state schools in Ballarat.

The project emphasised the human aspects of working with technology, using the empowerment of the partnership between teachers and pre-service teachers to develop a philosophy towards ICT use in classrooms. The Victorian Essential Learnings provided an opportunity to examine the role of ICT within the pedagogical assumptions of the new curriculum framework.

The project involved two face-to-face workshops, one early and one later in the program, and deliberate and careful mentoring of participants as they worked through school-based activities. The school experiences were deliberately hosted outside the practicum period, in the belief that the evenness of the relationship would be jeopardised by the assessment process of a practicum. Pre-service teachers and teachers volunteered to work on the project. As an adaptation and change in emphasis to the traditional action-learning model, a narrative process was used as a reflective tool throughout the project.

The project demonstrated how to enrich the core *Professional Development Framework* by helping articulate their beliefs about their pedagogy and curriculum interpretation as a foundation to considered uses of ICT.

Western Australia — description

The partnership in this project involved academics from Edith Cowan University and teachers from two schools. The purpose was to embed ICT into a 'whole-of-school' philosophy and provide a fertile environment for pre-service teacher experiences. The project also aimed to connect academics with ICT practice in schools underpinned by an action-research framework.

The University has a long-standing, formal partnership arrangement with a number of schools around professional learning, practicum and research projects. Further, the University has a set of professional learning modules including extensive resources from the Credentialed Learning Program, able to be efficiently instigated on demand. This created the opportunity to offer specific training in the use of ICT in a professional learning program involving teachers who agreed to host pre-service teachers wanting to co-plan classroom activities using ICT in their practicum.

The project is an example of the capacity of schools and universities to work together when long-standing partnerships have been formally developed and sustained. It poses a good example of the positive effects and potential of sustainable long-term partnerships. However, resistance from some pre-service teachers revealed an insight into how, both the pressures of assessment of their performance on the practicum and the culture of teachers not usually using technologies in classrooms, can work against pre-service teacher innovation around ICT.

The individual projects associated with different schools each tested variations of the core *Professional Development Framework*, resulting in a rich collection of ideas that provided understandings about the diversity of approaches and structures for professional learning programs that partnerships can host.

3.3 Surrounding contexts

The potential of the PICTL study to provide considered advice on both pre-service teachers' education and professional learning programs was contingent on the capacity of different partnerships to work together and the type of activity cycle that could be implemented. Thus context is an important aspect when interpreting the design of the state and territory projects and their findings.

This section presents a summary of the 'contexts' of each project by describing activities undertaken with particular emphasis on participant involvement, school level of ICT integration, school level of ICT access, and curriculum and pedagogical framework reform taking place in the education jurisdiction.

Australian Capital Territory — surrounding contexts

Urban setting close-by secondary schools.

Context for activities

Conducted within a university unit of study. There were no pre-service teachers involved in school-based activities. This was not a practicum model.

Pre-service teachers	**Teachers**	**Teacher educators**
Bachelor of Education (Secondary) 3rd year. One teaching studies unit investigating new technologies plus previous general skills unit. Twelve pre-service teachers were involved.	Secondary teachers and principals. Two schools — one government and one non-government. Small groups with previous integration experience — readiness to try new technologies.	Technology KLA lecturers and ICT Leader specialist.
School level of ICT integration	**School level of ICT access**	**Curriculum and pedagogical framework**
Above average progress in using ICT ('forward thinking') but not yet using Web 2.0 collaborative technologies.	Access to systems negotiated outside the university and school system to overcome policy restrictions and permit 'play' with new tools not yet implemented at the university or school.	This is under development in the ACT. Project used the National ICT Pedagogy framework as an indicator of the intent of expected reforms.

New South Wales — surrounding contexts

Set in remote and regional primary schools, including schools with high Indigenous enrolments.

Context for activities

Pre-service teachers attended workshops, undertook school visits, and used online communications for curriculum planning. Teachers implemented the planned unit because pre-service teachers could not be in schools or use a practicum period in the timeframe of the project.

Pre-service teachers	Teachers	Teacher educators
Bachelor of Education (Primary) 2nd year. No specific ICT skills development. Eight pre-service teachers involved.	Nine teachers involved. Previous professional development on Learning to Learn strategies and ICT integration professional development at Apollo Parkways School.	Eight lecturers including ICT learning team. Regional ICT specialist. School of Education Professional Experience Director.
School level of ICT integration Intent to embed ICT in learning. Some ICT integration experience.	**School level of ICT access** Teachers planned to use facilities they could access.	**Curriculum and pedagogical framework** Embedding ICT into Learning to Learn philosophy for higher-order thinking.

Northern Territory — surrounding contexts

Set in one remote Indigenous school and one urban senior secondary school.

Context for activities

Workshops were conducted to develop awareness of new online tools. Pre-service teachers implemented pre-planned units during a practicum. Interviews were used as a reflection tool. Some use of the online environments expected throughout the project.

Pre-service teachers	Teachers	Teacher educators
Graduate Diploma of Education pre-service teachers in last part of 18-month program for secondary teachers. Three of the four pre-service teachers selected were confident users of ICT but had no experience of the ELGG online system used.	Four secondary teachers at two schools and four other teachers involved in aspects of the project. Low levels of ICT experience and no experience with online systems. No experience of using portfolios as an assessment and curriculum integration device.	Two ICT lecturers plus an in-service coordinator who visited the local high school twice to collect data.
School level of ICT integration Local urban high school had low levels of ICT integration. The remote Indigenous school had high levels of ICT experience.	**School level of ICT access** Teachers and pre-service teachers used a system outside the university and school sector because permission could not be granted to either party by the Education Department. Quite high access to the Internet in both schools.	**Curriculum and pedagogical framework** No framework addressed.

Queensland — surrounding contexts

Set in one remote regional school cluster 400 kilometres from Cairns and in an urban-based cluster. Indigenous community schools in urban and remote settings.

Context for activities

Coursework, project-based learning in independent studies and ongoing community service projects. Practicum segments. Informal professional associations of enthusiastic pre-service teachers. Planning in coursework and community service activities, implementation by pre-service teachers on practicum or in community-service projects.

Pre-service teachers	Teachers	Teacher educators
Bachelor of Education 2nd, 3rd and 4th year pre-service teachers — primary program. Strong skills and ICT leadership capacity. ICT embedded in many units and programs in the course structure. Sixteen pre-service teachers with two partner schools plus 24 other pre-service teachers undertaking projects in schools in both practice-teaching models and school-based projects.	Mostly primary teachers involved in New Basics schools in North Queensland. Schools are 'ICT in Learning' champions. Teachers willing to embrace new leading-edge technologies and applications.	Small faculty team and partners in sponsored projects. Paid coordinator.
Schools level of ICT integration	**School level of ICT access**	**Curriculum and pedagogical framework**
Curriculum framework requires integration. Strong willingness to use ICT by schools. Level of expertise and management of facilities varied.	Pre-service teachers sought partnerships to access technologies and take them to schools. Permission and access sought for Learning objects and Learning Place. School networks proved restrictive and provided limited services.	New Basics and productive pedagogies where ICT use is embedded in the curriculum framework.

South Australia — surrounding contexts

Set in two local high schools in an urban area.

Context for activities

Preparation was an additional program at the university, included some pre-planning with cooperating teachers. Implementation in a practice-teaching period.

Pre-service teachers	Teachers	Teacher educators
Bachelor of Education 3rd year pre-service teachers. ICT skills development high and enthusiastic capable pre-service teachers chosen. Two pre-service teachers involved.	Two secondary teachers at two schools. Low levels of ICT use and no experience of ICT integration.	Two 'ICT in Learning' lecturing staff. Strong involvement with TSoF staff.
School level of ICT integration	**School level of ICT access**	**Curriculum and pedagogical framework**
Low integration level generally. No experience of the new eduCONNECT system or any online environment for organising resources for teaching and no experience of online pedagogy.	Department supplied special access. Still no connectivity to university system to use in further courses. Project officer had to change policy and procedures to support the project.	Broad new framework for essential outcomes within a traditional subject-based curriculum. No policy or program to guide pedagogical practices.

Tasmania — surrounding contexts

Set in numerous secondary and primary schools, all within 50 kilometres of pre-service teachers' homes in an urban area.

Context for activities

Preparation for practicum — school visits and then implementation in a practice-teaching period. Planning at schools and using e-mail and visits to complete. Long lead time for planning. Implementation by pre-service teacher while on practice-teaching experience.

Pre-service teachers	Teachers	Teacher educators
Bachelor of Teaching a post-graduate degree, 2nd year of two years. ICT skills unit in first year and ICT pedagogy unit in second year with practice-teaching segment in middle of the unit. Six pre-service teachers included.	Six teachers at six schools. Teachers volunteered — mixture of primary and secondary. Half were champions of ICT and half were novices at using ICT in classrooms.	One ICT lecturer and a part-time lecturer/research assistant. Some mentoring from Departmental ICT in Learning personnel.

Tasmania — surrounding contexts (continued)

School level of ICT integration	School level of ICT access	Curriculum and pedagogical framework
Varies from low level to sophisticated level. Role of pre-service teachers and outcome of project different in these cases.	Pre-service teachers' access to systems at school very limited and complex to achieve/arrange. No access to support services.	Information literacy approach within the new Essential Learnings framework.

Victoria — surrounding contexts

Set in numerous primary schools within 30-minutes drive of Ballarat.

Context for activities

Additional program of professional development days, planning activities with teachers, school visits and implementation with pre-service teachers as volunteers.

Pre-service teachers	Teachers	Teacher educators
One year of Bachelor of Education pre-service teacher (Primary) Graduate Entry. ICT integration within units. Moderate ICT skills and knowledge. Seven 4th Year Bachelor of Education (Primary) pre-service teachers included.	Seven teachers from five schools, one government and four Catholic primary. Moderate skills with ICT though deliberately chose people who were self-proclaimed as neither highly technical nor ICT champions. Some variety of skills emerged in volunteer participants.	Three lecturing team members with considerable professional learning experience hosting workshops, conducting lectures and mentoring projects to their conclusions.
School level of ICT integration	**School level of ICT access**	**Curriculum and pedagogical framework**
Low levels of ICT integration and low experience of ICT in learning projects.	Difficult for pre-service teachers to access school facilities in advance. Teachers and pre-service teachers co-planned activities within site resources. Low levels of facilities at the university.	Essential Learnings curriculum framework. General pedagogical intent embedded but not a specific framework.

Western Australia — surrounding contexts

Set in two local schools — one adjacent to the university and one 20 kilometres away.

Context for activities

Teacher professional learning modules in schools (though not always with pre-service teachers in attendance). Planning and implementation occurring during a practice-teaching period. Disrupted practicum in schools due to local activities, e.g., swimming week where no teaching occurs.

Pre-service teachers	Teachers	Teacher educators
Fourth year Bachelor of Education (Primary), or from Double Degree program that includes one year Graduate Diploma in Professional Practice. Pre-service teachers have a major or minor in Computer Education. Skills level medium, some units completed. Seventeen pre-service teachers included.	Twenty one primary and secondary teachers who completed modules in ICT in curriculum and developed some skills. Not much experience in ICT in classrooms.	One university staff member coordinating. Support available from others. Part-time researcher/supervisor.
School level of ICT integration	**School level of ICT access**	**Curriculum and pedagogical framework**
Low level integration. Project seen as an opportunity for involving many teachers in a whole-of-school approach.	Access was quite difficult. Attempts to negotiate access, plan units and implement in a short practice-teaching period was problematic. Low desktop services level limits exploration of new ideas. University short on resources.	KLA Outcomes approach. No specific pedagogical approaches embedded.

Contextual elements affected the design and consequent results of the state and territory projects. Important influencing elements included: the skills and knowledge of participants, the level of school's integration of ICT, and the quality of the curriculum and pedagogical framework in which projects were set.

The contexts that made the most impression on design and conduct of the state and territory projects included the need to adjust the core design to account for the timeframe of the PICTL study. This need determined whether or not a practicum period was possible within the stated timeline and the university's organisational procedures. Five projects involved using a practicum period and three did not. Only the Australian Capital Territory project did not involve pre-service teachers in a school-based experience of some type.

Schools' previous experience in integrating ICT within curriculum, and teacher and pre-service teacher knowledge and skills, influenced the capacity of participants to embed ICT within new curriculum and pedagogical reforms. In six projects new reforms existed, with two project schools having multiple years of implementation experience. In these projects, teachers deeply involved in the curriculum reforms were targeted, regardless of their ICT experience.

Pre-existing partnerships and relationships between stakeholders also had considerable effect on the speed with which projects could be initiated and how management processes might unfold. However, two different but related contextual variables identified in the state and territory reports had a direct and considerable effect on each project.

The first variable concerned timetabling difficulties between schools and the university. Clashes with calendars meant that activities were restricted to a few part-terms of the year when both teacher and pre-service teacher programs enabled collaboration.

A second variable was timing. The timing of the PICTL study meant that state and territory projects straddled two half-years of an academic year. In most university programs, this conflicted with the traditional education program cycles. Consequently, the projects' leaders were usually prevented from implementing their research in a 'natural' setting covering an academic year. A further implication was that universities could include, at best, only one practice teaching segment within their project design. Both these points are revisited in Chapter Five.

Timing, however, was not the only factor in the decision about whether to use a practice teaching period or not. Some project teams believed the nature of the practicum and the purpose of their project provided strong rationales for collaboration in a non practice-teaching setting.

3.4 Nature of partnerships

In designing the PICTL study, an online event and some follow-up conversations between the PICTL Project Officer and the state and territory project leaders developed a practical definition for partnerships.

For the PICTL study, a partnership is defined as *regular and sustained exchange of people, ideas and projects*. People build relationships in partnerships through exchanges, and use the synergy generated to initiate further, ongoing and sustained activity.

At first, this definition provided a way of helping design the nature of relationships and partnerships in the state and territory projects. Later it became useful to use the definition to describe and analyse the nature of the partnerships that were formed. To examine this view of partnerships further, seven questions were asked. These were:

- What were the partnerships?
- When were partnerships established?
- Who was involved?
- Where did activities occur?
- What was the purpose?
- What did partners do?
- How was partnership sustained?

Australian Capital Territory — nature of partnerships

What were the partnerships?

Schools and university, university and the company supplying the new environments.

When were partnerships established?

New partnerships for this project.

Who was involved?

Teachers and university staff.

Where did activities occur?

School-based meetings.

What was the purpose?

Develop case studies for use in lectures.

Develop future practice-teaching schools for innovative pre-service teachers.

What did partners do?

University staff and teachers explored new applications of collaborative technologies to build case studies for use in university classes and professional learning programs. Sponsoring company supported use of their technology in schools by enabling an experimental site for collaborative exploration.

How was partnership sustained?

Steering committee with university and school representatives.

Meetings, talks and demonstrations.

A management structure with a few progressive lecturers.

Establishing a working relationship to build the partnership.

Seeking flexibility in implementations of environments.

New South Wales — nature of partnerships

What were the partnerships?

Country Area Program (CAP) Northern Network and university. University and schools.

Learning community teams with a pre-service teacher, teacher and teacher educator.

When were partnerships established?

New relationship, professional history between individual leaders in partnership groups enabled the relationship to build new dimensions and develop some formality.

Who was involved?

Teachers, pre-service teachers, lecturers and practice-teaching coordinator.

CAP leadership and faculty leadership.

Where did activities occur?

University professional development programs.

School-based implementation.

Pre-service teachers only had occasional school visits.

Online forums hosted conversations and communications.

What was the purpose?

Promote remote school experience.

Supply quality teachers to remote and regional schools.

Further university mission of research in remote and regional schools.

Device a strategy to facilitate pre-service teachers and teachers in a learning journey.

What did partners do?

Managing partners designed the project.

Managing partners co-hosted the professional learning program, travelled to schools with pre-service teachers and collaboratively developed research reports and issues papers to reflect on the project.

Managing partners sought additional funding for ongoing implementation.

Pre-service teachers and teachers co-planned units at workshops and online.

Teachers implemented units and pre-service teachers observed and participated in reflection where possible.

How was partnership sustained?

Management team structure reflected the partnerships structure.

Project cycle with all stakeholders involved in all stages of the project.

Online communication.

Project-based activities as a venue and purpose for professional conversations.

Northern Territory — nature of partnerships

What were the partnerships?

University and NT Department of Employment, Education and Training (DEET). Teacher and pre-service teacher.

When were partnerships established?

New partnership for this project.

Who was involved?

Departmental personnel, lecturers, teachers and pre-service teachers.

Where did activities occur?

Departmental meetings.

University hosted workshops.

The pre-service teaching period in schools.

Limited online interaction.

What was the purpose?

Enable pre-service teachers and teachers to collaboratively plan uses of new technologies to support the use of digital portfolios in assessment and learning.

What did partners do?

System selected schools and participated in workshops.

University managed the project.

Some co-development of the project design by university and DEET.

Pre-service teachers initiated co-planning with teachers.

How was partnership sustained?

Organisational meetings.

Pre-service teachers and teachers attended the workshops.

Queensland — nature of partnerships

What were the partnerships?

University — schools, pre-service teachers — teachers, pre-service teacher teams — sponsors.

When were partnerships established?

New partnerships.

Who was involved?

Teachers, pre-service teachers, lecturers.

Where did activities occur?

In schools through community service programs and teaching practice sessions.

What was the purpose?

Develop a New Basics college.

Develop places where pre-service teachers explored new technologies within schools.

Stimulate innovation in schools.

Support leaders of innovation in schools.

Promote teaching practice in remote areas.

What did partners do?

Pre-service teachers developing and implementing new ideas to share in schools.

Co-writing submissions for funding.

University staff visiting remote and local schools.

Pre-service teachers undertaking a 'diffusion of innovation' cycle in schools.

How was partnership sustained?

University staff members visiting schools to develop relationships through principals and ICT leadership.

Pre-service teachers leading professional learning programs in schools and in university.

Pre-service teachers building resources into a website/database and leaving resources in schools, intending to be used by other teachers.

Undertaking projects schools want to do and where appropriate offering projects to schools.

Meeting with sponsors and showcasing results to sponsors and schools.

Pre-service teachers in schools for the practicum period and community service project time and extra volunteer time.

South Australia — nature of partnerships

What were the partnerships?

University — Department of Education and Community Services through the Technology School of the Future (TSoF). University — schools. Teachers — pre-service teachers.

When were partnerships established?

New partnerships for this project.

Who was involved?

Pre-service teachers, teachers, university staff and staff from TSoF.

Where did activities occur?

University and TSoF.

Schools in a practice-teaching period.

What was the purpose?

Develop and research a model for project-based learning in practice-teaching periods.

Using pre-service teachers as authentic and thorough testers of a new online system.

Allowing pre-service teachers to explore pedagogical strategies in classrooms in ways teachers might not easily adopt, thus providing classroom pedagogies.

Establish a culture with DECS and TSoF to work with the university in future projects.

What did partners do?

TSoF staff member intensely mentored pre-service teachers and drew in additional system resources to support the project.

DECS became a managing partner in the project and raised the profile of the project and partnership throughout the system.

Pre-service teachers and teachers collaboratively planned a small unit of work.

Pre-service teachers implemented the unit of work and were observed by teacher mentor, along with other teachers at the schools.

How was partnership sustained?

Formal steering/management committee.

TSoF expert working intensely on campus and held considerable and continuous conversations with lecturing staff.

School visits by lecturer to establish stronger relationships and ask teachers for support.

Practice-teaching periods as opportunity for pre-service teachers to be in the schools.

Tasmania — nature of partnerships

What were the partnerships?

University, system and Teachers Union. Education Department unit and university staff. Pre-service teachers and teachers. Pre-service teachers, university staff and Departmental staff.

When were partnerships established?

Old agreement but new functionality to partnership.

Who was involved?

University staff members and system group.

Pre-service teachers and teachers.

Where did activities occur?

School-based meetings between teachers and pre-service teachers.

Online mentoring by university and Department team.

What was the purpose?

Provide teachers with time to meet and pre-plan units of work that pre-service teachers could implement.

Establish a model to assist pre-service teachers to achieve beyond the standards for ICT use in the practicum within Department's new curriculum and pedagogical framework and priorities.

What did partners do?

Teachers and pre-service teachers met for up to four planning sessions (equivalent of two full days) to co-plan.

University and Department staff mentored pre-service teacher planning and designed the project.

How was partnership sustained?

School-based meetings prior to teaching-practice period.

Departmental meetings.

Pre-service teachers in schools.

One visit by lecturer and one by research assistant.

Victoria — nature of partnerships

What were the partnerships?

Teachers and pre-service teachers and university lecturers. University and schools. Catholic Education Office and university.

When were partnerships established?

New partnership for this project.

Who was involved?

Teachers, pre-service teachers and university ICTs in Learning staff.

Where did activities occur?

University professional development program.

Volunteer school visits by pre-service teachers (not a practice-teaching period or university credit program).

What was the purpose?

Establish university as a source of quality professional learning for teachers.

Offer some pre-service teachers additional learning opportunities in university and school-based context.

Explore the use of technology as a basis of equal professionals in a learning partnership.

What did partners do?

University staff and CEO staff designed project.

CEO approached schools and teachers.

University staff planned and implemented professional learning programs.

Teachers and pre-service teachers planned units.

Teachers implemented units with assistance from pre-service teachers when volunteer time allowed.

How was partnership sustained?

Steering Committee maintaining momentum.

Program of two workshops by university staff or teachers and pre-service teachers.

Mentoring by university staff of pre-service teachers and teachers.

Evaluator support to university staff.

Pre-service teachers volunteering time in schools.

Western Australia — nature of partnerships

What were the partnerships?

University and two districts. University and schools. Teacher and pre-service teacher.

When were partnerships established?

Established long-term partnership and commitment with two districts and multiple schools.

Formal written agreements in place.

Formal credentialing program and pre-constructed modules with resources available for use in partnership activities.

Who was involved?

Teachers and university staff.

Teachers and pre-service teachers. Schools chosen by availability and willingness from a large list of potential sites with relationships and programs established.

Where did activities occur?

Schools.

What was the purpose?

Strengthen the professionalism that arises from collaboration between colleagues in school and university sectors.

Deliver enhanced practice-teaching experience for pre-service teachers in established ICT programs.

Provide professional learning opportunities for teachers.

Provide research opportunity for university staff.

Develop mechanisms in linking pre-service teachers with teachers.

What did partners do?

University hosted professional learning program in cooperating schools for large numbers of teachers (whole-of-school philosophy).

Pre-service teachers co-planned and implemented ideas in classrooms while on practice-teaching sessions.

How was partnership sustained?

Reference group and school liaison team.

Conducting professional learning in the school setting.

Pre-service teachers in schools for the practicum period.

Part-time staff member conducting research onsite where possible.

The relationships between pre-service teachers, teachers and teacher educators were often referred to as 'partnerships' or 'learning partnerships'. In most states and territories, a pre-existing informal professional relationship between teacher educators and teachers or Department staff, provided the 'hook' that enabled the initiation and hosting of more structured partnerships (exchange of people, ideas and projects) between institutions. Except in Western Australia where a formal partnership existed, the partnerships between most institutional groups were established for the PICTL study.

Generally, management and steering committee structures enhanced the creation of formal partnerships, although it should be acknowledged that there are potential dangers in structures that are too formal. These committees hosted the activities of the projects and provided a way for the institutional links to be established or maintained. In state and territory reports, project leaders generally held the position that the relationships and activities between the institutional partners would be sustained beyond those established for their project and quite possibly beyond the relationships of the individuals that had been involved.

3.5 Purpose and strategies for professional learning

In the state and territory projects, it was anticipated that projects would aim at mainstreaming ICT into the curriculum and that action learning would be a powerful strategy for reflection on classroom practice. Purposes are often used as a framework for describing longer-term and complex-professional learning programs. Different strategies were suitable and this depended on the purpose of the professional learning program, the context in which it was set and the audience of the program. However, variations evolved.

In all projects, pre-service teachers, teachers and teacher educators were seen as learner groups within the project design. The synergy of learning together was anticipated as an important context to achieve the aims of each project. The following identifies the purpose and the learning strategies built into these local project designs for each learner group.

Australian Capital Territory — professional learning

Pre-service teachers

Purpose

Develop general awareness of new interactive technologies and tools.

Use case study of school's implementation to develop awareness of curriculum and pedagogical implications.

Develop high-end ICT skills.

Strategies

Lectures and tutorials in a Secondary Teaching Studies Technology unit.

Teachers

Purpose

Raise awareness of potential of new technology to meet new curriculum and pedagogical demands.

Develop small communities of practice around innovative teachers.

Strategies

Classroom projects with teachers observing students using technologies.

Action-reflection cycles with university staff mentoring.

Teacher educators

Purpose

Develop case studies for use in lectures.

Develop school knowledge of applications of technologies.

Strategies

Mentoring teachers.

Using new systems with pre-service teachers as a 'class'.

Action-reflection cycle participation.

New South Wales — professional learning

Pre-service teachers

Purpose

Provide awareness of remote schools' expertise and uses of ICT.

Embed the Learning to Learn strategies and higher-order thinking skills philosophy into their beginning practices as a benchmark for quality teaching.

Build local professional community for pre-service teachers as they begin their career and personal professional journeys.

Observe and reflect on uses of ICT in classrooms.

Strategies

Pre-service teachers involved in initial sharing session, with teachers sharing existing practice.

Co-planning with teachers using face-to-face (stimulating role models) and online dialogue (reflective considered comment).

School visits to remote areas with university staff.

Participation in online reflection.

Participation in final sharing day on an equal status with colleague teachers.

Teachers

Purpose

Build community amongst distributed teacher colleagues.

Provide an audience for existing quality work and provide a rationale for continuous improvement (pre-service teachers as audience).

Develop a culture of embedding higher-order thinking deliberately into ICT experiences within the Learning to Learn philosophy and using meta-cognition and evaluation as the drivers for this through an evaluation/assessment process.

Strategies

Co-plan to develop higher-order thinking with ICT (new professional goal).

Design measures or indicators of success and researching classroom practice for evidence.

Use online environments to share results and discussion with pre-service teachers and CAP and university staff.

Discussions in classroom setting where practical.

Final sharing day to celebrate implementation.

Action-learning cycle mediated by online technologies, visits and sharing days with the measures for integration of higher order thinking as the basis for observation and reflection.

Teacher educators

Purpose

Develop professional relationships for further project and research work.

Develop awareness of ICT in regional schools.

Raise awareness of Learning to Learn strategies within university course content through case studies.

Strategies

Mentor pre-service teacher — teacher relationships with CAP colleagues.

Involve many university lecturers as audience for the professional development and the project activities generally.

Northern Territory — professional learning

Pre-service teachers

Purpose

Explore use of new online tools for collaboration and publishing.

Investigate the use of these tools to develop digital portfolios.

Develop classroom experience in the pedagogies that support portfolio development.

Strategies

Two workshops to develop knowledge of the tools and meet teachers.

Co-plan with teachers using online tools.

Mentored implementation in schools in a traditional practice teaching model.

Teachers

Purpose

Develop awareness of new collaborative tools for community publishing.

Strategies

Attend workshops.

Support pre-service teachers' implementation in a mentored model.

Teacher educators

Purpose

Gain understanding of the pedagogical processes for using portfolios as a learning strategy.

Strategies

Action-research cycle as pre-service teachers implemented the project.

Queensland — professional learning

Pre-service teachers

Purpose

Gain knowledge and experience of New Basics philosophy and see classroom applications of this holistic curriculum including rich tasks as the assessment device.

Develop leadership and management capacity to lead and mainstream innovation in schools through practice.

Develop higher-end ICT knowledge and skills.

Mainstream using ICT in classrooms within the New Basics program, while on practicum segments and in other school-based programs.

Strategies

Lecturers and teachers as guest speakers.

Independent projects with structured development and management cycle to develop and use new knowledge.

In-school community service programs to try ideas and establish long term relationships with teachers and students.

Co-plan and co-teach in a reflection or project management cycle with documentation.

The practicum period and community service providing the venue.

Describe the project management process and mentor reflections on project cycle parts.

Design resources for use in practice-teaching cycle and to leave a legacy in the school and college archives.

Teachers

Purpose

Collaboratively work with at least one like-minded enthusiast and leader and build a sense of community.

Embed ICT depth into productive pedagogies and task implementation in classrooms.

Be supported while exploring new ideas and new technologies within the school to maintain new initiatives.

Strategies

Co-design an innovation cycle or seek assistance with a pre-planned implementation project.

'Plan, implement, and reflect' cycle with pre-service teachers leading questions and seeking answers.

Develop further long-term projects with whole teams of pre-service teachers joining the Professional Development College community.

Teacher educators

Purpose

Support a diffusion of development cycles in schools to lead innovation in the college concept, researching factors affecting school-level innovation.

Develop knowledge of New Basics implementation in local and remote schools for use in lecture materials.

Design more effective school experiences for pre-service teachers in practice-teaching periods and throughout other activities in schools.

Strategies

School visits and other regular discussions on-site with principals and ICT leaders.

Use a strict project management cycle including research, definition, implementation and refection as data for case studies.

Research within the project.

South Australia — professional learning

Pre-service teachers

Purpose

Develop knowledge and skills of new eduCONNECT system.

Develop knowledge of pedagogical approaches with online systems.

Use ICT in classrooms and become role models for further practice, while in practice-teaching period.

Strategies

Intense personal workshops and personal exploration with mentored support.

Action-learning cycle with input sessions developed on an as-needs basis.

Classroom experience and reflection with teachers and university/Department staff.

Teachers

Purpose

Develop awareness of the applications for eduCONNECT.

Develop some skills and knowledge of online system and instructional design within their pedagogical approaches.

Strategies

See implementation in the realities of their classroom with their students.

Learn to use systems along with students and pre-service teachers.

Teacher educators

Purpose

Develop awareness of applications being used in schools and pedagogical approaches strongly used in schools with ICT.

Strategies

School visits.

Mentor pre-service teacher progress.

Project evaluation and research.

Tasmania — professional learning

Pre-service teachers

Purpose

Develop skills and knowledge of Essential Learnings and Information Literacy approaches.

Implement ICT in practicum periods in ways that meet the teaching standards for new teachers.

Strategies

Co-plan with colleague teachers and occasionally a school's ICT in Learning or pedagogical champion (if one was available in the school).

Mentor by university staff and Departmental staff for planning.

Informal reflection with research assistants.

Teachers

Purpose

Embed ICT more deeply into classroom experiences and pedagogy.

Strategies

Support pre-service teachers' planning processes and deep dialogue during that process.

Observe classroom culture and student learning while pre-service teachers conducted lessons.

Teacher educators

Purpose

Develop deeper knowledge of Essential Learnings and Information Literacy approaches.

Develop case studies for use in lecture materials.

Strategies

Independent learning and briefings by Department personnel.

Mentor pre-service teachers' planning.

Research process.

Victoria — professional learning

Pre-service teachers

Purpose

Expand pre-service teacher knowledge of ICT and how ICT can be used in Essential Learnings.

Transform understanding about ICT themselves.

See and participate in classroom implementation of quality ICT for learning activities without a practicum segment distracting pre-service teachers from trying ideas.

Strategies

Develop intense educational engagement with the technology through deep classroom practices.

Co-plan and assist with implementation in 'The Activity Cycle' or a broader reflective cycle.

Participate in three workshops with teachers as 'equal-level' professionals.

Teachers

Purpose

Develop language and ways to communicate about ICT in learning in their educational community.

Develop and implement a deeply justified and transformative way of using ICT in the Essential Learnings framework.

Participate in a professional learning model that could be duplicated in the school settings over and over.

Strategies

The reflective narrative process as the structure for activities and development of deep reflective thinking.

Three workshops: one developing stronger ideas and learning to articulate rationales for ICT in learning, one administrative and developing some plans, one reflective workshop after units had been implemented.

Writing process determined by a reflective narrative process; some were videotaped community conversations rather than personal journals.

Mentor during reflective conversation sessions.

Teacher educators

Purpose

Develop a model for simultaneous professional learning for pre-service teachers and teachers.

Develop case studies for use in coursework.

Develop skills at facilitating learning conversations.

Strategies

Design and implement a model for learning.

Conduct research.

Western Australia — professional learning

Pre-service teachers

Purpose

Provide opportunities to support the implementation of ICT for Learning in a classroom setting as part of a practicum segment.

Assist in pre-planning ICT experience with constructivist approaches underpinning design.

Strategies

Plan and implement ICT activity in schools.

Teachers

Purpose

Experience a whole-of-school philosophy to generate momentum in a school using ICT and develop professional dialogue amongst a critical mass of teachers.

Develop skills and knowledge in readiness to hosting pre-service teachers.

Design and implement a constructivist or learner-centred ICT for Learning activity in a classroom setting with a research question underpinning the design.

Strategies

In school workshops and use of an online database of ideas in a formal Credentialed Professional Learning Program.

Online activities within the program.

Pre-service teachers assisting implementation.

University academic available for support and mentoring.

Teacher educators

Purpose

Conduct some action research into the recent uses of ICT to support pre-service teacher learning.

Strategies

Use of a research assistant to interview or survey participants.

The state and territory project designs simultaneously provided professional learning journeys for pre-service teachers, teachers and university staff. The needs of these participants varied and so projects used a variety of strategies to meet different purposes. Where pre-service teachers had opportunities to explore ideas and display knowledge in classrooms, the project designs ensured pre-service teachers had sufficient knowledge and their supervising teachers developed an awareness of quality uses of ICT through observing and assisting.

The converse also occurred. Where teachers used ICT as part of normal practice, pre-service teachers developed awareness through observation and assistance. Teacher educators generally developed awareness of ICT use in schools and conducted action research to develop case studies for use in coursework, though in some cases, they designed activities to focus deliberately on the core *Professional Learning Framework* itself.

Each of the projects had varying depths of reflective practice, ranging from mentored learning conversations in the professional community within the project to interview and survey activities after the project were completed. The decisions taken in project designs that facilitated these actions revealed much about the sustainability of some of the project designs.

3.6 Innovative classroom activities generated

The state and territory projects developed and showcased exemplary uses of ICT in classrooms. It was anticipated that the professional learning programs would enable teachers and pre-service teachers to plan cooperatively classroom activities that embedded new pedagogical approaches into current curriculum frameworks. Project designs varied in terms of: who planned the activities, who implemented the activities, and the depth of reflection facilitated in the learning partnerships.

The following represents examples from each state and territory project of the type of classroom experiences designed. The examples illustrate the synergy of the learning teams of teachers and pre-service teachers. These summaries describe selected activities, their goal(s), their relevance to pedagogical or curriculum frameworks, the software environment used or other relevant issues that arose.

Australian Capital Territory — innovative activities

Description of activities	Goals
Year 7: Using a Wiki system to work in teams to create documents and organise knowledge for use by a community of peers and develop entries for Wikipedia in a SOSE project. Year 10: Using a private Wiki space to undertake project-based learning on 'World Wars', to sieve information, discuss issues, and draw conclusions. Year 12: Using an Elgg system to construct knowledge about Spectroscopy and share conceptual understanding with a co-learner audience.	Information literacy approaches to develop knowledge through collaborative online community. Develop knowledge of collaboration processes. Develop proficiency with new collaboration tools. Experience and develop work-flows used by online researchers in professional communities. **Pedagogical or curriculum framework** Using 'Pedagogies in an Online World' as the framework for pedagogical approaches until local system model in place. Studies of Human Society and its Environment a Key Learning Area Curriculum Framework. Senior Chemistry Syllabus.

Australian Capital Territory — innovative activities (continued)

Software environments	Issues
Wiki and online systems hosted by commercial group — not available in school system or at university. Elgg system. RSS Feeds in to a web-based environment. Wiki and blog functionality.	Policy does not easily provide access to new technologies. State education system does not provide interactive environments for student or teacher use.

New South Wales — innovative activities

Description of activities	Goals
Composite K/1/2 class: English program. Creation of book reviews using de Bono's Six Thinking Hats. Storyboards, classroom reflection and construction using PowerPoint. Year 1–2: Collation of visual materials. Making a movie within the Human Society and its Environment (HSIE) unit 'Wet and Dry Environments'. Using excursions, designing collages, collaboratively constructing movies. Using a wide variety of thinking and cooperative strategies throughout the project stages covering the breadth of multiple intelligences.	Appreciate the value of literature from multiple perspectives. Develop independent thinking and collaborative strategies. Range of outcomes from relevant KLA programs. **Pedagogical or curriculum framework** Learning to Learn philosophies including higher-order thinking, meta-cognition, and independence of learning. KLA curriculum framework. Wide variety of thinking skills strategies and cooperative learning strategies. Range of Learning to Learn strategies including Multiple Intelligences, De Bono's thinking hats and reflection stems.
Software environments	**Issues**
PowerPoint. iMovie. Graphics manipulation software.	Teachers omitted the 'real audience' component that was the core tenet of the curriculum approach. Teachers' expectations of students' capacity with ICT was low and in contrast to sophistication of skills students exhibited. Teachers low knowledge of file management caused some stress.

Northern Territory — innovative activities

Description of activities	Goals
Development of transition portfolios and transition plans for pre-service teachers about to move to new schools or begin workplace learning. Supporting young indigenous students through a career profiling process and assisting them to build a personal online space to access job and career information as well as profile their best attributes and talents.	Improve pre-service teachers' self-esteem and develop personal career aspirations. To provide an audience for the results of the career profiling process. To use technologies to connect pre-service teachers to sources of knowledge and develop awareness of technology-centred careers and processes. To develop purposeful ICT literacy in young people. **Pedagogical or curriculum framework** The careers education program. Not really linked to Essential Learnings framework.
Software environments Elgg server of personal spaces on the Internet.	**Issues** Pre-service teachers do not have access to Department online systems.

Queensland — innovative activities

Description of activities	Goals
Year 4–7 Suite: Integrating telecommunication activities within the *Travel Itineraries* rich task to extract information and perceptions from a non-English speaking class using questions. Using a Blackboard site to organise communications and design an investigations structure. Collating, analysing and manipulating digitised information for different genres of communication. Developing spreadsheets for others to use to make decisions. Developing persuasive texts and justifications of choices of travel itineraries based on knowledge of cultural nuances of specific and known target audience.	Develop deep questioning skills and meta-language skills using the productive pedagogies built into the task. Develop pre-service teachers' skill on the targeted repertoires of practice: • generating graphical texts (e.g., maps, diagrams, charts, timelines, timetables); • interpreting information presented in a variety of formats and reassembling information in a logical sequence and appropriate format; • utilising computer software proficiently (e.g., spreadsheet). Develop pre-service teachers' knowledge using the New Basics referents: • mastering literacy and numeracy; • operating within shifting cultural identities. **Pedagogical or curriculum framework** New Basics referents. Repertoires of practice. Productive pedagogies.

Queensland — innovative activities (continued)

Software environments	Issues
Learning Place tools.	Providing pre-service teacher access from non-school locations is problematic. Teachers' lack of confidence to talk with international collaborating teacher using the technologies. Seeking permission for pre-service teachers to write in collaborative environments.

South Australia — innovative activities

Description of activities	Goals
Year 11: Organic Chemistry site developed. Using online environments to deliver interactive materials to pre-service teachers, including study exercises to check conceptual development and information-centred project work. Using discussion boards for pre-service teachers to share knowledge, respond to questions on issues and explore further issues/ concepts or intriguing scientific knowledge. Using face-to-face and online environments to assist pre-service teachers to use inquiry-based pedagogies to find out for themselves and check understanding with peers and teachers.	Develop inquiry approaches and construction of knowledge capacity with student cohort. Check for understanding of conceptual development using environments where students can carefully craft responses and receive feedback. **Pedagogical or curriculum framework** Senior Chemistry Syllabus. Essential Learning Framework in conjunction with the Pedagogies Strategy.
Software environments	**Issues**
eduCONNECT environment.	Permission for pre-service teachers to work offsite is needed. Teacher reluctance to change pedagogical approaches from delivering content.

Tasmania — innovative activities

Description of activities	Goals
Kinder/Prep class: Development of an Electronic Big Book using e-mail and travel buddies with an international class to design collaboratively and make a big book for a known and defined audience. Use podcasting and videocast exchanges to seek information and show progress on plans and products. Distribution of the Big Book electronically.	To develop pre-service teachers' awareness of using communications technologies to find out information from people and to work globally on tasks. Develop literacy skills while using ICT resources as a means and medium. Embed digital tools and activities in the everyday activities of young students. **Pedagogical or curriculum framework** Information literacy approach within the Essential Learning framework — accessing alternative sources of information, collaborating with others to organise information, developing knowledge for known audience. Bloom's taxonomy to design questions. KITO Outcomes.
Software environments Variety of online environments. Simple PowerPoint environment for book construction. Podcasting software.	**Issues** Departmental system does not provide access to higher-end communications technology systems. Pre-service teacher access to Departmental system very difficult to arrange.

Victoria — innovative activities

Description of activities	Goals
Year 7: Creation of Raps (music and videos) using a project management cycle where pre-service teachers developed and implemented their plans, working independently as far as practical to gain skills. Develop work-flow processes and produce their projects.	Develop literacy through development of media. Experience a project management cycle in teams. Develop independent learning skills. **Pedagogical or curriculum framework** Essential Learnings.
Software environments Began with PowerPoint. Developed music videos and then put music, raps and video online. Variety of software brought in as it was needed. Pre-service teachers needed to 'figure out' how to use software in learning teams.	**Issues** Short time for the term necessitated that pre-service teachers take responsibility for learning without so much teacher direction — turned into an advantage.

Western Australia — innovative activities

Description of activities	Goals
Year 2: Development of a multimedia storybook to represent a life cycle of an animal and present it to a Prep class.	Develop speaking and listening skills. Self-evaluation of cooperating learning. **Pedagogical or curriculum framework** KLA curriculum framework.
Software environments PowerPoint.	**Issues** Swimming lessons stop regular classes for a week. Not sufficient time for pre-service teachers to plan, implement and reflect on learning activity in a week. No pre-practicum visit or collaborative planning. Trolleys of 12 laptops not sufficient for class use.

These descriptions of classroom activities show the potential of the collaborative planning, implementation and reflection cycle to produce quality uses of ICT in classrooms. These examples highlight issues for adoption of innovation in schools generally, and innovative uses of ICT pedagogies specifically.

Generally, the tone of activities in classrooms was strongly influenced by the pedagogical approaches developed. Sometimes this resulted in observable changes in students' learning. The projects that involved extensive collaboration had a capacity to result in deeper learning activities. Variations in implementation style and focus did result in differing qualities of activities being planned.

3.7 Research questions

Research underpinned each of the state and territory projects. This enabled each team to seek answers to specific research questions that would shape future partnerships and programs, as well as contribute to the overall research agenda of the PICTL study. The following information summarises the research agendas of these projects indicating significant state and territory priorities and suggesting important national issues. To facilitate interpretation of the research questions they are grouped under four themes. These themes are innovative technology systems, adoption of innovation, professional learning models, and links to pedagogical reform.

Innovative technology systems

ACT: How can various technologies such as wikis, blogs and team-learning systems be used to foster collaboration? How can teachers (pre-service and in-service) be assisted to reflect upon their understanding of conditions that motivate teachers to expand their use of ICT?

NT: What use will pre-service teachers, the School of Education and employing authorities make of electronic portfolios?

SA: How effective is the online learning environment in facilitating learning involving schools, the university and pre-service teachers?

Adoption of innovation

ACT: What are the pedagogical benefits, barriers and challenges to implementing collaborative ICT-based knowledge creation pedagogies in selected ACT secondary classrooms?

NT: What is the take-up of ICT by the selected schools, the students attending them, pre-service teachers and university staff?

QLD: How is technological innovation diffused in local schools? What transformations are necessary for existing teaching/learning environments and practices to enable more effective ICT and innovation diffusion in schools?

SA: Does the online collaborative learning environment allow for the transition of pre-service teachers at the university into a school?

VIC: What barriers and opportunities affect pre-service teachers' use of ICT in schools?

Professional learning models

ACT: What are the implications for practice around the promotion of continuing and deep professional conversations between teacher educators, teachers, pre-service teachers and students on innovative uses of ICT to support curriculum reform?

NSW: How effective is the learning-team approach for supporting a professional development model?

NT: What are some of the practical difficulties in creating a successful community of learners in rural and urban locations?

QLD: To what extent can a virtual Professional Development College (schools, universities, government/ non-government authorities) succeed in working together to achieve better ICT outcomes for learners in schools? Can pre-service teachers play a role in the diffusion of ICT such that more sustainable ICT-rich learning opportunities emerge?

TAS: What was the take-up and persistence of in-service and pre-service teachers in this project? What factors did they attribute to their entry and maintenance of the project?

WA: Can pre-service teachers and their lecturers lead school-based action learning projects as an integral part of a professional practice experience? What are the conditions that need to be sustained in a professional partnership between universities and schools, if pre-service teachers are to be able to demonstrate their knowledge and skills? In a Professional Development School, does the quality of professional conversations about ICT in learning improve because of the input of university staff and pre-service teachers into the school community?

Links to pedagogical reform

NSW: To what extent is ICT being used to develop higher-order thinking and reasoning in the school? What criteria can be used to measure the effect on students' learning of an environment with ICT embedded in the learning process?

NT: Is there a distinct pay-off for children attending the participating schools?

SA: How effective is the online pedagogical approach in facilitating pre-service teacher learning and as a professional development tool for teachers?

TAS: What in the view of the teacher participants were the unique pre-service teacher learning gains directly attributable to this project? To what extent did these learning gains represent achievement in the system curriculum framework?

VIC: What professional learning models do teachers in schools believe will support their learning journey to broaden their knowledge and use of ICT in curriculum and pedagogical reforms? How successful are the models?

WA: Is a strong relationship with a university likely to support a school in developing consistently good practice in the use of ICT in the provision of the curriculum?

The research questions emerging from state and territory projects complement those of the main study. Clearly, there is much common ground, providing a rich data set to interpret in this report. Models for professional learning in pre-service and in-service education receive primary attention, especially as they relate to supporting curriculum reforms and innovation in schools. State and territory responses to their research questions can be found in the accompanying volume, *Partnerships in ICT Learning Study: Case studies*.

3.8 Uses of online technologies

It was expected that projects would use online environments as a communication facility to establish and conduct their business. For some projects it was possible that the online environments would also offer a pedagogical tool. Informally, project leaders declared that e-mail-based communications were often sufficient for their purposes.

This section summarises the online technologies used under five headings: what was used, who used them, what were they used for, why were they used and what issues arose.

Australian Capital Territory — online technologies

What was used?

Blogs, Wikis and Elgg systems.

Who used them?

Pre-service teachers and lecturers in classes.

Teachers and lecturers in meetings and demonstrations.

What were they used for?

Explore innovative uses of tools within the curriculum and pedagogical context.

Why were they used?

Subject matter of the project.

Issues

Environments not available to schools within Departmental systems.

New South Wales — online technologies

What was used?

University Web CT system.

University communications environments — forums and e-mail.

Website.

Other e-mail.

Telephone, fax.

Who used them?

Teachers, pre-service teachers, university staff, CAP staff.

Four learning teams used university communication environment; the other four used e-mail.

What were they used for?

Co-planning and sharing of draft plans.

Downloading documents related to the project.

Sharing observations and reflections.

Data collection.

Information distribution and housekeeping.

Why were they used?

More reliable than e-mail as an organisational tool for information.

Communications tool between management and learning teams.

Communication between learning teams.

Strategy for observation from a distance through the stories of teachers.

Issues

Permission from university for teachers to use the university systems.

Not possible for pre-service teachers and university staff to use school ICT services.

Northern Territory — online technologies

What was used?

Elgg's learning landscapes and forums.

E-mail.

Who used them?

Pre-service teachers.

What were they used for?

Developing digital portfolios.
Professional reflection.

Why were they used?

Structure and intent of the online system appeared to match the goals of the project.

It was available and was free to use.

Issues

Permission for pre-service teachers to use the Departmental systems was not provided.

Queensland — online technologies

What was used?

Website developed for the project.

Blackboard community.

Learning Place web services.

Who used them?

Teachers from New Basics schools.

Pre-service teachers and students.

What were they used for?

Provide an audience for resources developed in the innovative projects.

Inform teaching community of events and activities in the projects.

Invoke discussions amongst teachers, mentors and pre-service teachers.

Why were they used?

Develop a culture around the New Basics College.

Provide pre-service teachers with access to a range of ideas.

Issues

University could not host site and allow student access. Had to construct and host a dot com site.

Had to negotiate to allow external peers to access a university system.

Had to negotiate access to Learning Objects.

South Australia — online technologies

What was used?

eduCONNECT environment.

University suite of services

Who used them?

Pre-service teachers, teachers and students.

Technology School of the Future (TSoF) staff.

Pre-service teachers and lecturers.

What were they used for?

Mechanism for delivery of materials and resources to pre-service teachers

Why were they used?

Systemic trial of tools for use in schools.

Subject matter of the project.

Issues

University IT system and eduCONNECT cannot exchange data even though they have same Blackboard base.

Permissions mean pre-service teachers could not access from home and do preparation.

University staff could not support pre-service teachers questions and issues without access.

Victoria — online technologies

What was used?

Website.

Who used them?

Teachers and pre-service teachers.

What were they used for?

Promote the project.

Provide information portal for schools.

Support teachers and pre-service teachers in professional learning and school-based implementation.

Why were they used?

Convenience of one-way communication.

Provide a role model for online content.

Western Australia — online technologies

What was used?

Website of resources and course materials.

Who used them?

Teachers attending courses.

What were they used for?

Stimulus for ideas, background material and case studies of ICTs for learning.

Why were they used?

Provide access to a wide variety of ideas.

Lack of connectivity between systems and the unavailability of services in schools meant that the use of communication tools in projects was often restricted. This issue was exacerbated by policies of universities and education jurisdictions. Generally speaking, teacher access and use of the Internet are not commonplace, making any use of telecommunications seem special and needing to be specifically negotiated.

For most projects, face-to-face events provided a sense of professional community, thus developing the project culture. Some projects made valuable use of telecommunications tools, especially New South Wales, which used telecommunications as a window on classrooms for pre-service teachers who could not travel readily to the schools. This provided an indication of the potential for telecommunications in supporting projects of this type.

Research findings: Evidence of success and innovative approaches

4.1 Introduction

The findings from the PICTL study inform responses to the 11 research questions that underpinned both the design and conduct of the research. Data were drawn from state and territory project reports, interviews of participants and a National PICTL Forum that provided a venue for discussion of findings and issues.

State and territory projects each reported successes based on both their research questions and aims, but also on the more generic research questions associated with the PICTL study. This chapter considers two of the PICTL study research questions that together provide information on the evidence of success and nature of innovation. The two research questions are:

RQ 1 What does the evidence of relative success of the state and territory projects based on the feedback of participants mean for responding to the broad research theme?

RQ 6 What innovative approaches were used, and how successful were they?

To explore these questions the remainder of the chapter is divided into four sections. These sections focus on evidence of success; implications for partnerships, ICT within the curriculum and the *Professional Learning Framework*; innovative approaches; and successful innovative approaches.

4.2 Evidence of success

Findings have been gathered together here by state and territory and organised into five categories. These categories consider outcomes for in-service teacher educator design, pre-service teacher education design, curriculum and pedagogical reform, and partnership development. In addition, one project provided information on outcomes outside of those groupings listed above. For completeness, these further outcomes are also listed separately at the end of the specific project.

Australian Capital Territory — evidence of success

In-service teacher education design

A 'shoulder-to-shoulder' model was developed, involving university staff and pre-service teachers exploring technologies and new ideas within a framework of professional learning where all partners are valued. Interest centred upon online portfolios as a strategy for focusing professional learning programs and aligning them to teacher standards.

Pre-service teacher education design

Pre-service teacher explorations of the applications of new technologies were supported through the redevelopment of a Secondary Teaching Studies unit offered by the university. There was an expectation that pedagogies and subject matter of the unit would be a model for other units in the pre-service program.

Curriculum and pedagogical reform

New pedagogical approaches were developed for use in collaborative environments in a design, implement and document cycle. Further development is anticipated as a legacy of the project.

Partnership development

The project established the need to develop relationships with technical agencies external to the university, and for schools to explore innovative technologies as well as contribute to a robust educational debate.

New South Wales — evidence of success

In-service teacher education design

Strategies to assist teachers were developed to design value-added indicators for the level of ICT integration into pedagogy and curriculum interpretations, and for conducting research to inform that development. There were varying degrees of success with both the depth and breadth of the indicators, and the process of supporting teachers to design, describe and observe indicators in classrooms. The team worked together to design ways of supporting teachers to balance ICT knowledge and skills to pedagogical and curriculum indicators, and to adopt strategies beyond student self-assessment of skills. Ongoing work in this area is one legacy.

Teachers reported using new strategies to record more holistic assessment in classrooms after the experience of the project. There was evidence of teachers' determination to set new personal teaching-related challenges and to accelerate their own professional journey. A shift in concerns was noticed from implementation issues and whether ideas were practical to teachers being excited about the potential of rethinking their own practice. There were signs of development of a new culture in professional practice and conversations. There was evidence that participants wanted access to further professional learning programs from the university within the university-CAP partnership.

Criteria used by participants to measure effectiveness included:

- provision of collegiate support in a collaborative situation, even though many struggled to remain collaborative over time and distance through technologies;
- working in the learning team to plan and implement teaching programs was the greatest challenge of the project;
- development of collaborative skills;
- opportunity for professional development in context; and
- broadening professional horizons and networks.

Pre-service teacher education design

Pre-service teachers wanted further experience in schools including practicums but timing issues meant that this was not feasible in this project. Lecturers wanted to re-conceptualise their practice and how they framed the content of their units of study. There was a critical mass of lecturers embedding ideas from this project into lecture content and pedagogies. This resulted in internal discussions about the role of the practicum and how to improve the preparation of pre-service teachers for school experiences. As a result there was consistency in thinking concerning ICT across units of study to bring greater cohesion to the pre-service program.

Consideration was given to extending the partnership from the teacher-focus level to a school-focus level, involving more teachers and pre-service teachers in a school — building in sustainability to compensate for teacher movement. Also considered was integrating the practicum experiences into project designs, extending the partnership contact for deeper outcomes and providing pre-service teachers with first-hand implementation experience.

Curriculum and pedagogical reform

A range of quality examples of higher-order thinking became available through case studies of the use of various Learning to Learn strategies. These became available as awareness-raising material from other teachers and professional learning experts. Teachers provided evidence of independent learning and higher-order thinking skills in their classrooms. High quality professional dialogue about ICT and Learning to Learn strategies in the CAP community also resulted. There was general acceptance of the Learning to Learn approach in all schools and with all participants to the extent of teachers becoming advocates of the approach back in their schools.

All parties, especially university staff, acknowledged changes to their practice. A focus on measuring value-addedness prompted participants to rethink how to measure the impact of embedding ICT on learning.

Partnership development

Participants wanted closer links to CAP activities and university projects as a professional development strategy and mechanism to invoke school change. Teachers wanted more involvement with pre-service teachers. The legacy of the project was a more positive attitude to accepting pre-service teachers on practicums.

A focus on metacognition helped to consolidate the partnership and provided common ground or focus for discussions and long-term project work with CAP. The management team is now seeking collaborations in future projects.

There is evidence that the partnership has elevated participants into new roles and into a higher status within existing roles. It has also encouraged them to develop new perspectives on their own practice. Participants in the projects have since connected through other projects and as a result the network has been strengthened.

Other outcomes

There were examples of growth in student learning outcomes measured by teachers using value-adding criteria. The university provided new facilities for pre-service teachers and lecturers after seeing the depth and quality of ICT use in schools.

Northern Territory — evidence of success

Pre-service teacher education design

The university used the project to stimulate discussions about an upcoming review of pre-service teacher education. In particular, how pre-service teachers use ICT has come under scrutiny as well as raising awareness of the value of ICT being emphasised in school systems.

Partnership development

The university was keen to re-establish a mentor-training program to complement its practicum placement program.

Queensland — evidence of success

In-service teacher education design

The project represented a successful model to support innovators in schools and generate an innovative ICT culture in schools. Pre-service teachers led a range of collaborative projects that were being established throughout the region. The university was established as a regional centre of professional learning — involving large numbers of pre-service teachers in ongoing projects, and schools approaching the university for partnerships. Industry partners approached the university to use pre-service teacher cohorts in projects.

A continuous learning model is now available for those who participated and continue participating. In previous iterations, working with pre-service teachers in a practicum was short-term, without capacity to stimulate ongoing momentum for learning and activity. Those who continued to work with the pre-service teachers beyond the practicum timeframe built stronger relationships and the propensity to continue learning and exploring ideas. A planned development of an online database of innovative ideas within the New Basics framework will provide a range of activities and resources, building up the concept of a Professional Development College.

Pre-service teacher education design

Within the coursework structures there were multiple pathways and opportunities for pre-service teachers to adopt extensive uses of ICT, including the practicum, independent projects, and community experiences. Other faculty teams within the university were using a project-based model. The project-management approach and the materials to sustain multiple simultaneous project teams were being improved constantly.

Pre-service teachers volunteered to undertake additional activities within school-based programs. Pre-service teachers reported that the rich, diverse experiences of activities improved their knowledge and skills and readiness to teach in New Basics and other schools. Pre-service teachers hosted training and other awareness-raising programs for other pre-service teachers in twilight sessions. Second and third year pre-service teachers encouraged first-year students to volunteer within projects to raise awareness, develop knowledge and generate commitment to the model of learning throughout their pre-service education program.

Pre-service teachers are valued in the local community for their ICT proficiency within a rich task environment. They are also valued for their experience in the uptake of ICT for problem solving, knowledge building and rich-task collaborations, and the ability to connect ICT and align learning to rich tasks.

Curriculum and pedagogical reform

New uses of ICT in New Basics not explored before were being taken up as innovations by schools. Some schools established themselves as district leaders in ICT innovation. The approach of deliberately aiming at something the schools were not doing was unique to the region. Pre-service teachers had an intuitive sense of where to look to connect ICT to rich tasks. They knew how this connection might look and operate in a rich-task classroom.

Partnership development

The community activities set around the NewBICTs project required mutual engagement with other pre-service teachers, teachers, university staff and host school curricula. New schools volunteered to be involved with new and existing projects.

Transformations necessary for collaboration were beginning, but more needed to be done to shift school inertia. Submissions for grants around the innovative use of ICT for pre-service teacher programs in regional schools have been successful.

South Australia — evidence of success

In-service teacher education design

Pre-service teachers delivered messages about newly-available learning tools and systems to school communities by using them in schools. Teachers and the education system became more aware of the contribution pre-service teachers can make to using ICT at school. Teachers moved a little in pedagogical practice to better incorporate ICT into their existing pedagogical framework. Case studies of pre-service teacher achievements with the new systems are incorporated into the training materials for use across the state. There is evidence that resources constructed by pre-service teachers, left in the school environment, are being used by their colleague teachers.

Pre-service teacher education design

An expectation that school-based projects can alter the practicum activity design, relationships and institutional arrangements is developing. Incorporating training in the use of tools and pedagogical processes into course work allowed more pre-service teachers to have access to training in new tools in programmed activities. Awareness of the model for school-based projects in the faculty, with indications other units and subject areas may try it, has increased.

Curriculum and pedagogical reform

Use of the ICT delivery systems was more sophisticated for delivery of content.

Partnership development

Schools now approach the university to offer projects or seek projects where pre-service teachers can assist to initiate and support a school-based innovation. There is now potential for pre-service teachers and teachers to jointly attend training programs hosted by the Department.

Tasmania — evidence of success

In-service teacher education design

Teachers were provided with opportunities to try new ICT in learning ideas through pre-service teachers' implementation. A positive culture towards hosting and using pre-service teachers as a professional learning strategy and school development strategy was established. In one school, the unit of work was distributed to all staff in the school as an awareness raiser and to encourage discussion and observation of implementation. Some ICT champions welcomed both the chance for them to try something new and to show other teachers that if pre-service teachers can use ICT, all teachers should be able to do so.

Pre-service teacher education design

A strategy evolved to assist pre-service teachers set goals about the quality and quantity of their ICT use in practicums and to achieve at least the standard for school experience set for pre-service teachers. Research provided understandings of the difficulty pre-service teachers have in committing to in-school projects and revealed pre-service teachers' preferred models for learning about using ICT. Many pre-service teachers realised their knowledge and skills were already beyond those of their supervising teachers, providing a confidence booster and a context for setting up leadership aspirations.

Curriculum and pedagogical reform

Real case studies of holistic approaches in schools were portrayed as part of in-service. Teachers could observe how the information literacy approaches worked in their classrooms. Interviews and surveys reported that this had a profound effect of opening participants' minds to change and increasing their willingness to become further involved. The interviewees reported willingness to try further approaches on their own. The project team reported that half of the classroom applications were 'transformative' at the school level and half were transformative at a broader level in terms of depth of pedagogical approaches with ICT.

Partnership development

Schools involved are very willing to take pre-service teachers on a similar project-based learning model again. The project drew attention to the need for an upgrade of the formal partnership between the university, the Department and the Union to provide more flexibility and commitment by all parties to pre-service teacher education experiences in schools.

Victoria — evidence of success

In-service teacher education design

The approach adopted in the project with the Diocesan schools was duplicated with other schools. The development, analysis and celebration of a philosophical professional learning journey created a different culture for professional learning about using ICT in schools. Teachers used the story of their journey to inspire others in their schools.

Pre-service teacher education design

The first group of pre-service teachers to participate were very positive about the experience and wished to participate further. This attitude excited others and created an environment for more pre-service teachers to be involved. A volunteer model outside of the formal pre-service teacher program was established.

Curriculum and pedagogical reform

There was evidence of infusion of ICT into school approaches — especially regarding curriculum planning. Awareness was raised of the potential links between ICT and Essential Learnings in participating schools and within the Diocesan office.

Partnership development

Schools in the Diocese had confidence in the capacity of the university to deliver quality professional development. Personal learning partnerships were better understood as a professional learning strategy. Positive attitudes developed around working with and supporting pre-service teachers in schools.

Western Australia — evidence of success

In-service teacher education design

A number of teachers in school settings created a momentum for activity or extending activity. It was established that whole-of-school approaches have the most potential to shift school momentum and generate a culture of reflective dialogue about using ICT in a school setting.

Pre-service teacher education design

Pre-service teachers who were involved reported positively to their peers. An expected legacy is stronger positive attitudes to using ICT on practicums.

Curriculum and pedagogical reform

Constructivist approaches were used to interpret how ICT can be used to support learning.

Partnership development

Newly invigorated conversations have taken place between the university and schools.

There is a willingness to continue accepting pre-service teachers generally, and those wanting to use ICT specifically.

The number and diversity of the successes recorded for the various state and territory projects was very encouraging. There was evidence of genuine partnerships, new ways for education professionals to work, new thinking about how ICT may be better integrated into curriculum frameworks and class lessons, and deep reflection by participants bringing about new ideas for them concerning the role and place of ICT in education. The next section takes up these ideas in more detail.

4.3 Implications for partnerships, ICT within the curriculum and the Professional Learning Framework

The state and territory projects provided considerable evidence that professional learning programs integrating in-service education with pre-service teachers' experiences, provided important avenues where professional learning can occur for all concerned. This section considers three themes pertaining to this professional learning. Each of these addresses core issues within the central research theme for the PICTL study that stated:

> How can classroom-based professional learning projects be collaboratively designed among pre-service teachers, teachers, and university lecturers to focus on quality student uses of ICT within new curriculum reforms and pedagogical agendas, and which influence designs for professional learning for all stakeholders?

The themes concern the form of collaboration or partnerships, embedding ICT within the curriculum, and how the findings reflect the different phases of the core *Professional Learning Framework* used to guide the development of state and territory projects.

Partnerships

The successes recorded to design and implement programs that embed ICT within classrooms in the state and territory projects were facilitated by the partnerships formed among participants and institutions. These partnerships occurred at different levels. There were those among pre-service teachers, teachers and teacher educators. Other partnerships occurred at the institution level among schools, universities and education authorities. Also there were some projects where the partnerships added industry to the mix.

Learning partnerships

State and territory projects clearly suggested that learning partnerships involving pre-service teachers, teachers and teacher educators have far-reaching and positive effects. Teachers and pre-service teachers mostly reported that working together was valuable, especially within projects that had a strong structure and where mentoring was facilitated. The projects were seen as providing opportunities for them to work together through setting up workshop days or professional learning events, paying for teacher release and utilising time slots when pre-service teachers would be in schools. Some projects nurtured learning partnerships that were sustained over distance and time, using technologies and regional/school visits.

Within the partnerships, different measures of success were valued. When project designs provided time for partners to meet and there was mentoring available, the partnerships were deemed by project leaders to be successful. For pre-service teachers, the ability to work intensely with a teacher represented an opportunity for deeper, focused learning, not usually available in traditional practicum periods. For teachers, success emerged through the valuing of the chance to engage in fresh ideas, work collaboratively with an enthusiastic pre-service teacher, or see first-hand the impact of ICT pedagogy in their classrooms. The common ground of seeking experience in working with new technologies or working with technologies in new pedagogical ways provided a common ground which enabled relationships to blossom and learning to be achieved.

Many partners expressed the desire to undertake a similar activity again and indicated they would recommend the general idea to their peers. The legacy of the projects was a willingness by teachers to accept pre-service teachers in the school and to specifically value ICT-using pre-service teachers. This indicates that such partnerships have the potential to address the unwillingness of some teachers to take responsibility for supporting pre-service teachers on the practicum. Similarly, pre-service teachers, who had expressed concerns about undertaking a project using ICT while on a practicum, were willing to undertake the experience again and encouraged their peers to do so. They felt that ideas associated with mainstreaming the use of ICT in practicum were successful.

The experiences in the PICTL study led some local teams to suggest they would extend their learning partnerships in different ways, including using more teams and undertaking ongoing work. Successful partnerships in this study suggested that an ICT focus could be extended to: multiple teachers in a school as an alternative to multiple schools, enabling multiple pre-service teachers to work with a teacher or in a school, using school experiences other than practicums, working with specialist groups of pre-service teachers and teachers, and hosting long-term projects with ongoing partnership activities.

Institutional partnerships

The sustainability of learning partnerships required institutional arrangements and agreements. These take time to develop. However, once established such partnerships show considerable benefits.

The Western Australian project provided the strongest indication of the capacity of long-term partnerships. This project indicated the value of written agreements and supporting infrastructure including school and university liaison officers. Such infrastructure was facilitated the partnership at the highest levels in the university and at district level in the school systems.

The projects from Victoria, Tasmania and South Australia each benefited from education jurisdiction involvement. In these projects, links with education jurisdictions resulted in the use of system personnel within the project, access to technologies, provision of broader advice, and positive promotion of the project and its results. Significantly, there is a desire from all partners to continue projects within the partnership.

Industry partnerships

Some state and territory projects yielded valuable partnerships with the Information Technology (IT) industry. The purpose here was to provide resources for pre-service teacher and teacher use. The need for these partnerships is clear, when education systems cannot provide access to new technologies for early adopters to explore.

Industry IT partners were seen to fill an important gap in the development of new ICT innovation. Project leaders reported industry partners valued the collaboration and the general approach within the PICTL study to involve pre-service teachers, teachers and teacher educators. They saw a rationale in the structure of these partnerships and the potential benefits available. Additionally, some partnerships resulted in successful grant applications for supplementary funding to extend PICTL activities. Queensland was particularly successful in this regard. Clearly, the potential exists for universities and schools to extend their partnership arrangements into the IT industry.

Embedding ICT within the curriculum

It was expected that state and territory projects would result in quality uses of ICT within the classroom. It was also expected that pre-service and in-service teachers would experience a transformative personal experience leading to informed understanding of the potential of ICT for their students. Each project's context of new or revitalised curriculum and pedagogical reforms throughout the country provided an opportunity to research the assumption that pedagogical change would improve learning opportunities for students. Additionally, it was hoped that projects would provide teachers with strategies to engage students in higher-order learning activities, improve intellectual quality and provide some connectedness between learning activities and real-world experiences.

For most of the projects this wish list appeared to be met. Participants saw their project as a way of assisting learners to be prepared for the future; one where ICT processes may dominate critical thinking, information literacy and communication. The state and territory projects were successful in two ways in this endeavour.

Firstly, in those projects where pedagogy and beliefs about pedagogy underpinned the subject matter, processes and design of the project, the results appeared more positive. In these projects teachers believed they had an emerging view of applications of ICT in their classes. This finding differed for projects in which such principles were not embedded or not the focus.

Secondly, pre-service teachers often suggested that they had a stronger understanding of the content and basis of new curriculum or syllabus frameworks than their teaching partners. The drawback for them was that they did not have the matching implementation experience to synthesise their knowledge. The learning partnership in the context of an 'innovative' project provided a great learning place for both of these groups.

The focus on pedagogy using ICT as a driving factor in state and territory projects had a profound effect on in-service and pre-service education for the participants involved. This feature contributed much to the success of the PICTL study as all projects that implemented a pedagogical approach reported it was successful. This particular orientation offers a practical way for the future of both pre-service teacher education and in-service education. Importantly, it provides a strong foundation for the development of learning partnerships that encourages pre-service teachers to learn alongside teachers.

The Professional Learning Framework

The PICTL study offered a core *Professional Learning Framework* for state and territory project leaders to use as a basis for planning their projects. The *Framework* was described briefly in Chapter One and it has five phases.

Phase 1 involves partners in direct awareness-raising events about ICT, curriculum frameworks, pedagogy or other relevant subject matter. It has to do with establishing a common ground among participants based on syllabus/curriculum/core learning programs and to develop knowledge about ICT in learning and associated pedagogical approaches.

Phase 2 involves selecting and planning a specific student learning experience. This might be a unit of work, task, project or series of lessons where ICT would play an important role within the curriculum program.

Phase 3 involves developing the curriculum unit plan including the detail of the pedagogical approach. It is anticipated that the planning of classroom experiences is carried out collaboratively in a way that embeds ICT.

Phase 4 involves implementing the plan in classrooms.

Phase 5 involves participants as individuals or within groups, reflecting on the experience.

State and territory projects embedded some or all the phases of this framework into their project design, aiming at different audiences, using different partnerships and varying strategies to suit different purposes. The research into the projects produced evidence of the general success of the framework and of particular ways the framework was implemented. The following looks briefly at the phases.

Phase 1: Core learning

In action-learning programs, core learnings refer to the content that teachers can draw on when implementing new ideas into classroom processes. It is commonly delivered to teachers through workshops, and to pre-service teachers through lectures and tutorials. Core learning raises awareness of possibilities.

Strategies for delivering content, or raising awareness in the projects varied, depending on the target audience and context. This provided useful insights into ways projects may be extended. A common theme in the project outcomes was that teachers and pre-service teachers needed to develop deeper knowledge of ICT applications, pedagogical approaches and curriculum reforms. As a result it seemed that a unit-planning process would bring the domains of knowledge together.

In their projects, the Australian Capital Territory, New South Wales, Victoria, and Western Australia hosted specific activities for teachers to develop knowledge about ICT in learning and pedagogies. In the Australian Capital Territory, teachers participated in traditional workshops and demonstrations about the technology with guided comment, to stimulate interest in using technologies not seen or used before by teachers. The New South Wales project used the concept of sharing existing knowledge on a day allocated for this purpose. The Victorian project used teachers' personal beliefs and attitudes as a basis for sharing knowledge and developing a capacity to articulate what teachers and pre-service teachers did with ICT and why it was used. Western Australia involved teachers in a formal program of study using theoretical perspectives and training to raise teachers' knowledge of ICT.

In most projects, pre-service teachers were involved in additional core learning activities, either simultaneously with the teachers or within course work. In the Australian Capital Territory, the awareness-raising activities for teachers and pre-service teachers were conducted separately. In Queensland, pre-service teachers developed knowledge within course-work activities and through independent study. In South Australia, the pre-service teachers were targeted to develop deep knowledge of the ICT applications and use their accumulated knowledge (from coursework) of new curriculum frameworks and pedagogies to develop strong applications for the technology in classrooms. In this model, the pre-service teachers were intensely mentored as they developed skills and knowledge. The Department of Education staff took responsibility to inject new fields of knowledge into the program, informally as it was needed (instructional design, screen design). Pre-service teachers valued this approach immensely, though the project managers suggested it was not a sustainable approach with large cohorts of pre-service teachers.

In Tasmania, pre-service teachers and teachers did not have any core learning activities in their project. It was expected that pre-service teachers would have developed sufficient knowledge in coursework and that teachers had already attended multi-day workshops hosted by the Department. Although this was true in part, the project concluded more core learning would have enhanced and focused the work of project teams. In Western Australia, pre-service teachers were not involved in the professional learning, resulting in reflections by teachers that pre-service teachers were not as well informed or as willing to use ICT as they felt they were.

Where pre-service teachers, teachers and teacher educators were simultaneously involved in core learning activities, relationships were more strongly developed. Such approaches resulted in common knowledge being readily developed and the resulting projects featured more intensive embedded uses of ICT and strong pedagogical approaches in the classroom. Most projects reported that developing specialist knowledge contributed significantly to the formulation of quality ideas and capacity to work professionally.

Phase 2: Collaborative planning

The projects all involved pre-service teachers and teachers collaboratively planning classroom experiences to some extent. More collaboration generally meant better-quality outcomes. Further, the level of mentoring of the planning process had significant effect on both the depth of the collaboration process and the quality of classroom activities. Projects in which universities were heavily involved in this process elicited stronger results than those where teacher education staff members were not as involved in supporting curriculum planning. Where it was intended that pre-service teachers would implement ICT ideas in a practicum, university support of the mentoring and management process before the practicum period was vital. Teachers valued the university input and used the dialogue as a professional learning opportunity.

In Queensland, a project management process supported collaborative planning with teacher educator staff and others, providing insight into the potential of innovations in the curriculum framework. In South Australia, staff from TSoF and the university provided intense mentoring to pre-service teachers as they worked to plan ICT implementations with their teachers. In Tasmania, pre-service teachers

were responsible for the management of the collaboration process within the professional learning framework set up by the university. The management and steering committee reviewed pre-service teachers' plans resulting in improved plans and creative ideas matching the new curriculum reforms.

Where teacher educators played important roles in fostering and nurturing the collaboration, it was valued. In projects when this was not so overt, increased tertiary involvement was recommended in the final reports. Further, there is a link between the depth of pedagogical approaches and curriculum interpretation in those projects where there was some mediated input into the planning of classroom experiences.

In projects that involved teacher implementation with pre-service teacher support, the collaborative planning process provided a 'live classroom' for the planning ideas of pre-service teachers. In these cases, project teams ensured planning time was embedded within the professional development framework. Structured and mentored processes impacted on the complexity of the learning activity undertaken and the capacity to describe it both in written designs and in learning community conversations. The state and territory projects clearly showed that the planning process was a powerful time to integrate the curriculum, pedagogical and ICT paradigms. However, this process needed to be mentored and given time to develop. Overall, strong involvement of the university in the project planning and development phase improves the learning of teachers and pre-service teachers and provided valuable awareness raising for teacher educators.

Phase 3: Developing the curriculum unit plan

The context of a focused education jurisdiction curriculum does make a difference to the overall quality of ICT experiences for students and offers greater sustainability because it does not rely on the 'next teacher' having the same philosophy and making the same choices. The common curriculum framework and pedagogical context guarantees an extension of the same journey for students. In such circumstances, use of ICT is purposeful and connected to the tasks, and tends to feature deeper uses of ICT.

In all projects there was strong evidence of how the approaches reflected in some ways the broad curriculum pedagogy framework suggested by their education jurisdiction. Three projects used developing or newly advocated frameworks as a focus to ground their partnerships. In the Australian Capital Territory project the focus was on early drafts of the Territory curriculum development document, which in turn drew upon a National Pedagogic framework. In the projects in Queensland and Victoria there was strong references to the new holistic pedagogical and curriculum frameworks referred to, respectively, as the New Basics framework and the Victorian Essential Learnings. These frameworks provided a tight, deep curriculum design and a particular pedagogy.

The characteristics of such curriculum and pedagogy frameworks for projects ensured that pre-service teachers' learning was purposeful and connected to students' perspectives. It meant there was a local and global community context that had real rather than imagined audiences. Most importantly, the students' journey through the curriculum was balanced and focused through multiple levels of schooling. Teachers had a context in which to construct their students' learning journeys. Such contexts in these state and territory projects enabled focused models of professional learning where the pedagogical and curriculum pre-knowledge were deep and strong, enabling conversations about ICT to be at a much higher level and more advanced in terms of implementation.

Phase 4: Implementation

In schools, projects with outside groups provide a stimulus for professional dialogue and focus for renewing or extending activity. Pre-service teachers also valued projects as a way of adding additional value to their classroom experiences. The research basis and additional structure that emerged for projects as a consequence of being part of the larger PICTL study meant that what happened in schools was neither ordinary nor a 'run-of-the-mill' activity.

Involvement in a project was reported as special, providing opportunities to play with ideas, observe and reflect on what happens and generally invoke a spirit of innovation and change. Collaborative implementation simultaneously involving pre-service teachers and teachers was most valued as a learning strategy. All participants valued this opportunity for special attention and focus. This suggests that school-based projects with pre-service teachers were useful in many ways, and that project-based learning in courses was a powerful and rich pedagogy.

Generally speaking, schools valued the school-based projects contribution to the school's professional learning journey. An important outcome of implementation of the projects in school settings was the use of the school project as an awareness raising strategy amongst staff generally and the development of a school's culture for using ICT. Pre-service teachers were seen as valuable contributors to the process. It was expected that they would carry stories of the practices, the new innovations and their implementation experiences as they pursued their careers.

Overall, the tone of comments was generally that collaborative implementations are valuable for teachers and pre-service teachers and their students. However, it was revealed that where the teacher was conservative, pre-service teachers reported that they felt 'held back'. Conversely, some teachers were disappointed when pre-service teachers did not experiment and try new things for fear of failing their practicum.

Phase 5: Reflection

The amount of reflection built into project designs made considerable difference to the efficient running of the program. In most projects, some mentoring or at least school visits by teacher educators provided opportunity for reflection and support. In reports, pre-service teachers and teachers expressed the need for more structured reflection and facilitation of action-learning processes during implementation and after the project's formal classroom activities were completed.

Some projects built the notion of reflection around student-learning outcomes. In this vein, the New South Wales project required teachers and pre-service teachers to measure the impact of the activities on student learning. Similarly, in the Queensland project, the moderation of tasks provided the vehicle to examine the impact of the project on the quality of student work.

Where projects had a social reflection model, like action-learning and reflective conversations, participants provided positive comment about the power of the reflection process. The New South Wales and Victorian projects identified the development of a new culture in professional practice and conversation, and a desire for deep learning experiences. For those projects that relied on surveys as a private post-reflection process, participants did not acknowledge they had participated in a reflective cycle.

The practicum also came under scrutiny during reflection sessions. It was acknowledged that the practicum is a pre-service teacher's opportunity to demonstrate their implementation skills. Hence, the innovative and exploratory nature of projects generated inhibitions both by pre-service teachers and teachers but often in different ways. Pre-service teachers were cognisant of the assessment paradigm underpinning the practicum and the potential that this might reflect badly on their final grade. Teachers, on the other hand, reported that it was useful as in a practicum situation the project presented them with opportunities to see their pre-service teachers and students' reactions to ICT within the designed pedagogical approach.

Where the level of interaction and professional community was high, the nature of professional conversation shifted during the implementation and reflection phases of the project from being about 'practical' implementation to teachers excited about the potential of rethinking their own practice. In a model for professional learning that embeds ICT in learning, reflective activities need to be deliberately included during into the project design to maximise professional learning.

4.4 Innovative approaches

The PICTL study was designed to be a catalyst for the development and conduct of state and territory projects aimed at assisting teachers and pre-service teachers to learn from implementing an ICT experience in classrooms. Although being innovative, leading edge, or showing leadership was a strong motivator in designing these projects, deciding what aspects of a project's design were innovative was usually very subjective and depended on the experiences of the partnerships and the focus of the project. In general, 'innovative' meant "new and different for us". It was often the case that specific practices undertaken within a project might not be considered new and different across the country.

The innovation in projects varied enormously between the states and territories and even within project design. The following data are organised to display this diversity. 'Innovations' are collated under the following five general areas: in-service teacher education design, pre-service teacher education design, classroom applications, partnerships, and uses of technologies.

Australian Capital Territory — innovative approaches

In-service teacher education design

Using new collaboration technologies in collaborative projects to develop new pedagogies.

Exploiting characteristics or attributes of the technology to document student progress and thinking.

Analysing these data through professional reflective conversations.

Pre-service teacher education design

Using a Secondary Teaching Studies unit of work to provide pre-service teachers with an opportunity to explore the pedagogical potential of new technologies not often used in schools.

Using new technologies in the unit as pedagogical approaches — modelling practice and striving for anticipated outcomes.

Using 'Zing' and other systems for focus group discussions, providing pre-service teachers with some control over the design of programs by collecting information from them and developing visual maps of their responses.

Classroom applications

Using new technologies to develop collaboratively-constructed spaces.

Giving students ownership and control of the spaces — not just using spaces constructed and restricted by adults.

Partnerships

Establishing relationships by designing and implementing a 'working relationship' between school and university personnel around real projects.

Constructing the partnership through working together in a 'shoulder-to-shoulder' activity rather than a top-down partnership approach.

Using research to generate knowledge that can be used in future decision making about adoption of new technologies.

Uses of technologies

Using a variety of interactive and collaborative tools to encourage pre-service teachers to explore 'personal-learning landscapes' and knowledge creation.

Developing dialogue through a critical mass of community posts and personal spaces in an open charter, to explore the potential of the technology as a personal, curriculum and pedagogical tool.

Using open-source software to have more flexibility in developing student-centred designs of curriculum tasks.

Enabling schools to be better prepared and ready to address new technologies.

New South Wales — innovative approaches

In-service teacher education design

Linking ICT integration and ICT as a pedagogy into the Learning to Learn philosophies. This 'Linking' was central to the design and innovative appeal, and contrasted to previous programs which had focused on ICT and Learning to Learn strategies separately.

Facilitating the design of measures of integration (value-added criteria) as a way of helping teachers plan for, recognise and collect information about the impact of ICT on learning.

Sustaining momentum in learning teams across distances through meetings and ICT use.

Adopting district-wide a single philosophy enabling schools' learning teams to have common ground with those at other schools and thus build community between them.

Designing 'visual confirmation' of the success of using ICT in Learning to Learn philosophy in local regional schools as a powerful awareness-raiser and buy-in strategy.

Targeting ICT leadership in schools.

Promoting equality of roles in learning circles or partnerships.

Pre-service teacher education design

Ensuring equal status in the relationship between pre-service teachers and teachers, by attending the program together as professionals and working together as colleagues.

Taking pre-service teachers into remote schools. Multiple communication points and mediums in a short project — intense, focused and concentrated.

Developing a holistic learning model for pulling agendas together that are often separated into subjects in the university program.

Classroom applications

Taking advantage of the high level of existing knowledge of both ICT skills and Learning to Learn strategies as a pedagogical background. The pedagogical approach dominated designs of classroom activities rather than curriculum applications of ICT themselves.

Partnerships

Linking to the regional CAP structure to work collaboratively with local schools and local agendas.

Building pre-service teachers into the local district education initiatives.

Developing more formal relationships with CAP is important locally and new in some ways, but possible because of existing professional relationships.

Using the capacity of CAP Coordinator as a leader. It is increasingly unique to have ICT leadership in regional areas, and where they exist, there is regional direction, with all schools working in a similar way, rather than floundering on their own. This supports university work, as programs can focus on established local directions.

Structuring equal status on the management team for project partners where each had strong hands-on role in all parts of the project including design, implementation, review and report writing — a rich partnership.

Northern Territory — innovative approaches

Pre-service teacher education design

Using remote practicums to provide pre-service teachers with opportunities to develop interest and expertise of teaching in Indigenous communities.

Classroom applications

Using digital portfolios as the common ground between pre-service teachers and teachers had potential for professional purposes and for use as an assessment strategy.

Complementing this approach with the use of online collaborative tools.

Queensland — innovative approaches

In-service teacher education design

Using pre-service teachers as innovators in schools with new ideas not previously tried — an experimental approach for early adopters.

Developing ICT leadership or ICT champions in schools to sustain innovation.

Using activities and a database/repository of a Professional Development College culture based around New Basics innovations.

Creating the impetus and context to encourage ICT integration in new and possibly untried ways. There was a diffusion of innovation process and sets of strategies to support the processes necessary to sustain learning.

Pre-service teacher education design

Improving the breadth, depth and application of ICT in student work by pre-service teachers taking a leadership role.

Establishing pre-service teachers as those with important skills and knowledge in the school setting. The pre-service teachers' connections to ICT suggested that they can step outside of the rigid hierarchical apprenticeship of the traditional practicum towards a more inclusive model of professional induction, initiating innovation while drawing on the expertise of school-based champions.

Allowing pre-service teachers to work in new spaces, with new identities and with new partners.

Focusing this work on a well-defined and structured curriculum program with strong curriculum framework and productive pedagogies. This enabled a suite of projects to be conducted through multiple pathways in the university program.

Enabling a strong holistic approach to be maintained on New Basics and use of ICT in the curriculum framework. Project-based learning occurred in internship, independent project or structured volunteer work. This was a revolution rather than an evolution.

Mentoring pre-service teachers as they undertook the process of initiating innovation, as they dealt with teacher and school resistance/inertia and as they took on a leadership role rather than following practices in the school.

Developing a more inclusive model of professional induction than the hierarchical model of apprenticeship.

Classroom applications

Improving the breadth, depth and application of ICT in rich tasks in New Basics schools.

Pushing the school experience to a new dimension by utilising a very wide range of technologies and applications.

Enabling pre-service teachers to be leaders in the local region.

Partnerships

Developing partnerships with ICT innovators or champions in schools.

Creating a renewal model around early adapters and ICT champions.

Renewing experienced teacher interest to try new things rather than always working with teachers who are 'catching up'.

Developing schools capacity to nurture and foster pre-service teachers' leadership and the need to motivate pre-service teachers through interesting projects in schools.

Building the capacity of partnerships within a remote school cluster to improve local environment and build professional community around its ICT leadership.

Becoming a supplier of specially trained new teachers for local schools.

Managing diffusion through the partnership model where process and strategy are interwoven with action learning.

Uses of technologies

Identifying technologies such as new robots, kits and applications on pre-release to the global market.

Building case studies for general community. Everyday collaborative spaces were used to form the social networks of students with pre-service teachers who are the 'digital natives' of such spaces.

Developing databases to support projects and to attract young and new teachers to be enthusiastic, motivated and innovative in their classrooms.

Using technologies within the diffusion of innovation cycle with a project management approach — ICT integration as the trend and schooling system as the focus for diffusion.

Shifting from the focus on local innovation and school champion to a managed focus encompassing knowledge sourcing, knowledge sharing and knowledge dissemination in classrooms and between schools.

South Australia — innovative approaches

In-service teacher education design

Locating activity within the existing pedagogical approach of teachers.

Infusing ICT into the model as a basis for further professional conversation about rethinking pedagogy to account for new tools.

Planning professional development in ways that are sensitive to the current pedagogically knowledge and practice of teachers.

Using the opportunity of pre-service teachers in schools as a way of raising awareness of the capacity of a new online suite of tools within two school communities.

Pre-service teacher education design

Providing intense additional mode of support and mentoring.

Enabling core learning to be identified and delivered in a just-in-time rather than just-in-case mode.

Using pre-service teacher projects as a chance to leave a legacy in the school and for the professional community generally.

Classroom applications

Using eduCONNECT as a new online suite of tools, though less features available than normally expected in an online learning system.

Partnerships

Giving 'authority' to the use of new technologies in schools by being visible and hands on — delivered the message that this was the Departmental system.

Involving a systemic unit in an everyday hands-on mode, in management teams and steering committees resulting in far ranging implications for everyone.

Providing a school system person as a dedicated resource to this project.

Uses of technologies

Incorporating instructional design principles rather than just teacher intuition of visual and cognitive appeal.

Tasmania — innovative approaches

In-service teacher education design

Co-developing a unit with pre-service teachers and teachers in advance of the practicum period and implementation, with advice from external mentor to the pre-service teachers. The time for this was paid for within the project.

Focusing on information literacy approaches provided by Department meant teachers were focused and enthused.

Pre-service teacher education design

Providing additional time with teachers to plan the practicum experience.

Focusing on information literacy as a pedagogical approach within the Essential Learning Framework at the same time as their supervising teachers — "seemed real and on the same page".

Classroom applications

Encouraging individual creativity that draws together the new Essentials Learning framework, information literacy and ICT in a holistic approach that came together in a classroom unit.

Partnerships

Paying for teacher time provided an opportunity for principals to say "yes".

Victoria — innovative approaches

In-service teacher education design

Initiating an intense model of support for a term, albeit a short term and the high expectation that the in-service model would deliver changing attitudes, capacities and improved knowledge.

Emphasising the human aspects of ICT and focusing on ongoing motivation of teachers in a holistic model.

Focusing on deeper transformations — exploring how teachers might fundamentally change their perceptions of and interactions with ICT, rather than see ICT as an add-on.

Emphasising the holistic development of individuals; attitude, passion, motivation, perseverance, inquisitiveness, confidence and celebration in the design, activities and conduct as the subject matter of the professional learning program rather than ICT themselves.

Using a narrative model for deprivatising practice in an adaptation of action learning. Focusing on philosophies of using ICT in schools and measuring change over time.

Pre-service teacher education design

Working as equal professionals in the learning, planning, implementation and reflection phases.

Participating in the same professional learning as experienced teachers enabled pre-service teachers to feel professional.

Classroom applications

Focusing on multimedia — visual and holistic view of media and literacy.

Partnerships

Trying ideas and putting in time and energy to achieve them, is helpful.

Using teachers and pre-service teachers who were dedicated to try new ideas. The teachers were also dedicated to the partnership preservation, to maintain a link between the Catholic university, the Diocese and the Catholic schools. The parochial regional and systemic commitment was strongly valued by all.

Western Australia — innovative approaches

In-service teacher education design

Using a predefined and prepared program of credentialed modules of learning delivered in a school setting to large cohorts of teachers to invoke critical mass. This was designed to assist teachers to develop readiness for pre-service teachers who would use ICT during a practicum experience.

Implementing a whole-of-school model involving a critical mass of teachers at one site. Providing teacher educator support as needed.

Establishing action learning in schools as a professional learning model.

Participating in an action research model for lecturers to gain case studies for use in coursework.

Using constructivist approach as a pedagogical focus was new in the local context.

Partnerships

Using existing partnerships with a formal agreement around support for additional commitment on both sides as a basis for selecting schools, and developing the project. This is an excellent example of the benefits of long-term partnerships with schools or districts.

As the participants involved in the state and territory projects were at different stages in their knowledge of ICT, experience with ICT and curriculum reform and developments, it was expected that such differences would be manifested in the projects. Hence words such as 'exploratory', 'experimental', 'groundbreaking' or 'innovative approaches', especially when using ICT in schools, can take on very different meanings. These differences in meaning created dilemmas when describing the findings. It seems that the state and territory project teams had to choose between either mainstreaming ICT into pre-service teachers' and teachers' activities in everyday classrooms, or consider 'cutting new edges' into innovative pedagogies and innovative uses of ICT. In the end, projects chose the agenda they would address, based on local needs or beliefs.

A core question underpinning the PICTL study was, given that use of ICT in classrooms needs improvement both in depth and scope: How might this improvement be addressed? As all education jurisdictions were moving to consider new curriculum and pedagogical frameworks, it seemed a timely opportunity for some projects to consider these initiatives together with evolving ICT practices. The evidence provided here is that improvement may be addressed by simultaneously considering professional learning for pre-service teachers and teachers, and that this has the potential to accelerate quality ICT pedagogy activity in schools.

4.5 Successful innovative approaches

Innovative elements were identified in many aspects of the state and territory projects. These elements could be found in the designs of the projects, in how the phases assisted the learning journeys of the participants, in the way experiences were designed for the participants, in the way partnerships were formed and nurtured and in the new and different ways the partnerships went about doing business for local professional learning programs. Projects promised innovators an interesting new journey and all projects delivered on this promise. Some elements of the projects were unexpected, intriguing and offered insights into the recommendations being drawn in this report.

There are five parts to this section. These are pedagogical approaches with new technologies, ICT leaders in schools, beginning where teachers are at, credentialed learning and formal models, and regional universities providing remote activities.

Pedagogical approaches with new technologies

Traditionally, members of the professional ICT community who are early adopters, undertake an exploration period with technologies to abstract the qualities which have application in curriculum and which can be taught to peers and students. The approach in these state and territory projects differed from this 'normal' way of proceeding. The catalyst for the different approach was the partnerships formed. This meant traditional early adopters were not a lone voice.

An important feature of the projects was that pedagogical frameworks were used to explore the potential of the technologies. While the collaborations used new technologies for the jurisdictions, schools and teachers, the approach for infusing innovation focused on using pedagogical approaches in new ways. In three projects, the Australian Capital Territory, Queensland and South Australia, the subject matter of the projects in the school setting was innovative and new. This approach was also strongly represented in New South Wales project and to some extent in the project from Victoria. These projects represented quite a shift in practice for early adopters and innovators.

The notion of professional conversations about pedagogy was successfully implemented in the New South Wales project where the program deliberately aimed to infuse Learning to Learn strategies into how teachers understood and then used ICT within the curriculum. This innovative tenet offered much insight into models for mainstreaming ICT in classrooms and the professional learning frameworks that best support this. The New South Wales project added an innovative dimension to the framework to emphasise the learning outcomes for pre-service teachers, teachers and teacher educators, suggesting that having awareness of approaches and trying them was necessary but not sufficient. Teachers needed to measure the impact of the pedagogical approach and how ICT improved the pedagogical approach and depth of student learning. Measuring this 'value-addedness' of ICT to the pedagogy developed a culture that questioned the value of ICT and whether student learning deepened or improved.

Designing simple measures of assessment was powerful for teachers, because they needed to make decisions about what was important in their pedagogy and what was important and observable in student learning. Although curriculum frameworks and professional standards for teachers provide some examples of such measures, the constructivist process where teachers designed their own measures caused a depth of reflection before and during implementation that was not observable in other projects.

Making observations of the measures, and then formally analysing data, provided a basis for curriculum design decisions. This process was very influential in helping change teacher practice in ways that appear sustainable long beyond a teacher's journey though this project. This innovative component of the framework has significant implications for the design of both in-service and pre-service teacher education. Tertiary staff in the New South Wales project also reported that this aspect had a strong impact. It was influential in them altering their practice and understanding of ICT for their teaching and the subject matter of their units.

The dialogue around the pedagogy of new technologies offers a robust professional conversation, which is likely to appeal to a broader cross-section of teachers and thus generate a greater commitment than a technical or skills conversation. This professional learning approach is perhaps a significant innovation within the projects, one which when implemented and documented, could shape the future of professional learning programs around the adoption of ICT. Such an approach may well shape a new and more powerful framework for the diffusion of innovation from early adopters to early users and then to other teachers.

ICT leaders in schools

ICT champions in schools often deliver professional learning to their peers and use school professional development budgets to improve the uptake of ICT in the school. Individuals often initiate professional learning in their own time, with their own resources, because it is experimental in nature. It appears that many are cautious about using precious professional funds for such purposes.

Most projects used approaches that attempted to mainstream ICT. In general, projects were aimed at teachers wanting to extend their experiential knowledge of ICT use in their classrooms. Some projects' innovation (Queensland, South Australia and Northern Territory), however, was to target the ICT leadership or local champions in schools, and to help generate a culture of innovative practice being facilitated by very competent pre-service teachers.

The model in Queensland in particular, illustrates the potential for designing simultaneous professional learning for innovators at different stages of their careers. To a lesser extent, the projects in New South Wales, Victoria and Tasmania involved some ICT leadership in schools who used the collegiality of their learning partnership, to extend their innovative nature to the learning team, developing a culture of innovation that had infectious qualities within and outside of the partnership.

As a result of projects some pre-service teachers wanted now to be the innovative early adopters in schools and had the social capital of knowledge about new innovative technologies and ways of using them. To realise the potential of such capital, they reported that they needed to be able to step outside of the hierarchical apprenticeship model of the traditional practicum to contribute to their own professional learning and contribute to the learning of the ICT innovator and the school's innovation journey generally.

In some states and territories, the projects deliberately aimed at local champions, sanctifying experimentation and providing a professional community for the early adopters in schools. Emerging from all projects is the view that the enthusiasm and knowledge of pre-service teachers can be nurtured and used to support and realise innovative potential in schools. The results of these projects suggest that pre-service teacher innovation with local champions is powerful for their respective learning journeys but also for the quality of the schools uptake of innovation.

Beginning where teachers are at

Many projects reported a sense of inertia in schools around ICT use in general, and innovation with ICT in particular. The unique aspect of the state and territory projects, using pedagogy to drive the designs of classroom experiences rather than ICT, also revealed some inertia in the pedagogical approaches generally adopted by teachers. Didactic models of teaching dominate, particularly in secondary schools.

In the state and territory projects, an innovative approach that bore considerable success was to meet teachers at their level of pedagogically awareness and to use pre-service teachers' experimentation as the strategy to raise their awareness of small changes to pedagogies while using ICT. Further, in the core Professional Development Framework, teachers were asked to plan, or co-plan the experience, thus becoming involved in experimentation through a pre-service teacher's experience. The mainstreaming nature of the projects meant that teachers saw what happened with their classes in their classrooms in their schools. This was more convincing than stories from different settings.

The model for professional learning in the Victorian project offered a further unique and innovative characteristic. The project's core tenets centred on a holistic view of the individual teacher's talents and needs; attitude, passion, motivation, perseverance, inquisitiveness, confidence and celebration in the design and conduct of activities. The narrative-reflective framework applied to this project enabled teachers to identify and deprivatise their needs in a social sharing community. They used their beliefs about themselves, learning and pedagogy as the basis through which to interpret the use of ICT within their curriculum framework.

The resultant uses of ICT and the pedagogies adopted in the classroom represented sustainable changes (or transformations) of practice, according to the teachers and pre-service teachers who experienced the process. This innovative approach to underpin the choices about which conversations are conducted and how they are conducted offered considerable insight into models for pre-service teacher and teacher learning.

Overall, transcripts and interviews with teachers illustrated that this innovative professional learning strategy was successful in creating some momentum for change. For others, the change was transformative. In such cases the pre-service teacher's journey too was rapid, satisfying and likely to be sustainable. The synergy of the learning that has taken place for pre-service teachers and teachers was seen to accelerate the pedagogical journey of both learning partners.

Credentialed learning and formal models

The Western Australian project was built on the availability of established modules of learning from a pre-defined course at the university. The modules were organised so that they were relevant to teachers in schools. They could be delivered promptly in a school setting and represented a powerful way of immersing large numbers of teachers in one setting using ICT in classrooms. This enabled a school to become prepared to offer a practicum segment that focused on ICT in learning in a very short timeframe.

The project also uniquely contributes the story of long-term benefits of a learning partnership between the university and local regions and schools. The teachers had a propensity to want to work collaboratively with the university and valued the benefits they received as a partnership school.

The Western Australian project offers insight into the potential of collaborative partnerships with long-term horizons. It also illustrates the type of agreements and infrastructure necessary to sustain such partnerships. The approach taken towards building readiness in schools as a concept offers insight into mechanisms for improving the way ICT may be used by large numbers of teachers.

Regional universities providing remote activities

The state and territory projects in regional universities innovatively used this sense of local community to meet precise and unique needs. This was driven by a need to retain local expertise and knowledge and support the development of a local region through building capacity in its people. There was a commitment to regional universities from rural schools and conversely regional universities had a deeper sense of responsibility to their local educational community.

Regional universities who conducted projects in New South Wales, Queensland and Victoria added depth and focus in unique ways. Those projects in which there was one university servicing a broad but local region experienced a sense of shared regional focus that all partners celebrated.

These three projects offered some models for remote practicum and the development of projects designed to meet the needs of remote areas that appeared sustainable. The logistics and expense of designing and servicing remote activities present unique challenges to the point that achieving a remote practicum cycle is an innovation and a rarely delivered experience.

Research findings: Strategic partnerships

5.1 Introduction

Strategic partnerships between schools, universities, and government and non-government education jurisdictions supported the collaborating professional learning teams as they undertook their projects. These partnerships were based upon a range of structures from hierarchical with very formal agreements to flexible with less formal arrangements. The nature of partnerships impacted on the long-term sustainability of the projects and the likely capacity of the partnerships to extend or duplicate the activity.

There are four research questions related to this theme.

RQ 2 To what extent do the various groups (schools, universities, government/non-government authorities) succeed in working together to achieve the desired outcomes?

RQ 3 What are some of the challenges in trying to implement successful partnerships between differing levels of educational bureaucracy (e.g., governance issues, organisational issues)?

RQ 7 To what extent was it possible or necessary to transform teaching and learning environments and practice?

RQ 8 What were other barriers and critical success factors impacting upon the success of the strategic professional development partnerships?

This chapter addresses the four research questions relating to strategic partnerships listed above. In particular the four sections describe, respectively, the extent of collaboration, challenges for partnerships, transformation of the context, and barriers and critical success factors.

5.2 Extent of collaboration

The partnership nature of the PICTL study required that the various groups (schools, universities, government/non-government education jurisdictions) work together to achieve the desired outcomes. The nature of this collaboration varied across state and territory projects.

Australian Capital Territory — collaboration

This partnership was established between two schools and the University of Canberra. A small steering committee of school and university representatives created opportunities for schools to be selected and to provide general support to the university staff. The partnership is yet to engage in extensive activity.

The steering group was bound by a common desire to work beyond current practice and explore the next generation of pedagogical approaches with new tools. School-based activity occurred in some schools represented on the steering committee. The school system was not involved in the project.

New South Wales — collaboration

This partnership grew from existing professional relationships in the local region and involved the local Country Area Program region and the University of New England. A representative management team was formed to design and implement the project. The members of the management team were directly and equally involved in all phases of the project. This team had a common bond from the shared problem of attaining and retaining teachers in remote and rural areas. The partnership was vigorous, with strong structure, regular meetings and collaboration in all phases.

The partnership was supported by a steering committee. This is a highly successful and influential partnership. Ongoing and new projects have now been established in the partnership.

Northern Territory — collaboration

The partnership was mediated by and involved Northern Territory Department of Education officers, principals from identified schools and Charles Darwin University staff. The partnership was difficult as the relationship between the groups was complex and at times unhappy.

One school had a direct relationship with the university and was able to use the partnership for positive outcomes and wished to continue activities.

Queensland — collaboration

The partnerships were initiated through direct approaches from the James Cook University to schools, using established personal contacts. School principals and lecturers met to establish the extent of school involvement. The focus on innovation in New Basics attracted some schools and not others. The project involved extensive in-school activity.

An informal steering committee met occasionally. The local education region was not actively involved.

South Australia — collaboration

The partnership involved the University of South Australia and the Technology School of the Future (TSoF) with the latter as the managing partner. This management structure resulted in the appointment of a project officer from the TSoF for the duration of the project. A small management team consisted of personnel from both partners. The direct involvement of TSoF in implementing Department systems enabled the partnership to overcome barriers by changing policies that were not seen as practical. This ensured a strong partnership where the commitment to the project was valued.

A larger steering committee of personnel from within the university and the Education Department ensured a high profile and a level of authority to the project from both partners. Partners are now planning further joint activity.

Tasmania — collaboration

The partnership involved the University of Tasmania directly supporting volunteer schools across two large districts with resources to participate. School activity was limited to involvement for supporting pre-service teachers on their practicum. A liaison officer from the Department supported development of the practicum and general implementation of practicum arrangements.

A steering committee of university and Department personnel were actively involved in mentoring as well as providing advice to the project. An old agreement between partners was seen to hamper progress.

Victoria — collaboration

The partnership with the Australian Catholic University — Ballarat was facilitated by the Diocese through the Catholic Education Office at Ballarat. The Diocese was keen to value and support the local university group, given such a link had not been possible previously within the Diocesan structure. Schools involved valued the relationship with the university.

The Diocese and university staff formed a steering committee with stakeholder representatives. Partners are keen to provide access to the school for university staff and pre-service teachers in the future.

Western Australia — collaboration

The partnership was underwritten by a formal and long-standing agreement to support collaborative research projects in schools, practicum arrangements, mentoring projects and requests for support. The partnership was between regions and Edith Cowan University at one level, and several schools in these regions. The university has a committed liaison officer and schools nominate a liaison person.

A steering committee involved regional staff, university personnel and principals. Activity within the partnership occurred before and after this project.

In general, partnerships (involving schools, universities, government/non-government education jurisdictions) were formed through personal relationships constructed, or already existing among key staff of the project. These staff had a determination to improve ICT use in schools and to provide a common context in this work for learning opportunities for pre-service teachers, teachers and teacher educators. This meant that project partners were in a strong position to work together to achieve project outcomes.

The cooperation of schools was required to support pre-service teachers' experience in classrooms. The process was often difficult and the relationships tested when occasional complex situations with pre-service teachers required intervention and additional work by one of the partners. For some teachers, one less-than successful pre-service teacher experience was sufficient for them to decide never to host pre-service teachers again. In such circumstances, projects centred around practicums can either be seen as more work or can be seen as an opportunity to renew learning, to support the profession and generally to help re-establish a link with professionals from outside of the school.

In all partnerships where a sense of belonging was expressed, partnership structures supported the relationships of the individuals involved and all have expressed desire to work collaboratively again. Often, individual relationships were used to build and sustain the project activity and to leverage a relationship between institutions, a necessary extension if partnership were to be sustained beyond the PICTL study. In rural settings, the partnerships were strengthened by local loyalties and preference for supporting groups and activities with a strong sense of community.

Project management duties were often shared in the partnerships. Some states were determined to spread the load of the project evenly across the different partners. Where people representing education jurisdictions were involved in management teams and steering committees, issues were resolved more quickly, additional opportunities generated and a sense of sustainable and continuing activity was created. In some projects the involvement of local regional education personnel was preferred over involving centralised groups, with both providing authority for the partnership and projects in the institutions, and promoting both the goal and outcomes of the project. This enhanced the impact of the project locally and the value of the partnership.

The Western Australian project used an existing and formal partnership to host the project and deepen the relationship with partnership schools. The schools and the university have signed a memorandum of understanding with co-signing at local district level, enabling dedicated personnel to form a fabric of infrastructure that supports and generates activities in the partnership.

The value of steering committees varied across projects. In some, very little input was needed to establish, monitor and guide projects. In others, steering committees were formal, structured and met regularly. Generally, the formality of a steering committee, provided it did not become overbearing, added considerable value to the project and generated conditions for the development of future projects.

The suite of state and territory projects was extremely successful in having teachers renew their commitment to working with universities and pre-service teachers. It generated a positive working culture among institutions. In this context, the benefits of the PICTL study extended beyond the people who became directly involved in state and territory project activities.

5.3 Challenges for partnerships

Early in the PICTL study, implementation when partnerships were being developed, the complexity of establishing partnership agreements was highlighted. Attention was drawn to the procedural practice required to establish relationships, partnerships and project plans and schedules. Once the necessary parameters were put in place, attention diverted to the success of the project work itself and the partnerships formed.

Two factors emerged as significant in the early phases of the study, particularly during the design. Firstly, where existing partnerships had been established, the synergy between the partners could easily be harnessed and applied to these new projects. Secondly, where people had personal professional relationships, they could persuade their institutions to work together. This enabled many project teams to establish partnerships, and design and implement their projects within the available timeframe.

Implementing successful partnerships between differing levels of educational bureaucracy created a variety of challenges, especially around governance and organisational issues.

Australian Capital Territory — partnership challenges

This project was designed to generate innovation and push boundaries of policy and practice with respect to ICT use in schools. ICT systems not supplied by the Department were used to explore the ideas in the project. Care was taken to ensure the complexity of such an initiative did not cause undue strain in the partnership.

In this partnership, the key challenges revolved around dimensions of time. It was difficult, and as it turned out nearly impossible, to find blocks of common time in a school year where schools and university calendars matched. Schools operate 5–10 day cycles and universities operate an extended day beyond school hours. Common periods were needed for pre-service teacher activities in schools. Further, it was difficult for people involved to find time to participate. The intensification of workloads in universities and schools creates complexities and requires streamlined, efficient management, an opposing paradigm to exploratory open-ended trials of ICT ideas.

New South Wales — partnership challenges

This project partnership was designed for even workloads, responsibilities and rights. The subsequent hands-on involvement of the project managers meant that issues were identified and resolved as management matters in the day-to-day operations of the project.

There were some complexities early in the project to enable pre-service teachers to undertake activities in schools in New South Wales. Working through structures to obtain permission for participants were difficult because the procedures were complex. The ethics and intellectual property clearances at the university added to the workload in establishing projects. A long lead-time was necessary to design and establish projects and complete administrative formalities. The university research group required formal contracts with ACSA to participate in the project.

Northern Territory — partnership challenges

In this partnership, the Northern Territory Department of Employment, Education and Training wanted a strong hands-on approach to design and manage, but was unable to supply officers with sufficient time to follow through on activities. This caused delays in the project, missing a 2005 practicum timeframe because agreements could not be reached. The university ethics clearances and contract development took a long time. Different philosophies to professional learning meant differences in the culture of ways of working created an unhappy relationship in this project with the institutional relationships struggling to be positive.

Queensland — partnership challenges

In this partnership, informal arrangements were preferred by the schools, which had considerable autonomy as part of Queensland's school-based management. The university staff members visited principals and established projects without formal processes. An information memo to the District Director enabled the projects to be pursued. University ethics clearances and contract development were necessary but progressed relatively smoothly. The university now demands shared intellectual property rights for Commonwealth and State funded projects, something that needed to be negotiated in this case, but was easily achieved.

South Australia — partnership challenges

In this partnership, the Department was the managing partner of the project and provided human resources to support the project ensuring that this project different from all others. This enabled many issues within Department systems and processes to be resolved quickly and determinedly, to the point that policy on pre-service teachers' access to systems and other minor issues were changed to accommodate this project and future projects for the partnership. Having the Department as a managing partner did, however, result in some slower processes. Contract signing, releasing reports and responding to invitations takes an extraordinary amount of time and seems not to progress without numerous and frequent reminders. The workload of the university staff adds complexity to project management. The university had difficulties in staffing additional projects, so all project work done was by volunteers, requiring university staff to undertake considerable extra work to manage the project and partnership processes.

Tasmania — partnership challenges

The partnership was relatively easily established and an existing agreement between the university, teachers' union and school system provided the expectation that university projects in schools were covered in the agreement. The agreement was, however, more than 20 years old and did not extend to the activities of the project. In this project pre-service teachers were frustrated with lack of access to ICT systems and processes for ICT support. The project provided an impetus to review the past agreement, a process ongoing beyond the timeframe of the project.

Victoria — partnership challenges

The collaboration between the university campus and local Diocesan office, along with the nature of the project meant there were no challenges in setting up the partnership. Nevertheless, completing the university ethics and contractual arrangements was an extremely long and complex process.

Western Australia — partnership challenges

This project's partnership with two local regional groups rather than systemic involvement had already been established. Consequently, implementation was simple and could be explained as 'expected'. The workload of the few university staff involved meant that servicing intense projects was extremely difficult, with reports from that university suggesting that without formal partnership arrangements already in place, participation would have been impossible.

With recent amalgamations and multi-campus developments, the university structures had become more bureaucratic and hence diverse processes and procedures were necessary to maintain integrity and capable management. All universities had different procedures. In order to provide funds to support the state and territory projects, separate contracts were required. A decision was made to offer contracts to all universities. This meant that each university looked after its own financial details within an allocated sum rather than all payments being processed through ACSA. The implication for many universities was that they needed to undertake an involved process within their university to access funds as well as the high workload associated with meeting ethics clearances, shared intellectual property and copyright conditions.

Although each university partner claimed all the universities would want similar conditions and have similar processes, as "this was how research business was done", there were different procedures, processes and conditions in every university. In South Australia, using a government department as the managing partner, the process was still laborious and complex. In order to finalise contracts, legal consultation was sought. The time to complete these processes was extraordinarily long, the stress and workload on the people involved caused many to conclude in their interim reports that the effort was not commensurate with potential outcomes. Interestingly, once past these administrative hurdles, the pain was put aside and people rejoiced in their project outcomes.

There was also considerable variety between states/territories with the level of bureaucratic process required for collaborative projects involving teacher educators and pre-service teachers in school settings. There was growing administrative hurdles for pre-service teachers and teacher educators in obtaining permissions required under child protection legislation. This was time-consuming for some but it appeared that there were signs that the bureaucratic process was becoming more streamlined. In New South Wales there were additional permissions required and this process was very long and complex.

The formality of steering committees in the projects impacted on the level of bureaucratic process. In some states, formal steering committees were deliberately not used, so as not to add a layer of complexity including additional permissions and accountability into the process of "getting on with the job". In other states, the steering committee structures provided a strategy to ease bureaucratic process. In the case of the Northern Territory, the steering committee process added complexity and a bureaucratic layer to the organisational process. Despite the issues raised, the bureaucratic process was relatively manageable at local levels because of the personal relationships and partnerships that were already in place.

5.4 Transformation of the context

An important component of the PICTL study was the extent to which it was possible or necessary to transform teaching and learning environments, as well as classroom practice, to achieve the outcomes of state and territory projects. These projects were designed with the charter that new pedagogical approaches would add dimensions of quality to ideas for using ICT in classrooms, and that pre-service teachers would value the opportunity to interpret ICT use in schools from this perspective. Pre-service teacher use of ICT in the classroom was designed to raise awareness of ICT pedagogy and assist schools to approach ICT professional development in new ways. This section considers ways the state and territory projects could be seen as transformational of their context.

Australian Capital Territory — transformation

This project investigated the transformation necessary for strong pedagogical and curriculum use of new collaborative online environment tools. It was concluded that new technologies and new pedagogies required considerable transformation of environments, models of learning and general pedagogical approach to enable asynchronous and synchronous communications and publishing by pre-service teachers. The new tools and the spaces they create are quite different to asynchronous and information environments currently used by early adopters in schools.

Rethinking pedagogy in these more flexible spaces has the potential to reshape how curriculum reforms are interpreted. Pre-service teachers needed to have control of the technologies and not to be seen as passive clients, a demand that is difficult to achieve in the locked and restrictive online environments in most schools and school systems. The one-size-fits-all solutions, and policies usually determining what pre-service teachers were able to do at school with ICT, are not amenable with some schools' innovations and different approaches to learning.

The framework of the MCEETYA Pedagogy Strategy was embedded into the project design. This promoted pre-service teachers as producers of knowledge and designers of systems rather than consumers of information and passive users of systems. The project team discovered that many teachers were not ready to change to such a pedagogical stance and did not interpret current curriculum documents in this way. It appeared that in order for the potential of new collaborative spaces to be realised, considerable change was needed in schools to develop a culture of innovation, risk taking and change, and that access to new tools was simply the first step. Teachers had little understanding of what they do not know and use.

In this project, pre-service teachers reported that it was extremely unlikely that they could find teachers willing to try the new technologies and new pedagogical ideas in their practicum schools. Hence the project shifted design and began to work with some willing teachers involved in schools represented on the Steering Committee. The purpose was to build up case studies to illustrate the potential of the anticipated pedagogical approaches in new collaborative online spaces. The culture had to be created, because it did not exist in schools.

New South Wales — transformation

This project drew its pedagogical basis from the Learning to Learn strategies that had already been implemented in CAP schools. The teachers asked to participate in the project, had participated in previous in-service activities and had begun to use the strategies in their classrooms. The design of the project drew together ICT use and the Learning to Learn strategies.

There was a perception that the culture of the learning environments had already incorporated the Learning to Learn philosophies. In general, the schools were also high ICT using schools and teachers self assessed their ICT skill ability as high. The quality and depth of ICT activities given to pre-service teachers was the focus for professional learning events, including mentored collaborative planning. Although the context for developing ICT pedagogy was in place, developing the culture of mainstreaming ICT use was an important goal of the project.

Northern Territory — transformation

In this project, the pedagogical basis had not been strongly established and although new collaborative tools were implemented, the pedagogical potential of them was not realised. In the senior school where a project was undertaken, the didactic content delivery model was the dominating pedagogy, thwarting efforts of the pre-service teachers to try alternative models. In the remote Indigenous school a range of pedagogical approaches was already in place and matched the potential of the online spaces and systems being offered. Pedagogical approaches vary, with schools having progressive cultures of willingness to try new ideas. The university faced the complexity of supporting pre-service teachers to be able to graduate into this range of cultures.

Developing portfolios as a way of demonstrating learning outcomes by students and teachers is not strongly established as a standard approach to assessment in the Northern Territory. The task for pre-service teachers to lead change in the use of online tools, pedagogical reform and assessment practices were ambitious. Where there were flexible practices and an innovative culture in place, one pre-service teacher had success in supporting the school's journey. This project clearly shows the importance of matching the degree of innovation to a school's capacity to take advantage of it.

Queensland — transformation

The new curriculum reforms have been implemented for six years and so the teaching and learning environments in schools where the project was set were New Basics 'seasoned'. In one of the schools, consistent with the district, the turnover of teachers was higher than 90 per cent making it necessary every year to re-establish the framework and norms of practice expected and demanded in New Basics schools. Even within this environment, adoption of innovative practices with ICT was uneven, with ICT champions relishing the opportunity to work in new projects with innovators and other teachers approaching projects with a "we'll see how it works" attitude.

In this project the capacity to take up innovation was restricted by network architectures and controls, policies and procedures, and increasing centralisation and regulation. It is this technical environment, and the management of it, that needs to be transformed.

South Australia — transformation

In this project, a new Departmental online suite of tools provided the opportunity for pre-service teachers to explore their educational potential. However, the online tools were quite narrow in function, mostly aimed at delivery of content with some capacity for interactivity. This, coupled with the didactic nature of the pedagogy of teachers involved, resulted in quality materials designed to suit the entrenched pedagogical approach. Reflection by the project team partners had already resulted in different decisions designed to illuminate a range of pedagogies and curriculum approaches. This project demonstrated how easy it was to reproduce existing practices with new technologies and that deliberate intervention was needed to transform teaching and learning practices before new paradigms of pedagogical use of ICT are mainstreamed.

Some leadership-bound pre-service teachers were able to carry important messages about the new online systems to teaching communities. Although a powerful awareness raising strategy, the project could not in the timeframe available, cause such technologies to become mainstream, even in the classrooms of the participating teachers. Extending this, pre-service teachers could contribute to the uptake of such online systems by teachers more generally, where the curriculum approaches have embedded online learning or where innovative teachers have access to the tools and a willingness to try them. Online learning is quite difficult to incorporate into classrooms because it requires a holistic change in how teachers facilitate learning. It may require quite different pedagogical approaches, ones that teachers may not be skilled at in traditional classrooms.

From the university perspective, there needed to be a demonstrated uptake of the technologies by large numbers of teachers, before it was feasible to get the commitment of pre-service teachers for using online tools. The evidence is currently not there for pre-service teachers to be convinced such technologies are used routinely in classrooms. However, pre-service teachers seeking to specialise in ICT in learning would value the opportunity to lead classes in their uses of such technologies.

Creating an expectation that pre-service teachers need to be competent and proficient users of online technologies is difficult in the current technical policy context. Access to the network systems and online infrastructure for pre-service teachers is not routine in schools or at the university. While such access needs special circumstances for it to be arranged, the subtle message sent by the Department is that ICT uptake is not expected of pre-service teachers.

Tasmania — transformation

In this project, pre-service teachers reported that the uptake of technology in schools was not as strong as they had expected. This was evidenced by the discovery of locked up equipment and complex access procedures in schools, and the complex procedures within the Department to seek support, load new software and establish student use. Although every teacher had a laptop and some growing ICT skills, the use of ICT in classrooms is not yet mainstream. Recent professional learning programs using information literacy across the curriculum as an interpretation of the new Essential Learnings indicated a fresh perspective was developing momentum in schools.

The reflections of the pre-service teachers indicated that in order to undertake transformative practice, improvement in the provision of ICT environments to them was the first significant step. Many requested the same access to services as teachers, with some suggesting the teachers' laptop scheme be extended to pre-service teachers. Pre-service teachers noted low levels of ICT in schools and the difficulty of access. Some were only able to access a laboratory environment for 30 minutes a week and not able to secure access to laptop-projector combinations.

The pre-service teachers reported that there was inconsistency in the expectations of them compared with those for practising teachers. Pre-service teachers were required to demonstrate the pedagogical and curriculum uses of ICT in the pre-service teachers' standards for practice, but that the same standard, or better, was not required of their supervising teachers. The culture of ICT use was not an expectation by the professional community or the system, as far as they had observed.

Victoria — transformation

In this project, the purpose was to transform attitudes to using ICT in the classrooms of teachers who volunteered to adopt ICT pedagogy within a collaborative environment. The project design centred around the classrooms of participating teachers, and strove to empower the teachers to change their classroom learning culture. ICT was to be embedded into the daily practice of pre-service teachers through an examination of their philosophies towards ICT and their curriculum/pedagogy.

The project deliberately aimed at classroom transformation rather than whole-of-school change. In schools though, where there existed a critical mass of ICT-using teachers and a culture of community reflection, projects were more ambitious and participants reported higher levels of satisfaction about learning from implementing classroom-based projects. There was a greater openness to their practice in the positive culture that surrounded them. The project managers reported that all participants undertook an important learning journey resulting in classroom change, which shows every sign of being sustained beyond the project.

The project aimed to transform the way participants understood and perceived ICT and ICT processes in terms of the curriculum and pedagogical demands, while also embracing personal belief systems. This provided the partnership with a basis for conversation and celebration of learning when people developed their ideas and articulated them within a reflective processes. This project provides a powerful example of a model to support non-enthusiast teachers to mainstream ICT in learning.

Western Australia — transformation

This project was designed from the premise that a critical mass of teachers undergoing change in one school would develop momentum and a culture for professional discussion about implementing and valuing the change. Hence, the project involved formal in-school professional learning that generated a sense of expectation and excitement in the school context. This model had been trialled before and was deemed by the university as the most viable way to generate a culture where pre-service teachers would be immersed with strong role models and given opportunities to explore uses of ICT.

However, pre-service teachers did not participate in this learning program, and perhaps did not therefore appreciate the transforming context. In this project pre-service teachers had their own culture and perception of schools' ICT culture. They believed that using ICT in schools was not 'normal' practice, and that using ICT was "a lot of work" to the extent that using ICT on practicums limited

their opportunities to be awarded high grades. Thus the project reported that teachers were disappointed in the conservative attitudes of some pre-service teachers in what had become an exciting place for using ICT.

This project provided information about capacity to generate a culture of school readiness to accept pre-service teachers who will use ICT and preparing pre-service teachers for taking advantage of that culture. The whole-of-school philosophy was a successful way of developing sustaining partnerships with the school, which will generate activity beyond the current participants. Involving numbers of teachers from a single school may generate sustained change in a way that using small numbers of teachers within a school cannot match.

Underlying the purpose of the PICTL study was the assumption that schools would be involved in implementing the curriculum, and relevant pedagogical frameworks being advocated nationally and within states/territories. The projects reported that the rhetoric of framework documents was often quite different to everyday classroom practice. The infusion of new paradigms takes time to move from an awareness-raising phase to a practice that is mainstream. States and territories offered two interpretations of the context in their responses. The first was to discuss ICT infrastructure and where applicable, online learning environments. The second was to consider the context of the general state of pedagogical reform in schools.

Four themes from these summaries are discussed below. These are: level of adoption of ICT in schools, building momentum, pedagogy as a necessity, and ICT as a learning environment.

Level of adoption of ICT in schools

The PICTL study sought to examine a range of ways to provide new teachers with a chance to take on leadership roles and to use them as possible change agents in schools. By co-locating pre-service teachers with in-service teachers in ICT professional learning, it was anticipated that some new in-service education strategies might be successful in helping mainstream ICT in the classrooms of participating teachers and their schools. The context for the PICTL study acknowledged that the use of ICT in schools was neither widespread nor sophisticated. Early adopters, ICT champions and lighthouse schools have always led the uses of ICT in schools. The celebration of their work by systems, schools and professional associations entrenches an incorrect perception that many schools and teachers are achieving the same goals.

Universities, encouraging and expecting their pre-service teachers to use ICT in their lessons, face challenges in finding sufficient schools where teachers model such expectations. This issue is usually reinforced during conversations after the practicum when pre-service teachers share observations that the use of ICT was not prevalent in the classrooms they visited. For some pre-service teachers, this provided sufficient opportunity to avoid using ICT, and thus start the cycle of the cultural view that ICT is neither required nor necessary in classrooms. Given the dramatically changing demographics of teachers in the next ten years, the educational community has an opportunity to address this 'avoidance' culture.

Currently, states and territories are involved in curriculum reforms and with this they are focusing on the pedagogical practices of teachers as the vehicle to help students achieve improved learning outcomes in possibly new ways. This creates a timely opportunity while teachers are thinking about their teaching styles and philosophies, to focus on ICT as a pedagogical approach and to consider ways of using ICT within existing and new pedagogies. This offers teachers, who have positive attitudes to improving their practice but may not have positive attitudes to using ICT, the opportunity to contemplate change. Appropriately, pedagogical agendas were central to the PICTL study and were a major influence on state and territory projects.

Building momentum

The projects demonstrated that it was possible to change the culture of teaching and learning and generate momentum. Some projects sought to invoke broader change throughout a school and others deliberately aimed at changing individual teachers' classrooms. Within this, some projects sought to change the direction of innovative practice with school ICT leadership.

To invoke whole-of-school change, two strategies were significant. The first involved aiming at ICT leaders and supporting them to continue their leadership pathways by working with fellow innovators. This set new directions for the school, provided a learning pathway for innovators (something not usually provided) and sent a clear message to pre-service teachers that they have ICT leadership capacity and have opportunity in schools to set directions and trends. The second strategy involved multiple teachers in a school, using or developing a professional community in the school to accelerate learning, deepening outcomes and sustaining activity beyond the scope of the project. Although the models had a similar base design, the variety of audience and purpose created different outcomes.

Creating change in individual classrooms was possible. Regardless of the purpose, the ingredients were always the same: a learning community of pre-service teachers, teachers and university staff, an intense targeted model of learning, illustration in classrooms as the learning place, a philosophy of trying new activities and mentored reflection. In these conditions, the depth of change and the quality of ICT pedagogy was variable and dependent on the quality of the learning program, the strength of mentoring, the inspirational ideas available and the attitudes of participants.

The synergy in the partnerships seemed to both stimulate enthusiasm and creative inspiration, and provide the supporting context to carry ideas through into classroom practice. Most projects suggested the learning partnership accelerated or deepened the learning process, and improved the outcomes for teachers and pre-service teachers.

Pedagogy as a necessity

The question of whether it is necessary to transform learning environments to improve the uses of ICT in schools is complex. In projects where new pedagogical and curriculum frameworks, or defined philosophies or theories of teaching and learning were evident, the learning teams appeared to generate deeper uses of ICT in units or lessons.

The contexts of curriculum reforms demand this complexity, intellectual quality and connectedness to learners and so uses of ICT in such circumstances needed to reflect the same qualities. Transforming the pedagogical approaches of individual teachers and groups of teachers may be a catalyst to important changes in the way ICT is used. Such demonstrations of ICT pedagogy were seen as important influences on pre-service teachers' learning and their outlook on using ICT generally.

ICT as a learning environment

In all projects, access to ICT was an issue. Pre-service teachers reported that they had access to very few computers in classrooms, and when ICT was available in a laboratory environment they had very limited access. At times this was as low as 30 minutes a week. The issue of access for these few pre-service teachers suggests that schools would have considerable difficulty enabling pre-service teachers to demonstrate standards for ICT pedagogy, as would their teachers. There may be a chicken-and-egg scenario emerging. Where there is no demand by teachers for computers in classrooms and in other situations, there is no need to supply them. The contrast is sharp when there is sudden demand.

Access to the education jurisdiction network was also problematic in all projects. Across the country, pre-service teachers and their teacher educators did not have access to the schools' network for any pre-learning or preparation. Teacher educators had so little access they reported that they did not know what pre-service teachers might need to know, especially about file management systems, e-mail and web environments, desktops of software and general policy and procedures.

Some pre-service teachers reported their frustration that teachers expected they had knowledge of a particular piece of software of which they were unaware. To add to the frustration, it often took some weeks for pre-service teachers to find out how to obtain a login account and how to access Departmental services for support, for loading software and seeking file storage.

In another project, after a long and frustrating struggle, the pre-service teachers realised that student and teacher Departmental ICT accounts had different privileges, something their supervising teacher also had not known. For many pre-service teachers, problems were barely resolved before the practicum period was completed. In other cases, where pre-service teachers were in schools before a practicum period, issues were resolved in time for classroom implementation. In some projects, the ICT coordinator had greater capacity to address pre-service teacher ICT needs.

Half of the projects made significant use of online systems and collaborative online environments. In each of these projects, teachers, pre-service teachers and teacher educators reported that the services available for use were often restrictive, primitive, and quite unimaginative and unattractive. In many projects, pre-service teachers and teachers went 'outside' the school system to find innovative environments. Further, the restrictions on web sites, online tools and network ports were most unhelpful when seeking to explore the collaborative environments indicated in the MCEETYA Pedagogy Strategy and state/territory strategies. According to all state and territory project reports, there is a need to revise policy and set up a culture for innovative development in online learning.

5.5 Barriers and critical success factors

Apart from the major challenges of implementing the partnerships, the state and territory projects were asked to consider barriers and critical success factors that impacted upon the success of the strategic partnerships. Although there were similarities in professional learning models in the state and territory projects, the outcomes were quite different. The purpose and target audience impacted on the design and the results. During the design phase, project leaders made informed judgments about the factors and issues that they believed would produce best results. During implementation, however, significant issues and critical factors emerged and new issues rose to the surface.

This section has two parts. The first reports on the barriers and the second on the critical success factors that impacted on state and territory projects. Data are drawn from state and territory projects, and PICTL Forum papers that were complemented by discussions at the PICTL Forum. The design of the forum enabled data to be collated, rather than a consensus to be made. Small groups worked together and reported issues, ideas and recommendations that were synthesised from the group discussion. These were collected using Zing technologies and panels. Because pre-service teachers, teachers and teacher educators were part of the forum, the data provide a contrast to that collected from states, because pre-service teachers and teachers had more 'voice' than was represented in reports and interviews.

The factors describing the barriers and successes in this section fall into seven categories. These are: pre-service teacher perspectives, in-service teacher perspectives, capacity of universities, role of the practicum, face-to-face and online learning, dimensions of time, and (where appropriate) innovation.

Australian Capital Territory — barriers

Pre-service teacher perspectives

Pre-service teachers feared that being innovative and independent in thought while on the practicum would disadvantage them when working with less-confident ICT-using teachers. This was thought to be of most concern when they tried to showcase their best teaching skills rather than their willingness to be exploratory. Pre-service teachers believed that if schools were not adopting new technologies now, there was no need to pursue innovation because it will change by the time schools catch up.

Using ICT was reported as difficult and complex to plan and implement in schools because school logistics, booking rooms, permissions and set-up. This made the decision to use ICT very time consuming and stressful. The situation was exacerbated if untried and untested innovations were to be used. Pre-service teachers' personal use of ICT was quite narrow, even for ICT specialists, so many were not early adopters or had not been part of an early-adopters' culture.

In-service teacher perspectives

Staff and administration changes made it difficult to sustain and generate momentum even in the short-term. An increasing number of staff members in leadership positions were on long-service leave and the resultant relieving positions meant people felt disempowered to initiate or sustain change. School willingness to take on pre-service teachers was diminishing as the teaching community ages and accumulates bad-experience stories. Champions of ICT were less enthusiastic to take responsibility for the professional development of reluctant peers and reluctant pre-service teachers.

University capacity

Staff turnover was an issue, especially practice-teaching coordinators, whose role was usually honorary or part-time and stressful.

Role of the practicum

Project-based learning requires pre-service teachers to synergise ICT, pedagogy, curriculum interpretation and delivery, something difficult for pre-service teachers to achieve from such a novice position.

Face-to-face and online learning

Pre-service teachers were generally inexperienced with online systems.

Dimensions of time

Schools operated on timetable cycles varying in length from five-to-ten days. This made it difficult to build systems and timetables for pre-service teachers and university personnel to regularly work in schools. General scheduling in school terms is difficult when university and school terms do not match, have different daily beginning and ending times, different term lengths and vacation breaks.

New South Wales — barriers

Pre-service teacher perspectives

There was a high cost in terms of time and money accessing remote schools regularly.

In-service teacher perspectives

There was a high teacher turnover in country areas. Teachers who had been in programs before were often not available for new programs, and teachers willing to work with pre-service teachers had often moved on, causing the university to feel they constantly need to start again in building relationships.

University capacity

University ICT environments were not as rich as schools and access to technology was more problematic.

Role of the practicum

There was an inability to integrate the project experiences into the conventional pre-service teacher program. A consequence was that the pre-service teachers felt that the project was a diminished learning experience.

Face-to-face and online learning

Inability of the university online environment to send an alert to e-mail participants when new entries were made meant that conversations did not flow as well as hoped. Half the teachers did not think the online environment was useful. The school system was not available at all to university or pre-service teachers. A lack of a strong online culture meant it felt clumsy for teachers to share, comment, reflect, probe, etc. Teachers lack of situational awareness of online environments meant they were either uncomfortable or ineffective online.

Innovation

Low teacher knowledge of innovative ICT applications limited the choices they had for innovation. Teachers' lack of experience and confidence with video conferencing, even though equipment exists in remote schools resulted in only minimal use of this medium.

Dimensions of time

Pre-service teachers had difficulty making time to access schools, with family and work commitments. Time and travel made remote practicums impossible for many.

Northern Territory — barriers

Pre-service teacher perspectives

There was limited time for pre-service teachers to manage their involvement in the project. Low level of ICT knowledge inhibited development of pre-service teachers' ideas and ability to support innovation.

In-service teacher perspectives

Teachers felt they needed training in being a mentor-teacher for the practicum. Mandating a professional community as a model for learning may not support organic growth of the professional community built on mutual trust, opportunity and obligation. Some teachers returned from professional learning sessions to meet a wall of negativity. Poor school culture inhibited personal growth of even the most enthusiastic teacher. Teachers' lack of flexibility in their planning meant that it was difficult to try new things and to plan outside of the usual school program.

University capacity

Developing projects in new online environments not approved by the Department caused confusion and complexity. Lack of university staff to take a hands-on role meant components of the program were not nurtured. Lack of contact and collaboration within the partnership meant positive relationships did not occur. Intensification of lecturer workloads made project initiation emotionally draining. Previous history of failed professional learning programs caused mistrust at systemic and teacher level.

Role of the practicum

There was a lack of pre-service teacher contact with supervising teachers during the planning and preparation period. There was opinion that practicum a constructed was not entirely a suitable vehicle for the purposes of this individual project. Remote practicums are difficult to manage and it is hard to ensure pre-service teachers have had a quality experience.

Face-to-face and online learning

Different approaches to professional learning about new online environments in the partnership caused a lack of progress. Teachers' misconceptions about the purpose of professional learning programs generated a difficult atmosphere in face-to-face events.

Dimensions of time

University members have difficulty setting aside the large block of time needed to travel to and interact with remote community schools.

Queensland — barriers

Pre-service teacher perspectives

It is emotionally draining being an innovator in a school without general support for innovation.

In-service teacher perspectives

The absence of long-term planning impedes pre-service teachers, as they are unable to look at what schools will be doing. New Basics schools had some plan, at least in yearly and term cycles. The innovation model is not for everyone. It is not a mainstreaming model because teachers could be overwhelmed by the enthusiasm of pre-service teachers and other teachers. Schools could feel under siege from initiatives and innovations — every innovation is like a new crisis to many. Turnover of staff in regional and rural areas is devastating to school communities and their capacity to sustain or initiate projects.

University capacity

Sustaining management time for projects is difficult and the university needed to employ people to help with this. Universities need to have continuous capacity to supply and manage sufficient pre-service teachers for the school-initiated projects and school requests.

Role of the practicum

The quality of temporary/visitor accommodation in remote communities made remote practice uncomfortable and for some it was a "not-to-be-repeated" experience.

Dimensions of time

Travel time to remote communities added to the time away from home and the day-to-day costs of being away from home were difficult to sustain with no income in that time.

South Australia — barriers

Pre-service teacher perspectives

Pre-service teachers may be unable to repeat the process in other schools in the next practicum because of teacher unwillingness.

In-service teacher perspectives

Lack of teacher knowledge of the capacity of online environments and limited perspectives on pedagogical approaches meant teachers had simply not been provided with training using ICT. There was no awareness of the link between ICT and pedagogical reform in schools. These were often separate conversations and separate professional learning program topics. Teachers' unwillingness to take big steps meant pre-service teachers needed to meet teachers at the level where teachers felt most comfortable.

University capacity

It seems doubtful that universities have the capacity to develop an intense model for a large number of partnerships. There was a belief that scaling-up will reduce the quality of the experience for schools and pre-service teachers. This issue will be difficult to resolve.

Role of the practicum

There is a growing number of teachers who are unwilling to accept pre-service teachers. A culture directed towards nurturing the next generation of teachers must be developed.

Face-to-face and online learning

The inability of pre-service teachers to work online from their homes during their self-allocated study times made the tasks more complex. Information generated by pre-service teachers in schools cannot be converted to a format able to be used in universities. Reports are usually narratives concerned with what happened instead of actual examples, consequently, impact is lost.

Innovation

Lack of school experience in online systems, instructional design and online pedagogy meant innovation was treated as a technical innovation rather than pedagogical.

Dimensions of time

Teachers felt they had insufficient time available to attend workshops on the new tools offered by the Department. Pre-service teachers wanted a longer span of time to prepare and complete adequately a program of activities.

Tasmania — barriers

Pre-service teacher perspectives

The expectation that pre-service teachers could lead innovation in some school climates added pressure on pre-service teachers seeking to undertake a positive and high quality practicum. Pre-service teachers involvement in the project was extremely low at first. Once successes could be demonstrated and pre-service teachers began to tell each other positive stories, the interest improved. Pre-service teachers have the perception that ICT was not strongly appreciated or rewarded in schools, and that their enthusiasm about ICT would not enable them to build relationships with non ICT-using teachers who may supervise them on the practicum. The Christmas holiday break between planning and implementation meant that some work had to be redone, because circumstances in schools had changed.

In-service teacher perspectives

There was a perception that IT resources in classrooms are too low for teachers to get started using ICT. This meant that few teachers wanted to accept pre-service teachers using ICT in their classrooms.

University capacity

There were limited teaching staff at university for the number of pre-service teachers. In Tasmania there is an excess supply of pre-service teachers. This meant that very little involvement in schools was possible. Teacher educators needed to be more hands-on with organisation and management but seeking time to do this was difficult across so many locations at once.

Role of the practicum

The practicum was seen as very short for a project cycle. The project did reconceptualise the role of the practicum, and this was not yet accepted by teachers and schools, or even the university.

Face-to-face and online learning

Teachers' lack of use of online systems meant they were not interested in using them. Some were comfortable e-mailing but preferred faxes and face-to-face meetings. Teachers and pre-service teachers could not use a common technical system due to policy restrictions. This created a barrier for changing the culture that discouraged people from trying.

Innovation

Lack of access to large numbers of ICT resources meant innovation was limited to whole-of-class activities. Lack of innovation in schools meant there were few examples to draw on to support development of ideas for those who could not generate their own. For many, innovation and experimentation with ICT was seen as another distraction that made it difficult for teachers to meet curriculum objectives.

Dimensions of time

Supply of resource funding was needed to match the timing in schools and universities when cooperative opportunities were possible. Time was reported as a precious resource for pre-service teachers when family and work sacrifices were already being made to support a university study program.

Victoria — barriers

In-service teacher perspectives

The complexity of implementing the Victorian Essential Learnings added stress to a busy year, but also created pressure to measure the value of ICT against student-learning outcomes. This was restrictive because there was no time to find out the nature of other benefits. Teachers had to justify how pedagogical approaches would lead to demonstrated student learning outcomes before they used them.

University capacity

Finding time segments in the year when this model of volunteer 'extra' programming could be fitted in between required commitments was difficult.

Innovation

Equating innovation with success and judging quality as innovative practice works against supporting mainstream teachers use of ICT in ways that are new and powerful to them in their current phase of learning.

Western Australia — barriers

Pre-service teacher perspectives

Telling pre-service teachers that using ICT would not be assessed encouraged them to participate. The fear that using ICT would disadvantage pre-service teachers needs to be addressed in real ways. One school reported that pre-service teachers were too tentative about ICT. There was a lack of real incentives to involve pre-service teachers in additional school-based activities. Most pre-service teachers were only interested in doing things that explicitly impacted on their employability. The perception of pre-service teachers was that experience and expertise in facilitating ICT use by students was not a necessary component of teaching and accreditation of teachers. This perception constrained their involvement.

In-service teacher perspectives

Hardly any teachers wanted credentialing in ICT as part of their involvement in the project. This option does not appear as attractive as it once might have been.

University capacity

The university feared that pre-service teachers would shift programs and institutions if the expectations of their participation were too high. It was difficult to persuade non-ICT academics to be involved in meaningful ways. Expectations on lecturing staff continue to grow especially with international teaching commitments.

Role of the practicum

Building more and more activities and agendas into practicums was not seen as manageable for anyone.

Innovation

Reliability of school networks, especially in secondary schools, meant that teachers were reluctant to be innovative when networks could not deliver reliable services. Secondary school teachers seemed reluctant to try new technological or pedagogical innovations.

Dimensions of time

More time was needed for a practicum, to plan, implement and reflect on a large unit or activity. It is difficult to schedule schools' involvement in this model to coincide with practicum periods.

The Forum — barriers

Pre-service teacher perspectives

Pre-service teachers did not all have a clear understanding of the PICTL goals and needed more immersion in the key agendas and processes before participating. Pre-service teachers believed universities need a much more 'hands-on' management and leadership style to foster the PICTL study's goals. There were varying views on the relative importance of ICT, especially in the practicum. Pre-service teachers questioned the relevance of using ICT when it was not fully integrated into the schools that will employ them. There was a perception that the most valuable learning occurred in the university setting and this was supported in policy and curriculum documents of education jurisdictions. However, pre-service teachers were finding ICT usage was not desired or supported in schools. Supply and demand for quality practicum places was problematic. Competing pressures for pre-service teachers' time changes the culture of pre-service teachers' programs.

In-service teacher perspectives

The lack of role models in schools not only makes pre-service teachers' placement difficult, but it sends inappropriate messages to pre-service teachers about the importance of ICT in pedagogy. In general, teacher conversations about ICT refer to its use as 'an extra' and difficult. This creates a culture that says that minimises the likelihood of ICT usage in classrooms. However, a culture of resistance to ICT was not a position that the community would want future teachers to adopt. In some cases ageing teacher populations had accumulated resistance to hosting pre-service teachers because of difficulties in mentoring experiences that had happened from time to time. This was complicated by the attrition rate among younger teachers, resulting in fewer teachers able and willing to mentor a pre-service teacher. There was a lack of policy directions or incentives for teachers to host pre-service teachers. The opportunity to tie pre-service teachers' supervision to professional teaching standards had not been fully realised.

University capacity

Reduction in full time staff in universities reduced their capacity to host intense professional learning programs in schools and support pre-service teachers in schools. Increasing workloads on university staff result in projects being seen as crises to accommodate. The lack of knowledge and experience in developing and maintaining partnerships places strains on project management and relationship development.

Role of the practicum

The current model of the practicum may be limiting thinking about the design of professional experiences or school-based experiences. The use of part-time or sessional staff to supervise or support the practicum is not sustainable in terms of providing a quality service through which the university and schools grow and learn, but is rationalised on economic grounds. The incentives for teachers to host pre-service teachers vary across the country. The use of payments can encourage teachers to measure their services on a hourly basis, setting a tone that "it is not worth the effort". Payment for teacher release and other resources was valued where it occurred. The professional commitment to nurturing new teachers to the profession did not have a strong voice in the debate about how to sustain the practicum and other school experiences.

Face-to-face and online learning

Mature-age pre-service teachers may be reticent to use online technologies, but not only because of their unfamiliarity with technology-mediated communication. Mature-age pre-service teachers were often critical of university use of threaded discussions in online units, especially if the lecturer does not take an active role. The quality of discussion from other pre-service teachers does not measure up to their expectations of academic rigor. The deep educational potential of online environments has not yet been demonstrated in enough schools for it to be an acceptable learning tool or professional tool. Teacher access to online environments is limited and not critical to professional work. Hence it is seen as an interesting but additional means of collaboration and working.

Innovation

Resistance to change and questioning the 'syndrome' of change means that innovation is difficult to initiate.

Critical success factors are now discussed using the same sub-headings as were employed for barriers.

Australian Capital Territory — success factors

Pre-service teacher perspectives

More time was essential to immerse participants in the technologies before the practicum or school visits. Time was needed to develop confidence and competence, and to allow sufficient experience for pre-service teachers to be reflective and insightful about the synergy between new technologies and curriculum.

In-service teacher perspectives

The potential for teachers to accelerate their learning journey occurs when teacher educators filter the knowledge in the field and deliver specific new ideas in context to teachers.

University capacity

Universities need to be appreciated as a capable source of support for both innovative and mainstreaming practices, and need to deliver quality professional learning programs to schools. Development of a new Teaching Studies unit was the most appropriate place for ICT pedagogy as the content of the unit provided the impetus to focus on pedagogy of using new technologies. To establish a common message to pre-service teachers about ICT, more disciplines in the university education program need to discuss pedagogical considerations of ICT use.

Role of the practicum

Intense support over a long period of time is needed to achieve a critical mass of teachers using new technologies who will be able to mentor pre-service teachers. The practicum is a channel to use to continue conversations and build relationships.

Innovation

Schools need to choose consciously to allow innovation. Universities need to commit to stimulating innovation.

New South Wales — success factors

Pre-service teacher perspectives

Building in additional school-based activities is significant to building partnerships. Additional opportunities for face-to-face dialogue between pre-service teachers and teachers can then be provided. Traditional practicum as a school experience is part of the mix of activities. The high awareness level of the Learning to Learn philosophy enabled participation in a school-based learning model to focus on strategies in practice rather than imagine them. Pre-service teachers need access to a wide range of ideas from more than one school. The capacity to participate in the sharing days gave them access to a broader range of ideas from multiple district schools. They could see a regional program was in place and that ICT pedagogy was normal school business.

In-service teacher perspectives

The sense of belonging to a professional community with shared responsibility to complete a task maintains interest, caring and momentum. Regional teachers support local universities and want pre-service teachers to adopt a similar sense of local identity. There is a desire to work together in a region and care for the region. To enable a continuity of programs and yearly uptake, there is a need to expand the partnership from teacher level to school level. To maintain high quality ICT experiences

for students, there is a need for more input sessions so teachers can access a wider range of ICT ideas. The design features that could be improved to foster collaboration include:

- clarifying teacher educator and pre-service teacher roles in the learning team;
- aiding teachers to share control of their planning for teaching and learning;
- providing more time to plan and evaluate, including discussion of presentations at the professional sharing days;
- providing more opportunities for face-to-face communication, especially site visits; and
- clarifying mechanisms for communication between students and pre-service teachers (and the related role of teacher educators) that reflect local conditions.

University capacity

Adding expertise into input sessions is highly valued, suggesting that in a professional development program, the content is the most critical factor of success.

Incorporating evaluation into the program structure, purpose and implementation ensured projects were focused. Mentoring and follow-through was important to develop quality learning experiences and high completion rates. Embedding learning partnerships that included pre-service teachers into the mainstream professional development programs in schools ensures pre-service teachers are always welcome and that practical school-based learning is available to them.

Role of the practicum

Waves of large numbers of learning partnerships would generate sustainability and improve learning partnerships for people repeating the experiences. Continued involvement would develop the capacity of teachers to lead school innovation and pre-service teacher involvement in schools.

Face-to-face and online learning

Teachers prefer face-to-face and do not enjoy online forums. Expertise of facilitators ensured that both online and face-to-face activities yielded success. Management team passion for ICT use is essential to develop and plan quality programs and share a positive culture. Teachers felt valued when they were away from school and had time for reflection and celebration. Learning partnerships need to develop a positive culture of mutual respect and collaboration.

Innovation

The depth of knowledge of the pedagogical framework and experience in implementing the strategies enabled them to more easily applied to ICT contexts. A culture of ICT innovation is critical to learning teams being innovative.

Dimensions of time

A practicum or some other form of school experience is important for project success and needs to be within the timeframe for each project implementation.

Northern Territory — success factors

Pre-service teacher perspectives

High ICT knowledge and long experience enabled pre-service teachers to select more effective ICT applications and critically review online tools. Positive attitudes to ICT enabled pre-service teachers to cope with technical difficulties and the frustrations of learning about new environments.

In-service teacher perspectives

Teachers who want to learn from teacher educators need to share the same beliefs about models for professional learning: open-ended versus step-by-step; instructional versus constructivist.

University capacity

University desire to support teacher learning provided the stimulus for embarking on projects.

Face-to-face and online learning

Different approaches to professional learning about new online environments in the partnership caused a lack of progress.

Innovation

Being able to apply innovative ICT to authentic needs in schools develops sustainable examples more likely to be adopted by schools.

Queensland — success factors

Pre-service teacher perspectives

There was a belief that pre-service teachers can play a role in the diffusion of ICT, so that more sustainable ICT-rich learning opportunities emerge. Action learning requires collaboration of cultures not just people. There is a need for group solidarity as well as a community-shared culture. Project-based learning has successful characteristics built into the model, including a defined cycle of activity with defined beginnings, purposeful activity and ends. This is unlike the practicum, which is a slice in time. On practicums, pre-service teachers do not always see the end or beginning of their work. They can really only teach lessons, not experience a curriculum unit cycle. Projects are richer learning experiences. Pre-service teachers' knowledge of the New Basics curriculum and productive pedagogies framework enabled them to intuitively see opportunities for powerful uses of ICT.

In-service teacher perspectives

A regional sense of belonging is very powerful to obtaining commitment from teachers to be involved. Schools want to work with local groups and obtain mutual regional benefit. They celebrate the uniqueness of the local community plus they exhibit a sense of responsibility to maintain and grow local services. The project design required schools willing to explore innovations and take risks. It was crucial to build positive relationships with school champions in helping build their capacity and to help them maintain an innovative outlook. There was a need for constant change and new things to sustain enthusiasm amongst early adopters.

University capacity

A community of practice surrounding the innovator in pre-service teachers and schools is a significant structure and needs energy to sustain it in the face of barriers. It is important to manage the innovation process at school level. Solutions include supporting pre-service teachers with a management structure and process, and supporting the partnership between pre-service teachers and teachers. Universities need to take responsibility for ensuring pre-service teachers reach their potential. They also need to develop processes to support pre-service teachers looking to forge careers in local schools. The synergy between research, project and community work, and teaching can be drawn together into project-based learning. This type of synergy is worth exploring further and appears top offer some potential within the context of current university capacity.

Role of the practicum

Pre-service teachers' immersion in the school and pre-planning stages is essential if the practicum period is to be maximised.

Innovation

Schools' readiness to be innovative was important. School-based ICT coordinators were significant in innovation. Without at least one person supporting a whole-of-school initiative the project did not sustain or extend beyond the first implementation.

Dimensions of time

Volunteer time and enthusiasm enabled pre-service teachers to value-add to a linear management model.

South Australia — success factors

Pre-service teacher perspectives

Access to people who can resolve issues rather than needing to work out who can help, was an accelerating factor in success for a practicum. Strong knowledge of the pedagogical framework was vital. Often pre-service teachers were more conversant with recent state curriculum initiatives than their supervising teachers. Building the additional work into both coursework and the practicum meant it was a feasible extra project.

In-service teacher perspectives

Teacher willingness to allow pre-service teachers to do something new and different with a class is the vital first step, but a difficult one in senior secondary classes within a Higher School Certificate year. As a professional learning model, involving more than one teacher in a school is essential for the professional pathways of the individuals and the growth of the school. Some teachers felt sustained while pre-service teachers were involved with them, as previously many saw themselves as islands, isolated from other teachers. Teachers retained the materials for reuse in their classrooms and in the school.

University capacity

The university needs to build project activities into coursework and normal routines of the pre-service teachers' program in order to assist pre-service teachers to value the returns from the additional investment in their time. Further, the program design needs to enable some pre-service teachers to use an alternative study pathway to allow these specialist projects to occur for small cohorts of pre-service teachers. Using teachers are part of university programs and using teacher educators in schools' programs would take advantage of the possible synergy and ensure the content of pre-service teachers programs was current. Common pedagogical bases and philosophy in both university programs and school programs ensure meeting of agendas, development of substantial programs in universities and schools, and a common message to pre-service teachers in the transition between university and school.

Role of the practicum

There is a need to raise awareness of project-based learning as a practicum-learning experience so it becomes more accepted by teachers. This is different in style and substance to the traditional apprentice model. Pre-service teachers should be provided with access to similar professional learning models recently experienced by their supervising teachers, so they gain common ground in which to explore new ideas.

Face-to-face and online learning

Face-to-face, online and telephone mediums are parts of a complete learning and support system. Timely interaction is the key. The ease for students to slip into online pedagogy provided incentive for pre-service teachers to continue working with them and created greater and improved results for students and teachers. Pedagogical approaches online underpinned the activities students completed in class. Students were actively engaged in knowledge construction activities, online dialogue and debate and mentored-sharing of quality ideas.

Innovation

An online mentor from TSoF provided support, especially for pre-service teachers who were leading a new initiative in a school environment, where there was no experience. For the innovation to be used as an awareness-raising tool, the project needs to be promoted in the school community to influence others. Pre-service teachers were not as distracted by survival in the day-to-day issues of teaching, and have the capacity to explore innovations more thoroughly than teachers thus becoming strong advocates of a particular innovation.

Dimensions of time

Capacity to buy time and expertise though partnerships or real grants to schools is essential.

Tasmania — success factors

Pre-service teacher perspectives

Provision of resources to travel to schools is important. There needs to be a process of attaining the funding before the necessary journeys. Support for pre-service teachers and quality planning by university staff and steering committee was a strong incentive, as was building the results into a future portfolio task.

In-service teacher perspectives

Involvement of a critical mass of teachers in the Information Literacy program hosted by the Department ensured a critical mass of teachers in schools had an understanding of the project's intent and its significance in addressing the same issue at the same time. Involving pre-service teachers in the same professional learning program enabled the synergy to be maximised. Teachers needed to appreciate that this project was their professional learning program and approach it as a learning and exploration experience. This facilitated more risk taking and took pressure off pre-service teachers having to prove that the innovation is successful.

University capacity

Additional planning time to be ready for practicum units was valued and deemed essential for an innovative project. Co-planning with mediated quality checking was essential to generate quality experiences for all in their learning journey. The inclusion of ICT in the standards for pre-service teachers' performance added authority to this project, especially in asking teachers to support pre-service teachers.

Face-to-face and online learning

Pre-service teachers' capacity to visit teachers in schools was powerful to develop pre-service teachers' situational awareness of the school. It also raised the profile of the project in the school setting and enabled half-day visits to be practical for teachers. Mentoring during implementation increased learning for pre-service teachers and teachers and enabled the university staff opportunity to find out more about ICT in schools.

Innovation

Working with the school's pedagogical champion created a rich interpretation of ICT pedagogy and ensured pedagogical agendas were at the forefront while using ICT in classrooms.

Dimensions of time

Provision of resources to pay for teacher-time release meant school leadership members were positive about the project. Calendar years worked best for cohorts of teachers and pre-service teachers. Term 1 and 4 should be avoided where possible.

Victoria — success factors

Pre-service teacher perspectives

Opportunity to experience the program as learning professionals on an even standing with teachers provided confidence and support, and made pre-service teachers feel professional. The philosophical approach provided the space for pre-service teachers to develop ideas, where they might not have had the opportunity to do so previously.

In-service teacher perspectives

Confidence and motivation were keys to transformative practices with ICT in classrooms and deep learning by individuals. These needed to exist or to be generated by the project. Journaling was a powerful reflective tool that added structure to reflections and the project generally. It was important to value and listen to teachers' concerns and balance these with positive reasons for using ICT. Teachers' fears could be heard without the progress of the project being adversely influenced.

University capacity

Capacity to mentor each team during implementation was critical to reaching some end point as well as quality reflection. Commitment by the Diocesan office provided authority to the project in schools.

Face-to-face and online learning

Multiple face-to-face events built a sense of community and kept projects prioritised and vibrant.

Dimensions of time

Short timeframes enabled some participants to focus on ICT with their classes in a productive and deliberate way. They would not have done this in a normal term. Project structures enabled participants to have a defined cycle of ICT activity rather than a loose, integration plan over a longer period.

Western Australia — success factors

Pre-service teacher perspectives

The laptop loan scheme for pre-service teachers encouraged more positive attitudes to technology. The partnerships used were beneficial for pre-service teachers. They found that they had more productive practicum experiences when they were placed in schools with strong links to the university.

In-service teacher perspectives

Using teachers known in the partnership provides some probability of success. Partnerships offer a range of professional learning experiences for teachers, improving their understanding of the university's caring and intent. The more they are involved, the more amenable schools and teachers are to hosting pre-service teachers.

University capacity

Involving more teacher educators in such projects would encourage them to use ICT pedagogy approaches in their teaching programs and they would add value to the participants in PICTL-style programs. There is now a belief that the internship model needs restructuring to enable project-based learning to enhance the school-based learning program.

Role of the practicum

Using a standard practicum period encouraged pre-service teachers' participation.

Face-to-face and online learning

The combination of action research and action learning offers a rich opportunity to learn new things, and use research as a basis for learning and reflection.

Innovation

Passion for ICT in learning enabled innovation to be tried even in more traditional learning environments.

Dimensions of time

Lead-in time to enable pre-service teachers to develop greater breadth of ideas was essential to their capacity to develop quality ICT pedagogy experiences.

The Forum — success factors

Pre-service teacher perspectives

Increased school experience provided a variety of experiences and improves employability. Intense support is appreciated and valued and improves their pedagogy. Incorporating ICT experiences in coursework and including as much project activity as practical in coursework enables greater pre-service teacher participation, given the complexity of their lives.

In-service teacher perspectives

Resourcing for remote practicums enables them to occur and this benefits the school communities and contributes to pre-service teachers' experience. Incentives to undertake professional learning needs to be real and concrete. Establishing a culture where pre-service teachers' involvement is recognised as a professional learning strategy is essential to collaborative partnerships and the future of pre-service teachers' education.

University capacity

There exists potential in using school-based projects and school-based partnerships as the synergy between research, teaching and community service commitments. Buying management and research time is a key strategy to ensuring quality projects are designed, implemented and researched.

Role of the practicum

Project-based learning offers a rich learning experience and provides a sense of special focus that encourages all involved to "dig deeper" and make ideas work. Creative, exciting and innovative ICT in Learning projects are needed. Projects that are dull drain motivation and do not represent the ICT pedagogy examples pre-service teachers need to experience.

Face-to-face and online learning

Relationships are nurtured more successfully when people have multiple face-to-face activities over a long period of time. There is a need to maintain a balance between online learning and face-to-face contact, and online learning should not be seen or used as the cheaper option.

Innovation

Linking ICT innovation directly to curriculum and pedagogical changes is synergistic when approaching ICT with fresh approaches, and when seeking to engage the majority of teachers who are not early adopters. Adopting technologies comes from unusual quarters such as being required to use technologies for administrative duties.

Emerging from the descriptions of the barriers and success factors are several issues. This final section provides a voice for issues not yet raised elsewhere in this report. The breadth of issues and potential resolutions and suggestions in the rich data set collected from this study is very large. Partnerships adopted one of two basic approaches: first to accelerate the journeys of individual teachers, and second, to move the direction and momentum of the whole-school towards more extensive ICT use. The focus on pedagogical reform was the most critical aspect of the professional learning.

School culture was pivotal in supporting innovation, change and participation in collaborative partnerships and their projects. Such a culture appears complex to build. Maintenance of a favourable culture was made more difficult in situations of high staff turnover, especially in rural and regional areas, and by temporary absences by key staff for long-service leave — a legacy of an ageing workforce. Continuity of staff and the existence of ICT leadership in schools had considerable impact on a school's ICT journey and its capacity to sustain partnerships.

Innovation required deliberate intervention. In general it appears that the policy structures, working cultures of teachers and the complexity of ICT innovation work against innovation. In the state and territory projects where universities and pre-service teachers carried the innovation into the school and worked with local teams, innovation was vibrant and exciting and produced results. In regional areas, the loyalty to local universities and schools strengthened relationships, provided purpose and helped form strong partnerships. A determination by all parties to support regional initiatives created a culture of support and gave focus to local activities. In urban areas, strong formal partnerships with a few schools or a district/region provided a sound basis for development of similar loyal culture.

Pre-service teachers reported that their lives are complex, maybe more so than in the past. When questioned about the need to value every opportunity to be in schools and learning with teachers, they reported that they do. However, many spoke of the struggle this created with being able to meet work and family commitments. Questions of incentives for involvement were raised and debates about designing coursework and other required program activities became prevalent. The use of ICT in schools was deemed to require more effort. Adding ICT to any school activity brings complexity, and can create a situation in which it is difficult to convince people of its worth.

In many areas, *the demand for pre-service teachers' places in the practicum model was greater for many areas than the supply of teachers willing to support them*. Many teachers see additional initiatives such as supervision as an additional load and not an opportunity for professional learning. This was especially true if the teacher had had a difficult experience with a previous supervision. The rewards for accepting pre-service teachers do not seem to match teachers' expectations. These impediments to supervising pre-service teachers appeared to be even worse for teachers if the pre-service teachers wished to employ ICT in a significant way. This had the potential to push organisational boundaries in schools, especially where such ICT pedagogical approaches were not mainstream practice. Issues, in this case can seem overwhelming for teachers. However, as a balance to these comments, in the PICTL study when state and territory projects were successful in schools, because of strong learning partnerships between teachers and pre-service teachers, mutual respect and support overcame issues and the resultant learning that occurred in the partnership was appreciated.

Learning partnerships as envisaged within the PICTL study, where participants have defined roles to play, appeared to be central to the critical success factors for quality learning by all parties. The data suggest that learning is not automatic because such partnership exists. The depth of content of the program and the need for defined input to learning was vital. The quality of input sessions, the enthusiasm of presenters and mentors, and a moderated reflection process were key qualities to the success of the professional development program.

The use of online technologies had mixed benefits in the partnerships. While seemingly the solution to communication between face-to-face events for co-located teams, two issues emerged. Firstly, teachers and some pre-service teachers do not routinely use online tools and environments. They needed to go to special effort to communicate, and did not feel comfortable in the environment. In these cases the medium appeared to get in their way. Secondly, policy barriers can prevent teams using each other's systems or transferring data between them. This emerged consistently as a significant issue. Pedagogical and curriculum frameworks encouraged the use of online environments by students, something that will be complex to achieve as a mainstream philosophy. In projects where innovation was centred on new online environments, considerable knowledge was gained through the state and territory projects in this study. Their message is that pedagogical strategies are critical to successful online interactions for learners.

CHAPTER SIX

Research findings: Towards sustainable professional learning

6.1 Introduction

The state and territory projects had considerable impact locally, on university discussions about models of learning and the subject matter of their pre-service education programs. They each embraced the notion of simultaneous professional learning between teachers and pre-service teachers in school settings. The findings presented in previous chapters suggest that these learning partnerships are potentially important contexts of learning for the individuals involved.

This chapter considers three research questions that together provide information about the future of professional learning for both pre-service and in-service teachers. The three questions are:

RQ 5 To what extent is effective professional development in this area dependent on whole-school or system-wide reform? What change management issues were faced in trying to achieve these reforms? What cultural change was/is necessary?

RQ 10 What are possible strategies for sustaining the partnerships beyond the life of the project?

RQ 11 What are recommendations on ways to develop innovative professional development projects on a wider scale?

The challenge for universities and school systems is to sustain activities that continue to inform the development of pre-service and in-service education and to improve the profile of university-partnered activities as valued professional learning for teachers. In the area of supporting teachers to use ICT, there seems to be two shared goals. First, that more teachers need to incorporate the use of ICT in their classrooms; and second, that pre-service teachers need to see that ICT is a mainstream activity and develop the skills of teaching with ICT.

There are four key sections in this chapter. These are context for reform, strategies for sustaining learning partnerships, and developing wider-scale professional development projects. The chapter concludes with a discussion of important ideas that need to be taken forward in moving towards future models for pre-service education and professional learning for teachers.

6.2 Context for reform

State and territory projects reported that the extent of the effectiveness of professional learning in the ICT area was dependent on whole-school or system-wide reform. Also reported were the management issues faced in trying to achieve these reforms and necessary cultural change. The culture in school and universities is generated by collective attitudes of the people in them. What people say, how they behave and what they do to support others generates an atmosphere that is conducive to innovative exploration, risk taking and professional learning. School and university policies and procedures can reflect this school culture portraying opportunities for change and a minimalisation of barriers.

The culture in schools and universities is a recurring theme in all sections of this report, because it is the context in which the state and territory projects have been set and the basis from which respondents have forecast their views about the future of pre-service education and professional learning models. This section offers data about additional changes needed for schools, universities and pre-service teachers to support professional ways of learning in the state and territory projects.

Australian Capital Territory — context for reform

For schools

Expanding knowledge of alternative models for professional learning to include the shoulder-to-shoulder model in this project means that universities need to spend less energy 'selling' their project design to schools. There is a general need to raise awareness of universities as a place to seek support for professional development projects and programs. There is also a particular need to raise awareness that hosting pre-service teachers is a valuable way of providing input into the school's pool of knowledge. Schools appear to focus on individual learning journeys in an ad hoc way. There seems to be little team learning in traditional professional development models, and yet, teachers need to build skills to be able participate in learning teams. For pre-service teachers and teachers to learn together, team learning needs to become habitual.

There is a need for supportive cultures in schools where innovation and risk taking are valued and respected. The design of school networks and limited services offered on them, encourage conservatism and mean that teachers have to go to great efforts to arrange to tryout new tools and services. Departmental policies and procedures fuel this conservatism through standardisation policies and centralisation of ICT network services.

For universities

Developing the policies and structures to enable teacher educators more time to work in schools and be part of school-based initiatives would focus attention on schools and thus create more goodwill. Encouraging teacher educators to use an ICT pedagogy focus in their lectures, assessment and other activities would carry a consistent message that ICT in schools are everybody's business and that a high expectation of use exists.

For pre-service teachers

Pre-service teachers have gained a perception from their experiences and observations in schools that being innovative is not necessary to maintain job security and status and not rewarded in any tangible way. They see the opposite to what is hoped, and they observe that innovation and risk taking require extraordinary efforts with many barriers being put in the way. They do not see ICT being used routinely in schools and little evidence of schools seeking to encourage teachers to use ICT. They see a lethargic attitude to using ICT by most teachers, except the enthusiasts. Hence pre-service teachers need to be encouraged not to repeat this cycle but to break the trend and to take a leadership role in using ICT in spite of current practices.

New South Wales — context for reform

For schools

Developing greater sharing between schools raises the profile of progress towards ICT pedagogy in the region. Because of the embeddedness of metacognition and Learning to Learn in schools in the region, there is a common dialogue and language that needs to extend to conversations about ICT use in schools. Involving pre-service teachers in this dialogue is important for individuals and for the preservation of wisdom in the region.

For universities

Including regional and remote schools in university projects creates goodwill and a general awareness that the university is regional in its outlook. The SiMERR National Centre provides a structure to support school-based projects and access resources to support pre-service teachers for school-based activities. Specialist centres can focus research and developmental projects. Including ICT and Learning to Learn pedagogy holistically throughout the pre-service programs demonstrates the university position on ways of developing classroom ICT experiences, giving the approach some authority.

For pre-service teachers

For pre-service teachers, the opportunity to be involved in any projects that provide access to stories on teacher uses of ICT and time in schools is appreciated.

Northern Territory — context for reform

For schools

It was considered necessary to repair and develop greater trust between the university and schools, and university and the school system, for any future work to be initiated. To develop a positive culture for pre-service teachers to be in schools, teachers need support to appreciate the importance of making pre-service teachers welcome, and that teachers want to assist them to start their careers and value them as future colleagues. This might be supported with systemic policy and messages of support to host pre-service teachers in schools sent though payroll systems, Department newsletters and newspapers.

For ICT projects to be conducted by pre-service teachers, there needs to be recognition that pre-service teachers will want to try new ideas and use technologies in the process. Supervising teachers need to value the opportunity to learn from watching a model experience in their classroom. Flexibility in pedagogical approaches and assessment strategies would enable pre-service teachers to try ideas schools had not attempted before in the spirit that successful innovations can be incorporated into schools.

For universities

To undertake redevelopment of programs in universities and encourage collaborative projects in new ways, there is a need to build transformative leadership capacity in schools and the university. Small micro-changes are unlikely to improve the uses of ICT by pre-service teachers. University staff need to be given more time in duty allocations, to be in schools to develop greater knowledge of the use of ICT in schools, and to share case studies and expectations of positive ICT pedagogy in coursework. The university needs to provide additional opportunities for teachers to attend the mentor-training programs that build very positive relationships and enable professional dispute resolution and counselling.

For pre-service teachers

Pre-service teachers quickly adopt the attitudes of their supervising teachers, especially when barriers to using ICT are so easily used as avoidance measures. For pre-service teachers to overcome access issues, find equipment hidden away because of under-use, test timetabling and other cultural barriers they quickly loose their resolve to be creative. Support networks amongst pre-service teachers and from a mentor at the university would encourage them to value innovation and keep trying to break down negative cultures in schools where they want to use ICT with students. This is difficult from the disadvantaged power position of a pre-service teacher. Collaborative planning with positive role models before practicums would create a substantial positive impact.

Queensland — context for reform

For schools

Encouraging schools to address the professional learning needs of their ICT champions would create a sense of reward for them. Using university involvement as their network of support and opportunities for advancement serves multiple purposes and especially creates a atmosphere that early adopters and innovative activity is sanctioned and rewarded in schools.

Continuing to improve the use of ICT within New Basics schools through encouraging pre-service teachers to undertake practicums in schools and use pre-service teacher activities to immerse new teachers into the New Basics philosophies provides real purpose and real work for the pre-service teachers to pursue while they are in schools. This portrays the message pre-service teachers are valued for their contributions when they are learners and expert. Developing a culture of innovation and encouraging all teachers to nominate for innovative projects will extend innovation past the ICT leader, who sometimes acts as a gate-keeper.

For universities

Acting on the responsibility for each pre-service teacher to reach their potential, universities can encourage leadership development through authentic projects in schools and a project development and management cycle. Including all teacher education staff in a program develops the capacity for consistent messages to come from everyone about the university mission in regard to using ICT in New Basics and other partner schools.

The development of a New Basics College creates a structure to host activities and provides confidence for partners that the university approach is sustainable. It also provides confidence with pre-service teachers that the university focus will lead them to employment in the local community. There is a need to develop greater recognition in the university system, that school-based projects enable the university to meet community service obligations, research quantum and teaching responsibilities simultaneously.

For pre-service teachers

Pre-service teachers need opportunities to take leadership positions and be valued for their innovation. Positive experiences of pre-service teachers spread in the university community, drawing other candidates into programs and projects.

South Australia — context for reform

For schools

When teacher use of ICT in schools is more prevalent and when new pedagogical approaches underpin teachers' adoption of technologies, there will be a large range of positive role models in schools for pre-service teachers. Schools and universities need to adopt the attitude and action that enables the journey to be taken together to maintain momentum in the use of ICT by teachers and pre-service teachers simultaneously. Building use of ICT into teacher standards, including pre-service teacher standards, would add authority to efforts to mainstream powerful uses of ICT.

Considerable promotion is needed to improve teacher attitudes to accepting pre-service teachers on practicums and for other activities. Support from the Department through policy change would be useful to promote the value of hosting pre-service teachers thereby supporting future colleagues. The time spent hosting pre-service teachers could fulfil the requirement for professional learning in the teachers' award. Changing the pre-service teacher payment system to reward teachers in real ways, including access to professional learning programs, teacher release days and resources may be valued more positively than small financial payments through the payroll system.

Schools need to be encouraged to see pre-service teachers and university involvement as a professional learning strategy that can be built into a whole-of-school approach to improve ICT use. Schools could be encouraged to use student work as evidence of the value of ICT as a pedagogy or curriculum enhancement and build this as an expectation and culture of judging the value of innovations through student learning. This focuses teaching and learning and provides evidence for professional reflection.

For universities

Developing stronger links with partner groups in the Department would provide additional project opportunities and portray the message to teacher educators that the system is keen to pursue strong links. There is a need for opportunities for them to be rewarded in the university structure for school-based activities.

For pre-service teachers

Pre-service teachers want access to technology, laptops, services and support to pursue the expectation that they use ICT in teaching. They believe it is important to show they are valued as future professionals and worth the investment.

Tasmania — context for reform

For schools

Greater responsibility to support pre-service teacher programs is needed even though there is a greater supply of teachers in Tasmania than there are vacant positions. Although pre-service teachers may travel nationally to seek work, their time in Tasmania should be nurtured and the state could gain a reputation for exporting quality teachers.

The use of ICT in schools needs to become commonplace to generate some positive role models and to create a platform for positive professional discussion and reflection, rather than sharing stories about why using ICT is difficult. ICT can be considered as a pedagogical approach. The information literacy agenda and Essential Learnings creates a new culture for teachers who have not been strong ICT users to adopt technologies as they change their pedagogy and reinterpret their curriculum. It is a positive time for change and schools may need to be supported to develop this awareness and commitment. Developing awareness that collaborative planning and implementation of ICT experiences is synergistic and valuable for the individuals involved, provides schools with much needed professional learning opportunities in situ for little effort and no expense.

For universities

Embedding the project's stories into lecture materials and coursework, and telling positive stories about the value of the experiences for pre-service teachers will generate more positive interest from pre-service teachers in working on additional programs in schools. Not sympathetically accepting the views about additional work and expecting positive responses from pre-service teachers a culture of professional expectations can be generated. Developing a culture of using ICT as a pedagogical approach in course work, rather than teaching about it, will develop new ways of thinking about ICT and assist pre-service teachers to view ICT from a multitude of positive perspectives.

For pre-service teachers

For pre-service teachers to adopt positive attitudes to using ICT on practicums, they need to be reassured that their supervising teachers will not disadvantage them or give them poor standards on assessment. They want assurance the school will allow them to explore and experiment and, if it is difficult or does not work smoothly, that it will be seen as part of innovative practice and not a direct consequence of poor teaching skills. Pre-service teachers suggest they have no clear understanding of what effective ICT in learning looks like, having neither experienced uses of ICT as a learner or a teacher. Schools seem unable to show or tell them what effective use of ICT is, and so they feel uncertain and apprehensive of suggesting what they do is 'right'. This is made more complex by systems that seem also to send unclear messages about effective use of ICT through policies, statements and exemplars. Systems need to provide clear examples and clear definitions to support both pre-service teachers and their supervising teachers.

Pre-service teachers believe that using ICT places an extra demand on them above what is required and beyond what their supervising teachers are required to do. For some, the extra work occurs because in schools where use is low, pre-service teachers had to find out where equipment was, how to get software installed and how to put systems together because there was no ICT leadership. For others,

convincing their supervising teachers required them to 'prove' the approach valuable before being 'allowed' to use ICT. These stories told in universities, create the sense that using ICT takes effort and determination and that it is not always rewarded. Thus considerable change to make ICT mainstream in school is needed so pre-service teachers might 'slip' into a prepared school, and be able to initiate activity easily and that such enterprise would be valued.

Work pressures and fear of "losing the job" if pre-service teachers asked for leave from work duties to attend school activities creates anxiety. Pre-service teachers clearly choose work and family commitments over additional hours required in project-based learning. Building activities into coursework and stipulating requirements at the beginning of a course enables pre-service teachers to plan work commitment around university responsibilities.

Victoria — context for reform

For schools

Planning to use ICT in normal terms and not only special terms would create a sense of business as usual.

Western Australia — context for reform

For schools

Schools adopt pre-service teachers because of their contractual obligations to the university and value the extra attention they receive. In this project, school distractions with swimming, sport and camps, created disruption to classroom learning and the practicum, and sent a message that extra-curricula activities take priority over academic work. School curriculum programs may need to be sharpened to balance distractions.

For universities

The message to teacher educators is that pre-service teachers need to be nurtured so they remain within the university and not become disenchanted by high expectations of community work and additional projects. This view needs to be given a positive spin. The funding to education faculties needs to improve to generate higher staffing levels, so ICT in learning programs can be expanded to keep pace with the prioritising in the systems. Universities need to be developed to be leaders in ICT innovation and thought, a state not possible with current funding and university priorities.

For pre-service teachers

It is important to reverse the fear that pre-service teachers will be disadvantaged by using ICT in teaching practice. This fear has 'cult-like' status developed by accumulated stories of reluctant computer-using teachers harshly assessing risk takers. Positive stories and active promotion to pre-service teachers about the value of using ICT may negate the damage. The university's whole-of-school philosophy when seeking schools to participate means that schools join the program under the understanding that there will be ICT use throughout the school. Teachers receive professional development programs and the school is asked to be ready to accept pre-service teachers who want to use ICT. Using ICT specialist schools like the '100 schools' may create more positive circumstances for pre-service teachers involvement.

The sense that using ICT is not normal gives voice to those who do not want to exhibit enthusiasm for using ICT and they are supported in the school culture for this. Schools need to adopt technologies holistically and encourage pre-service teachers to support the school as it adopts that stance. Schools need to encourage pre-service teachers to use schools as an opportunity to try new things and support school change. Strong hands-on leadership in schools would be required to reverse negative trends. Pre-service teachers need to want to use ICT. Personal laptop loans at universities provide access and promote personal ICT use. Creating innovative ICT projects, particularly in multimedia and new media in coursework will enable pre-service teachers to use ICT creatively and enjoy using ICT.

The collaborative models for professional learning adopted in the state and territory projects required support from universities and schools and required positive attitudes by pre-service teachers, teachers and teacher educators. A culture of innovation and an optimistic outlook is needed about uses for ICT in learning. Also needed is some flexibility and adoption of new ways of thinking about professional learning, acceptance of pre-service teachers for practice teaching, and mainstreaming ICT.

Expanding knowledge of professional learning models

For a professional learning partnership approach to be sustainable in school environments, schools will need to adopt broader professional learning models. They will need to value university involvement and pre-service teachers presence in schools as professional development. Universities will need to deliver programs and projects around pre-service teachers involvement in schools, creating mutually beneficial programs for everyone. Universities suggested they wanted schools to "think of us first" when seeking professional development about ICT in learning. Both parties will need to develop understanding that professional development opportunities are available when partnerships between schools and universities are formed. This can be supported by policy that recognises the contributions teachers make to their professional learning, when they are involved.

Responsibility by teachers for pre-service teachers

There is evidence in all reports that universities find it difficult to access sufficient quality placements for pre-service teachers in schools for practicums generally and that the task of finding teachers sympathetic to using ICT is even more difficult. There is a view that the ageing teacher population have accumulated a history of negative experiences with practicum incidents to the point that not accepting pre-service teachers is normal.

This needs policy intervention and acceptance of a tolerable stand on responsibility for the next generation of colleagues. Schools generally need to persuade their teachers that hosting pre-service teachers is a professional development experience, especially in the context of structured university-led programs in ICT pedagogy. Policy changes can include making acceptance of pre-service teachers required as a condition of employment, a component of teacher standards, especially those relating to professional responsibilities and attitude, and a necessary demonstrated competency in career advancement. Teaching institutes, now taking responsibility for teacher registration, could include acceptance of pre-service teachers as part of the professional standing for fully registered practicing teachers.

Although policy intervention corrects trends, there is a need for the teaching community to agree to support new teachers coming into the profession. Project leaders in their reports and at the forum strongly implored *Teaching Australia* to begin a campaign to raise awareness of pre-service teacher needs and universities are calling for collaborative professional learning partnerships like those explored in the PICTL study. Systems too were asked to conduct awareness-raising campaigns and provide incentives for schools to be involved.

Mainstreaming ICT

Projects clearly reported that low use of ICT in schools by the majority of teachers, reinforced pre-service teachers to associate a negative culture to ICT use in schools. Their supervising teachers do not use ICT routinely. School processes for accessing ICT are not robust and pre-service teachers found they needed to undertake long preparation periods to set up equipment, access services and seek permission. From listening to the workplace banter about ICT in learning, pre-service teachers believed they would be disadvantaged by using ICT in the practicum, not only because they thought teachers would view any issues that occurred as poor performance by the pre-service teacher, but that it was not clear what the expected use of ICT was, by school systems, schools and teachers. Pre-service teachers also believed they were being asked to use ICT in schools when this was not required of their supervising teachers.

Universities want schools to model use of ICT and to expose pre-service teachers to a positive culture. The state and territory projects offered strategies to achieve that through collaborative professional learning around co-planning and co-implementing experiences. In that regard, universities wanted to raise awareness of their capacity to support school ICT journeys and the role pre-service teachers can take in supporting schools.

6.3 Strategies for sustaining learning partnerships

State and territory projects reported possible strategies for sustaining partnerships beyond the life of the project. In these projects partnerships had two meanings. They were partnerships where: pre-service teachers, teachers and, often, teacher educators embarked on a simultaneous learning journey; and where institutional arrangements provided robust structures and processes around which individuals could work. For many, the capacity to initiate professional learning projects stemmed from the personal connections of individuals. Hence, the status given to institutional partnerships varied.

Australian Capital Territory — strategies for sustaining

Professional learning journeys require multiple learning incidents. For universities to influence schools' uses of ICT, there needs to be multiple channels of professional development between schools and universities. This builds relationships and generates opportunities. Partnerships and working relationships between individual schools and the university become more established as they do further projects together. If the partnership activities generate case studies of teacher practice, and become a source of research projects, they will influence the design and content of pre-service education units and add an integrative feature into pre-service teacher programs.

Pre-service teachers are available each year to work collaboratively with schools, providing a renewable workforce of innovators available to try things in schools. As schools embark on innovation cycles, pre-service teachers will see there is fertile ground for their ideas, and be more willing to collaborate with schools. Project-based learning is a powerful model for pre-service teacher learning enabling them to develop their practice rather than only developing theoretical knowledge and skills. Being able to locate these projects in schools is essential and once mainstreamed as a professional learning strategy in the university, it will produce a supply of school-based projects that can focus the professional learning of teachers. Thus, universities may need to be the instigator of activities, at least in the beginning.

New South Wales — strategies for sustaining

The commitment of the partner associations to work together was strengthened by the project and has already resulted in additional joint projects being initiated. The key to partnerships is to do things together and enable different schools, groups of lecturers and cohorts of pre-service teachers to be involved. Accessing funding for additional projects and especially those that involve remote practicums provides the means to devote resources to joint partnership projects. Sustaining the submission writing process is difficult, something possible only in a research centre like the SiMERR National Centre where support is available to complete a quality process. If annual grants automatically provided funding to support pre-service teachers activities in remote schools, valuable time could be put into developing the programs.

Partnerships are strengthened with longer-term projects that contain many activities and provide opportunities to allow pre-service teachers and lecturers to work with schools. Further, projects provide an audience to showcase ICT in the district and between schools.

Using projects as a source of content for pre-service teachers' programs provides a rationale for teacher educator and pre-service teacher involvement. Focusing research projects in partnership schools provides additional opportunity for participants to be in schools, to feed knowledge back into the school community, and to design improved professional learning programs.

Northern Territory — strategies for sustaining

This project was not a happy partnership, but as a consequence it offers a different perspective on the conditions for successful partnerships. Partnerships require a willingness to build common ground and develop common cultural approaches to professional learning. Partnerships with schools require strong communication systems and liaison people who take a hands-on role in generating and sustaining activity.

Queensland — strategies for sustaining

This partnership is based on generating innovation and hence requires that the university build a community around school innovators to sustain the energy and enthusiasm of the school-based ICT leaders and the pre-service teachers who take up this challenge. Building innovation cycles with new schools provides a continuous supply of sites for pre-service teacher activity and thus builds up a range of university-school partnerships in the local region. There is a need for diffusion of the innovation model to sustain cycles of innovation and diffuse new knowledge throughout a school or cluster.

Enabling pre-service teachers to take leadership roles in the community and manage their own projects is sustainable from a university perspective in management terms and in terms of supporting pre-service teachers to reach and demonstrate their potential. In schools where spare management energy is rare, this approach enables schools to be involved more easily.

The documentation process for the school-based resources becomes the legacy of each partnership. Collating these into a website generates a culture of sharing and an awareness of the value of the partnerships with the university and promotes the qualities of pre-service teachers. Promotion of the partnership generates the message that both parties want them to continue.

Focusing much of the university's activities around New Basics schools is sustainable for the university because it reduces the clutter in the pre-service teachers program, provides common ground for partnerships and improves the university's capacity to enable their pre-service teachers to specialise on the region's local curriculum.

The program is extending to more and more internships in schools, which are highly valued by both schools and pre-service teachers and represent a sustainable (and funded) structure that provides a final focal point in the pre-service teacher journey. Some have become available in remote communities, improving partnerships in more remote clusters.

South Australia — strategies for sustaining

The university has committed to building Departmental initiatives into coursework and pre-service teachers activities in schools more often. This represents the confidence the university has in the capacity of pre-service teachers to contribute to the action research of the Department about its initiatives in schools. To sustain the model, the university needs to involve more teacher educators from a range of disciplines. This would develop the model as a mainstream strategy for school-based project learning and assist the university to fulfil its community-learning mission simultaneously. Inviting schools to initiate projects is an important sustainable management strategy, so that the task of brokering partnership schools is practical within university resources. Including Departmental staff as guest lecturers raises awareness of issues and initiatives of importance to the partnership to many more pre-service teachers.

Building ICT-centred project-based learning into the practicum model is sustainable because all pre-service teachers do undertake a practicum. However, a model of delivering the additional support to pre-service teachers before and while they are implementing projects in partner schools is required if quality projects are to be undertaken.

The Department has been encouraged to involve pre-service teachers in trials, professional learning programs and research.

Tasmania — strategies for sustaining

The Tasmanian model paid for teacher time for collaborative planning with a pre-service teacher. Schools reported this made the project possible for them and it was appreciated. Thus for the project in partnership schools to be sustainable, this funding model needs to be continued. Variations in the 'payments' system to schools and teachers may re-divert small inadequate payments to teachers into the equivalent of teacher release days. The model with some improvements is quite robust and able to be duplicated in more schools. The Department might be able to provide a resource person to broker ICT projects and then mentor teachers and pre-service teachers as they undertake innovative projects. The university intends to continue to duplicate the model with more schools. This arrangement already exists to support the practicum generally.

A new partnership agreement between the union, university and school systems with greater flexibility around teacher conditions is underway. If this encourages schools to enable pre-service teachers into schools for more than minimal practicum periods and provide teachers with joint professional learning programs centred around supporting pre-service teachers, the partnerships would be strengthened and generate more schools for pre-service teacher programs. Partnerships with more schools would be sustained if policy required that teachers accept pre-service teachers. This could be achieved by building in pre-service teachers' mentoring into teacher standards, and demonstration of pre-service teacher mentoring into promotional pathways. The partnership quality could be improved by enabling pre-service teachers and teacher educators to attend professional learning programs offered by systemic groups.

Victoria — strategies for sustaining

This project was not designed to generate any ongoing projects or activities with partner schools. However, the Catholic Education Office promotion of the partnerships and project has generated a fertile ground to plan new project opportunities should they become available. The partnerships were designed to be learning partnerships among individuals.

Western Australia — strategies for sustaining

Formal agreements between the university and partner schools provide the sustainable infrastructure for this university. Further, the signed agreements with multiple schools enables the university to justify a liaison officer position to nurture agreements and relationships, thus freeing the teacher educators to focus on the project activity.

To sustain partnerships, universities need to be involved with a school over a long period of time and thus build capacity for the school to host pre-service teachers with special projects to do. Involving pre-service teachers more often and more deeply in schools outside of a practicum activity would enhance the quality of the partnership activity and the relationships needed to enact the projects. This needs to be complemented by greater lecturer involvement in schools while pre-service teachers are there.

From the data provided above, five themes emerge and these are discussed briefly below. These are concerned with partnership requirements of the purpose, people to cooperate, long-term management, a framework for professional learning, and policy changes.

Partnerships require purpose

The strategies for sustaining partnerships are complicated by the number of agendas embedded in the purpose for the partnership. If partnerships aim to invoke innovation, the culture of resistance and the intensity of models to sustain innovation add to the task of nurturing the partnership. If the partnerships aim at supporting teachers not yet integrating ICT into their teaching, the partnership needs to deal with the years of accumulated baggage about why ICT have not been used to date.

Universities approach partnerships with the goal of establishing improved opportunities for pre-service teachers to use ICT in schools and so want to establish a model context where ICT is routinely used in pedagogical ways. This requires a long-term strategy where the school is supported as it undertakes a professional learning journey. Only three state projects were designed for supporting ICT pedagogy over a long time, three others aimed at supporting innovation in schools, with long-term intentions, and two did not intend to continue the activity.

For universities, their work in schools, although relevant, is not core business in the current culture. This means teacher educators need to benefit from the partnership in concrete ways for the activity to be justified in an ongoing way and thus sustain their involvement. The projects demonstrated that universities value school-based involvement if it generates case studies about ICT innovation for use as course material, can add to research quantum, provides pre-service teachers with a window into what schools are like, especially if teachers become involved in lectures or online events, develops a culture that teacher educators have contemporary knowledge about schools and helps them maintain their passion for ICT in education.

Although individual teacher educators want further and continuous contact with schools, their role descriptions require them to balance their responsibility with university duties. Thus for school-based projects to be sustainable for them, they need the projects to help them improve course designs and content. This might explain why half the projects aimed at innovative uses of ICT in schools attempted to generate new knowledge.

Schools approached partnerships with both immediate and long-term goals. The immediate goals relate to the learning needs of their teachers or ICT leaders. These are at the forefront of concerns in the context of a long-term view of the future that suggests teachers use of ICT will need to increase and will change with new technologies.

No school reported that hosting pre-service teachers and university projects in schools were embedded in their long-term professional learning plans, but some individuals indicated they appreciated the value of the idea. There was little evidence that schools had any long-term vision for ICT professional development. Partnerships with universities could foster a more strategic approach. For schools, partnerships need to generate professional learning opportunities for individual teachers or small teams and contribute to the schools' directions with ICT.

Partnerships require people to cooperate

Overwhelmingly, sustainability was linked to the desire and need to simply develop joint activities between schools and universities, based on the premise that relationships build when people work together on mutually beneficial and purposeful projects and activities. Including pre-service teachers in such activities as a basis for relationship building had practical merit.

Participants in the project suggested redesigned practicum, community service projects by pre-service teachers, volunteer work in classrooms with a specific ICT foci, action research projects to try new technologies and technological approaches, internship arrangements and pre-service teachers working in schools would all provide the opportunity for pre-service teachers to be in schools. Once there, there was no doubt the synergy would foster improved ICT use in the school.

For schools undertaking partnership activities with universities, pre-service teachers are a renewing source of creative teachers to be involved in school-centred activities with different groups of teachers on different ideas over time. They see it as an evolving relationship rather than a duplication of activity for each cohort of teachers. Such partnerships do need to be deliberately fostered, and reflective professional learning activities built in, to maximise the potential of the learning opportunity. Sustainability of partnerships between individuals and institutions is linked to undertaking joint activity and learning from the experience.

Partnerships require long-term management

Managing partnerships is complex and may require university and school staff to undertake professional development about partnerships and institutional relationships. For universities to manage multiple partnerships to serve the needs of large cohorts of pre-service teachers, management systems would need to be developed. In some states, pre-service teachers took on some of this role and universities appointed coordinators to support the process. The Queensland project management approach may offer a sustainable solution. The documentation generated by the project management process was a legacy of the project and a resource for others. Other projects suggested the education jurisdiction might support the process by offering staff to help initiate and maintain partnerships.

Although partnerships can be successful at the participant level, they need to be successful at the system governance level to be sustainable over time. The Western Australian experience of formal partnership agreements suggests a sustainable strategy to nurture joint projects. Experience in other states warns that care is needed with formal agreements so that they do not constrain the activities and that agreements need regular review to maintain their usefulness.

Formal agreements might offer a conduit for funding remote practicums and other remote school experiences for pre-service teachers and provide rural and regional schools with a source of professional development from their regional university. Without formal agreements in remote schools where high staff turnover erodes relationships, effective partnerships are near impossible to sustain past the generation of initial participants. Formal agreements provide the time needed to support partnerships at the people level, and to build structure into programs so they are effective and efficient. Agreements offer much to sustain partnerships.

Partnerships require a framework of professional learning

The *Professional Development Framework* adopted in the PICTL study contributed to sustainability for all parties. The framework of in-school learning appears sustainable for teachers in remote areas as the chance to meet with teachers from other schools is part of a necessary social structure and professional growth. Learning cycles need input for teachers to learn new things, so they would be willing to participate in a project more than once. This input needs to come from teacher educator involvement, other agencies, innovative pre-service teachers or teachers.

Working with new knowledge is a key to repeat activities by a cohort of teachers or even new teachers in the same partnership schools. Further, the facilitation of ongoing reflection activities was necessary and important to the quality of learning. These activities based upon partnerships are intense to sustain and manage for project leaders, but appear essential to maintain teacher interest.

For pre-service teachers, building models of learning into existing programs is more likely to be sustainable than volunteer programs, especially over long-term degree programs. Community outreach programs, practicums and internships offer opportunities for pre-service teachers to be in schools and achieve credit for their experiences and professional growth. This study demonstrated that pre-service teachers will choose to do activities which enable them to achieve higher standards and they will not participate if they think such activity will jeopardise their progress in their learning program. By building as much school-based ICT activity as possible into their programs, universities are elevating the importance of school practice and helping to generate a more positive culture to pre-service teachers' attitudes about ICT in schools.

Partnerships require policy changes

It will take large numbers of collaborating schools to make themselves available if opportunities are to be offered to large numbers of pre-service teachers. Should this be the case, then policy support will be required from state and national education jurisdictions. Many teachers have accumulated rationales for not being involved with pre-service teachers and so policy may be needed to balance this perception and build a positive culture of support.

Project teams suggested that standards for professional learning should include supporting pre-service teachers practicums and learning with pre-service teachers. Needed are policies that encourage teachers to take responsibility for new and training teachers and that Teaching Institutes incorporate partnerships with pre-service teachers into registration requirements. There is scope for considerable policy support in this area.

Policy support should incorporate resourcing. It costs approximately $1000 to support a pre-service teacher in this intense project model (more for remote locations), a number not sustainable for universities, schools or systems. Even the most creative scaling models would not reduce this number to zero. So, in the end, learning partnerships where pre-service teachers are to be more involved in schools, and where teacher educators need to dedicate additional time, require a funding source.

Some projects suggested that policy change by redirecting teacher payment for the practicum to schools, as is sometimes the case, to buy time for pre-service teachers to be in schools more often. Other creative measures may be possible. Regardless of the approach, the strong message from the projects is that for ICT to be fully integrated into teaching and learning programs there is the need for resourcing the partnership groups to initiate or sustain this form of professional development.

6.4 Developing wider-scale professional development projects

State and territory project teams were asked to recommend ways of broadening the scale of their professional development models and asked which innovative design attributes might provide more teachers and pre-service teachers with access to collaborative professional learning.

Australian Capital Territory — wider-scale projects

Develop the Teaching Studies Unit to include exploring innovative technologies as a basis for investigating models of ICT pedagogy. Improve the professional learning of teacher educators and raise their awareness of the benefits of a partnership approach, so it could be adopted more widely in the university. Construct multiple channels of professional development between schools and universities to build relationships. Use e-portfolios as an assessment strategy more broadly in pre-service teacher programs and encourage their use in in-service education. Use school-based activities to help schools better prepare for the practicum and other activities.

New South Wales — wider-scale projects

Seek additional funding for practicum activities. Integrate partnership activities involving pre-service teachers, teachers and teacher educators, ICT content and ICT pedagogy, into pre-service teachers' units of study. Encourage many teacher educators to adopt such an approach and its subject matter. Incorporate the practicum and other in-school activities so that it can become one of several options available for professional learning. Provide opportunities for schools to share what they are doing with ICT with the teacher educators and pre-service teachers, and simultaneously share ideas with each other.

Northern Territory — wider-scale projects

Incorporate ICT into pre-service teacher programs more broadly. Undertake a total review of pre-service teacher education, perhaps taking a clean slate view of renewing programs. Conduct annual audits of pre-service teacher programs.

Queensland — wider-scale projects

Improve management strategies for maintaining a wide range of activities building in project management processes within projects and across projects. Develop projects with districts rather than single schools to cater for turnover of staff and those times when schools cannot sustain innovative challenges. Nurture community groups including parents, teacher aides and local businesses to be involved in remote areas, providing the opportunity for more stability than school leadership or teacher communities.

Use every available university and coursework structure possible to give pre-service teachers credit for project work, e.g., independent studies, open projects in coursework assessment, the main project of a course, community service requirement, and volunteer programs. Improve the recognition that pre-service teachers can be change agents in schools.

South Australia — wider-scale projects

Include content about new technologies and training programs into coursework to develop knowledge in a larger pool of pre-service teachers. Encourage other faculty members to try partnership activities. Investigate ways of shared staffing between schools and the university. Involve pre-service teachers in Departmental in-service programs. Involve Departmental groups in university teaching and projects. Use as many existing university and coursework structures as possible.

Tasmania — wider-scale projects

Duplicate the model to offer more pre-service teachers the opportunity for pre-planning with teachers, though there are resource implications. Consider if teachers will take more than one pre-service teacher to reduce costs per pre-service teacher. Use technologies to communicate with teams in schools from the university. Emphasise pedagogical applications of ICT rather than skills. This approach appeals to different teachers and pre-service teachers. Equip pre-service teachers to be cultural change agents more deeply before the practicum and offer them support and training in this. Use the internship option to focus some internships on ICT in schools.

Victoria — wider-scale projects

It is unclear if the activity is sustainable or can be scaled. It was not designed to be scaled although the idea has merit. If it were to be expanded then questions of activity focus would need to be considered especially if current teachers were to continue to be involved.

Western Australia — wider-scale projects

Difficult to scale the model involving ICT until schools use ICT more broadly and pre-service teachers are willing to undertake additional activity.

Recommendations shared here relate to attributes enabling scaling, duplication or extension. Some duplication of ideas is appearing, reflecting the interrelationships between the partnership designs, the models of learning and culture in which they were set. Project teams are suggesting this interrelationship is critical to extending this partnership approach.

The *Professional Development Framework* (see Chapter One) involved developing knowledge and experience of ICT as a pedagogy for pre-service teachers and teachers simultaneously. Although variations were developed in this study, the framework was suitable for the individuals involved and manageable for the universities. The variations on the framework were initiated by universities and aimed to ensure pre-service teachers knowledge of ICT had a pedagogical underpinning necessitating activity in or around schools. Professional learning of teachers is not the prime responsibility of universities and although teacher educators took responsibility for supporting the teachers engaged in their projects, broadening the framework to engage all teachers was not envisaged. They were excited about discussing ways of involving more pre-service teachers in quality learning about ICT in classroom use.

For universities, incorporating ICT as a pedagogical approach into coursework was strongly recommended as a way forward and a strategy to at least raise awareness among more pre-service teachers about ICT linked to pedagogy. Generally, project-based learning where pre-service teachers design and implement a project with teachers or other experts offers a tactic to make learning practical and contextualised within the university program. Further, universities reported that the outcomes of projects needed to be deeply embedded in the content of units in the pre-service teacher program, sharing stories about ICT as a pedagogical and curriculum tool in new reforms as routine practice.

Some program structures available in universities can be flexibly interpreted. Project managers suggested independent courses, project courses, teaching studies courses, practicum, community service programs and internships all offered opportunities for pre-service teachers to be in schools. Internships offered most appeal, because they are timed for the end of the pre-service teacher's academic journey when pre-service teachers are most capable of working intensely in schools and taking leadership roles. These structures can be enhanced by flexible approaches to assessment, providing pre-service teachers with credit for their work in schools.

To incorporate this framework into the mainstream of university practice and improve the coordination of school-based activities by pre-service teachers, all teacher educators would need to be involved and committed to a partnership approach and the subject matter. In this project, ICT specialists led the projects. Other disciplines would need to use the model to send a consistent message to pre-service teachers and schools about ICT in learning.

Generally, pre-service teachers have the opportunity to be carriers of messages about ICT in curriculum and pedagogical reform, a state welcomed by some schools and some teachers. In these projects, pre-service teachers became agents of change, initiating new practices in schools, asking teachers to support new ideas and generally pushing the schools beyond their existing state in terms of ICT innovation and pedagogical practice. Broadening this approach by instigating it more often and in more schools will generate an expectation and acceptance that pre-service teachers can be agents of change and together with their teacher educators, be sources of professional learning for teachers.

6.5 Future models for pre-service education and professional learning of teachers

By the end of this study, there was general agreement amongst state and territory project teams that the process that involved teachers learning about implementing ICT pedagogy through a collaborative-planned project with a pre-service teacher, was a powerful learning model for all collaborating parties. Many projects had clear ideas about ways that might improve what they had attempted and this accumulated knowledge provides some background for suggesting future recommendations.

The cultural change needed to support ongoing development and extensions of the existing *Professional Development Framework* involve: changing pre-service teacher perceptions about the use of ICT in schools, helping teachers accept pre-service teachers on practicums, and universities incorporating content about ICT pedagogy into coursework. Each state and territory had their own contributions to make towards considerations for future models of professional learning.

Australian Capital Territory — future models of professional learning

The approach adopted targeted specialist teachers wanting to work with ICT early adopters. Additionally, pre-service teachers who wanted to be at the cutting edge and leaders in the field were also targeted. It is sustainable for a university to support this smaller group, and make substantial difference to the future of ICT use in schools, particularly to create a mechanism for exploring and researching new technologies and new technological approaches to using ICT in learning. The model could be adapted to build 'innovation laboratories', including think-tanks of ideas and forward thinking action-research projects. Some pre-service teachers would want to be involved in this. For the approach to have most effect there needs to be strong action-reflection cycles within the professional development framework and a mentor for that reflection. While the project work is exciting, the deepest learning occurs with facilitated reflection.

New South Wales — future models of professional learning

The Learning team approach with 'evenness' in the partnerships enables everyone to simultaneously be learners and experts. This needs to be preserved in adaptations of the model and be supported by a redesign of practicum experiences to sustain this equality.

Collaborative planning of a curriculum activity/unit is attractive to all participants as it enables them to synthesise their knowledge in a practical situation. This practical feature accords with what teachers need to do. Pre-service teachers gain considerably from planning real activities for authentic classrooms and then observing the results. Co-implementation is even more powerful, if the reflection on implementation was mentored and used to draw out important observations about practice. Constructing measures of learning into the professional learning framework design enables data to be used for this deep reflection.

The pedagogical focus gives the framework a sustainable future because it is everyday business for teachers who strive to improve pedagogy. Talking pedagogy is talking the teachers' language. By honing in on the local pedagogical context, it is more likely to be relevant to the partnership and creates a common solidarity among members. This gives them common ground on which to share and develop experiences. Further the university is seen to be a strong supporter of the regional initiative, thus strengthening the partnership at all levels.

Northern Territory — future models of professional learning

E-portfolios for pre-service teachers provide a way of rewarding them for innovative practice and are relatively flexible, enabling all faculties to use them as assessment. Teaching schools, based on the Professional Development School concept rather than demonstration school concepts, have much to offer as a model to underpin this study and build long-term partnerships. Calling these schools 'Associate schools' may capture the spirit of the partnership. In such an arrangement, the communities of learners will be expected to evolve, changing their involvement as their professional learning matures, and supports cohorts of learners using the partnership for the personal learning journeys. A problem-based action research model for professional learning is most powerful and provides innovative experimentation with a research focus.

Queensland — future models of professional learning

Any tightly knit curriculum, like New Basics, or any other core structure, focuses teacher attention in a school culture. All ICT experiences should be seen as integral to the curriculum to be explored and this tight focus provides a common ground for the community who then have something to share. Sharing becomes immediately relevant and useful. The focus on ICT pedagogy is essential to any model and appeals to a broader cross section of teachers. It enables ICT early adopters to adopt technologies for pragmatic reasons, while they are excited about the new ideas. Consequently, the conversations they have with others take on a broader appeal.

This model is most effective as an ICT leadership model, though it does need to incorporate leadership strategies and mentoring as content in the program of coursework and activities. The next generation of ICT leadership will need to be nurtured while they are pre-service teachers, and helping them develop confidence by putting them in supported leadership positions seems essential.

Conducting multiple pre-service teachers activities in each school with multiple teachers is more likely to generate whole school progression and change than focusing attention on a single teacher. Multiple staff involvement generates a culture of excitement that is harder to initiate with one lone innovator. Here needs to be flexibility in university structures to create opportunities for pre-service teachers to undertake school-based project work that enables them to receive credit as well as gain time to be involved. Stronger action learning processes will support the in-service component of this model.

South Australia — future models of professional learning

Facilitated mentoring and reflection will deepen the activity for teachers and provide pre-service teachers with an early experience of this professional learning framework. The involvement of expertise outside the partnership adds value to the synergy and provides new perspectives, much needed content and knowledge, and enables the organic nature of the partnership to blossom.

The SiMERR National Centre with state and territory hubs may be a useful national structure to explore, research and broker new ways of working with pre-service teachers and teachers around ICT in schools. The impact of this single study is profound (in all states it seems) and needs to be initiated, mentored and steered. Universities alone will not do this easily and the synergy between the project teams is unlikely to emerge without a national structure of some type.

The focus on ICT Pedagogy is profound and will change ICT in Learning across the country and generate different conversations. It will appeal to a greater cross-section of teachers and needs to be the centre of all new ICT in Education activity. The payment system to entice teachers to accept pre-service teachers is unsuccessful. The commodity of release time and resources is far more attractive and may be better 'value for money'. Approaching schools with agreements rather than individual teachers will develop better relationships, enable school communities to benefit from the involvement and provide a better quality experience for pre-service teachers. This alternative vision with partnerships to improve ICT in learning and teaching, would work very well.

Incorporating learning sessions, training, collaborative planning and school experiences into the pre-service teachers program including their assessment, enables them to participate as strongly as they would like, without having to sacrifice work time for volunteer time. The broadening of the approach taken to include more pre-service teachers is complex for the university to achieve and although some deeper awareness raising for all pre-service teachers is possible with 'build-in' components, an all encompassing approach with large number pre-service teachers including project-based work in schools, would need to be targeted at a specialists ICT cohort only.

The mentoring of specialist ICT pre-service teachers and their teachers takes time and would need to be a whole-of-course time span, rather than a term or two. A very comprehensive and powerful program could be built for these specialist pre-service teachers and their collaborating teachers that would have profound impact on their careers and what they achieved in schools. If more than one pre-service teacher was involved in a school with multiple cooperating teachers, the school's journey would be accelerated.

Tasmania — future models of professional learning

Using ICT pedagogy as the focus for coursework and school-based experiences will be sustainable in schools and appeal to them. If pre-service teachers had sufficient professional learning before attending schools, they would be more confident to act as change-agents, at least in the classrooms they had. Schools would value this approach, as part of their professional learning programs and may be more willing to host pre-service teachers specialising in ICT than other specialisations.

Cooperative planning is an excellent strategy to encourage both teachers and pre-service teachers to be involved, and provides the strength of any future activity. Mentoring this co-planning is essential though, to quality ICT experiences in classrooms where both professionals are extended beyond their current practice. Pedagogical change in schools is an essential catalyst to school capacity to host pre-service teachers, so their school experiences are models for the systemic change envisioned by the ICT in learning community.

Victoria — future models of professional learning

The evenness in the collaborative partnerships needs to be preserved and hence it is not appropriate to include activities within practicums. Focusing on teachers' philosophies and assisting them to develop and articulate these further is a cornerstone of a holistic approach that aims to support mainstream teachers. Focusing on pedagogy appeals to these teachers and seems 'useful learning' to them.

Western Australia — future models of professional learning

Partnerships with schools involving multiple teachers is essential for a future model, to assist schools to become role model sites for pre-service teachers. Involving pre-service teachers in their journey on a volunteer basis would deepen the professional learning experience for them. In a future model, combining action learning for teachers and pre-service teachers with action research for university staff enables everyone to participate in the learning journey and share that with each other in the partnership. Deep reflection cycles are important for teachers and the professional school community if the benefit of the project is to be realised.

It was clear that schools have "some way to go" in offering pre-service teachers a school experience where multiple teachers can act as role models for ICT pedagogy. It was also clear from the evidence of successful partnerships, that programs with universities to improve the capacity for schools to host pre-service teachers and to improve ICT use within the school, was valued and simultaneously accelerated the learning journeys of teachers and pre-service teachers, and in some cases accelerated the schools' journey in adopting ICT pedagogy.

The model for initiating and implementing partnerships and partnership activities is intense. State and territory project teams raised issues concerned with sustainability as a key factor in extending the activities, duplicating the approach for more cohorts and mainstreaming the ideas into program designs of universities, including the range of in-school experiences.

In looking back at their experiences, state and territory project teams had differing views about whether the project activities were sustainable for them and whether there was a strategy to broaden the project context to a mainstream model. For some, there was no intention of sustaining the model, having deliberately designed it as a once-only research project; others had embarked on a mission of creating substantial local change. The ICT pedagogy approach that focused state and territory projects, offers much to encourage deep uses of ICT in the classroom practice of these professionals, once they commit to being involved.

Research findings: Effective management

7.1 Introduction

Many management issues have become evident in the research findings in the previous chapters. In order to avoid repetition only the key issues identified are expanded in this chapter. The overall project management centred on the development of a national community of state and territory project leaders, each of which had management responsibilities of their own project. For these project officers, this project represented a small proportion of their workload. Thus the asynchronous communication with occasional synchronous events matched their working styles precisely. In state and territory projects though, the local circumstances of participants determined the extent to which electronic communication was used. This varied from the use of communication tools being the focus of, and means of communication in, the project to some projects that only occasionally using e-mail.

In this current 'connected' era, there is anticipation that electronic communication will be strongly prominent in the professional work of educators. The assumption is that all educators have 'on-the-desk' access to e-mail, connectivity tools and indeed computers, and more than that, that educators are embroiled in the online culture and instant connectivity afforded to other professions. In schools, this is not necessarily the case and especially so with many classroom teachers whose desk-time is limited and whose classrooms do not necessarily have teacher Internet connectivity and teacher machines. In universities, though, there are personal offices, individual computers and better IT support. The use of ICT is embedded in teacher educators culture of working. Thus the different working cultures for the participants in the partnerships in this project meant that use of electronic communications tools varied.

This chapter considers two research questions that together provide information on management within the PICTL study.

RQ 4 What are key project management issues (e.g., importance of defining scope, methodology)?

RQ 9 What are the advantages and disadvantages of using online networking tools (e.g., online communities of practice, closed discussion groups, extranets) to support these partnerships?

For all projects, the initial process of designing and initiating the project created the most project management issues. Once these were resolved and plans were in place implementation was quite smooth, except for perhaps the Northern Territory project where the partnership was not a satisfactory activity for all partners. First, project management issues are outlined, and then, the advantages and disadvantages of using online networking tools to support the partnerships.

7.2 Project management issues

State and territory projects reported a variety of project management issues.

Australian Capital Territory — management issues

Seeking a project officer with sufficient time to host the project was difficult. Finally, a teacher educator with reduced teaching load offered to coordinate the project as an extra. The timing of the project within the calendar year meant that it was not possible for pre-service teachers to be involved in a school experience. Staff changes at schools during the lifetime of the project were extraordinary. Breaks for long service leave and acting positions, as well as changes to school leadership, added complexity to partnerships with schools. University staff changes also added complications to the situation. This particularly affected the steering committee for the project.

New South Wales — management issues

Requiring a contract for the administration of funds based around the research project added a layer of complexity. Seeking permissions to be in schools and obtaining research clearances from the schools was a long and cumbersome process, which began with needing to find up-to-date information on what to do. The timeframe of the project, spanning neither a school nor university calendar year, created scheduling complications. This also reduced the length of the possible timeline for the project, making it unrealistically short. The complexity of undertaking the project, conducting the research and reporting on it in the given timeframe, added to the stress of the project.

Northern Territory — management issues

The initial scope of the project was too extensive and hence unmanageable. This created other problems. The time required to initiate and manage the project was difficult to schedule in an already full teaching and university load. The formality of the steering committee meant that it needed to meet regularly to progress the project. The scheduling of meetings meant that the project could not start in a timely manner and the project was delayed. The university ethics processes were convoluted and complex, and took extreme amounts of time to manage and complete.

The loosely-coupled approach chosen by the management team did not provide the regular updates needed for smooth management of the project and hence did not permit intervention when necessary. The differences in philosophies of professional learning led to an impasse between partners. Lack of communication to schools meant that teachers who were selected to participate did not understand the project and were unclear about what was expected of them. The relationship in the partnership was very unhappy and led to diminished outcomes for the project.

Queensland — management issues

The original contract provided had to be modified before the university would sign it, adding to the workload and delaying the project. This meant that the project costs had to be covered until the funds were available. The added pressure of the pre-service teachers' enthusiasm for the project meant that a project officer needed to be appointed.

South Australia — management issues

Having the Department of Education as the managing partner required extensive checking on contracts. This delayed all administration, payments and reports. The project required the project manager to undertake the project as an extra commitment above normal workload and support it in his own time, as it was conducted outside of standard university teaching time.

Tasmania — management issues

It was difficult to find sufficient numbers of pre-service teachers interested in participating. An outdated contractual arrangement about teaching practicum added a layer of complexity to organisational arrangements. The timing of the project did not fit neatly with a university or school year or the planning cycle required for such activity. Short time for practicum did not allow a big enough project cycle even though all planning occurred before the practicum.

Victoria — management issues

The timing of the project over two calendar years provided only one opportunity for a collaborative project timeline and it was in a short Victorian term disrupted by the Commonwealth Games. Finding implementation time that was common to all participants was difficult. The time required to initiate and design the project by already committed teacher educators was problematic. The contractual arrangement required extensive processes in the university that took an extremely long time.

Western Australia — management issues

The delayed start of the project from the initial approach at tender time meant that the initial contacts had to be repeated and different school selected. The timing across two school years meant that a one-semester project was all that could be completed in a project cycle. Further delays were caused when the project could not begin until contracts were signed. Contract signing was also essential before ethics clearances could begin. Management overheads were seen as excessive and need to be reduced. Offering adequate incentives to pre-service teachers to participate was difficult and their attitudes to using technology on practicum were difficult to overcome.

In managing the project between the states and territories, the management team discovered that all processes are not the same within all universities. Contracts were needed with each participating university to enable management of the finances for a research project. However, it was found that contractual requirements were not the same for each managing university. This added to the complexity of contractual arrangements, as each had to be individually negotiated and managed.

Similarly, it was found that the processes and procedures for university ethics clearances varied considerably, as did the research clearances to work with schools and the necessary permissions to be in schools. The university ethics and permissions clearances can be quite complex and take long periods of time to traverse. Thus the expectation of a short start up period created considerable stress at the beginning of the project. Project officers needed to add the project into the already-set pre-service teacher course and processes, and their own workloads, as well as try and 'rush' an ethics approval process that was already difficult to do in the most menial circumstances.

Important to successful management were the processes and communication employed. All projects identified the need for a strong structure at the management level of the project and a means of sharing critical project information regularly. Those projects that had a clear management structure built into their design and had relevant arrangements in place for a communication system that spread the ownership and the responsibility for the project amongst all key management personnel were able to address issues more quickly and appropriately. Closely aligned with this issue was the need for all key personnel involved with the project to have similar, or at least agreed-upon compromises for, philosophical approaches to ICT learning and teacher professional learning. This did not happen in all states and territories and proved to be a stumbling block for project progress.

The project cycle revealed many dimensions of time that need to be accounted when designing a project cycle. The timeliness of the project did cause issues for each state and territory. The project activity needed to involve an 18-month time span with a six-month planning and design cycle and a calendar year implementation cycle. The critical time for data collection and report development often fell at inconvenient times in the university calendar, though with increasing workloads, any time would have been problematic. This highlights the amount of time needed to actually manage a project. In those state and territories where teacher educators were expected to balance project management within the constraints of their already heavy workload with no time allowance, there were problems with being able to complete all management commitments on time. Teacher educators found that the time needed for management activities was more than expected. This was particularly relevant for the time needed to initiate and plan the project. Similar difficulties arose when teachers tried to find time to deal with management issues.

Involving pre-service teachers was problematic for some states and territories. In those cases, this added to the project management tasks. Further the pre-service teachers fear that using ICT in school experiences would both add to their workloads and jeapodise their results made the project unattractive to them. As has been reported elsewhere in this report, some pre-service teachers rationalised their lack of need for involvement and their poor valuing of the use of ICT in classrooms against their perception that teachers were not required to use them or did not value their use. Strategies for addressing this have been suggested in this report. From a project management perspective, this attitude added complexity to the tasks of the project manager.

Unexpected staff changes at both the university and school level was another complicating factor in the management of the project. In schools, the changes were not necessarily teachers just leaving, but teachers taking sick or long-service leave and teachers having changed responsibilities in acting leadership positions. All these changed arrangements precluded teachers from fulfilling their commitment to the project. Also impacting significantly on support for project implementation was changes to school leadership. Similar personnel issues happened at the university level but not to the same degree.

7.3 Using online networking tools for supporting partnerships

The issues that arose from the use of telecommunication-tools within the state and territory projects for ICT in learning have been described in other chapters of this report. This chapter is restricted to reporting on the use of electronic communication tools for project management and partnership communication. The advantages and disadvantages of using the various tools were reported by the state and territory projects.

Australian Capital Territory — online networking tools

Advantages

The use of electronic communications tools was the focal point for the project and thus using the tools for communications within the project served multiple purposes. Pre-service teachers, teachers and teacher educators and had to develop familiarity with only one set of systems that was applied to multiple circumstances. Further, the value of developing a working culture with the tools added to the general knowledge about the tools under study.

Disadvantages

The school network system had not yet adopted the tools being used and external providers had to be sought. The network and online systems in universities could not be accessed by teachers in schools.

New South Wales — online networking tools

Advantages

The use of asynchronous tools allowed participants to join into conversations when they could.

Online tools provided a record of the project and an accessible place for participants to catch up on the project, remind themselves of activities and access the resources of the project. A website for a project saved the project officer much work.

Disadvantages

Online conversations and events required management for deep conversations. This added to the workload but was important, especially for teachers and others to develop a stronger culture of working online.

The university-based system used did not e-mail participants when new messages were added to the bulletin boards. Thus the communications strategy relied on participants accessing the system to receive management and other communication. Participants did not do this enough. School systems did not offer the necessary tools and could not offer university staff access.

Northern Territory — online networking tools

Advantages

Online tools enabled communication between teacher educators and remotely located pre-service teachers and teachers. The focus of some projects involved using online communication tools and hence using the same systems for management communication enabled synergistic learning. The tools offered some flexibility in the style of communication and enabled multi-person conversations.

Disadvantages

Schools did not offer the same tools as the university and the communication systems of both partners were locked to internal users. The school system does not enable use of new communication tools and external providers were required. Some university sites were blocked by the system, preventing pre-service teachers from using their resources and creating angst.

Queensland — online networking tools

Advantages

The website for the project became the cornerstone of the professional community surrounding the project. Asynchronous tools matched the working styles of people involved in the project. The communication tools enabled mentors to communicate with pre-service teachers and support activities in remote locations.

Disadvantages

The university and school network systems did not use common tools and did not enable partners to see each other's systems. An external service provider was required to host a system that all partners could use. Use of online systems was not part of the culture of all teachers. Bandwidth issues in schools complicated communication and use of websites.

South Australia — online networking tools

Advantages

Use of the Department of Education system was the core activity in the project itself and thus using it as a communication system for management was relevant. Using this system enabled pre-service teachers to access help systems and support.

Disadvantages

The university staff could not access the Departmental system and communicate with pre-service teachers or look at their work. Pre-service teachers could not access the system easily from the university or from home.

Tasmania — online networking tools

Advantages

The use of online systems enabled communication between the pre-service teachers and teacher educators spread over two campuses.

Disadvantages

University systems were not accessible by teachers in schools and pre-service teachers could not access the school systems or obtain support to solve difficulties that arose during use. The university rolls over access rights each calendar year and so straddling the project over two calendar years did not enable data to be easily retained or access rights to be retained.

Victoria — online networking tools

Advantages

A website for the project promoted the project in the local educational community and acted as a common point for administrative information.

Disadvantages

The use of online tools by teachers was not part of their work culture — and so participants saw any online communication as extra work.

Western Australia — online networking tools

Disadvantages

The use of online tools was not common in schools and so was not a natural part of a teacher's practice.

Commonly reported are two issues around using online tools and network systems in partnerships between schools and universities. The key issue is that the two groups use different systems and do not enable easy access to their particular system for outside groups. Teachers did not have access to university networks while pre-service teachers and teacher educators did not have access to the school network systems. Different levels of restrictive policy added complexity to the situation. Thus it was not easy for pre-service teachers, teachers and teacher educators to use common online tools to support communication with each other. Each project needed to make special within-institution arrangements, organise a third-party provider or avoid using online tools except e-mail. Even when some schools had access the use of tools the situation was problematic because of the lack of sufficient bandwidth to support them.

The second issue is that the use of online communication is not yet an integral part of teacher work practice in schools. In many cases the need to develop skills and strategies to use the tools overshadowed the depth and strength of communication. Teacher access is not as common as that of collaborating partners. This is a legacy of teachers' work duties and the need to be with students in classrooms, rather than at their desks.

The potential of online tools to support project management was realised by all states and territories. The asynchronous nature of the project communication for participants involved in multiple activities, suited the working styles of most participants and they were able to maintain momentum in a project while attending to other responsibilities. This increasingly reflects the nature of professional work in education. There was an advantage for all participants when similar online tools were used for both the focus of the project itself and the management process. What needed to be learnt about the tools could be utilised for both purposes. Further, use of online tools was perceived as a strategy to manage participants at remote campuses and schools, and to support pre-service teachers undertaking professional experiences in remote areas.

Some project teams had considered using videoconferencing as a strategy for communicating with remote teams. However not all schools had such facilities and where they did, the use was not strong and/or the staff did not have the skills to manage the systems. There needs to be more acceptance and use of communication tools before their use will be seen as mainstream.

Findings and recommendations for project management

8.1 Introduction

State and territory project reports, interviews with project management teams and the National PICTL Forum all contributed data for the PICTL Study. Results were presented in previous chapters across four themes: evidence of success and innovation, strategic partnerships, towards sustainable professional learning and effective management. The findings outlined in this chapter are framed in response to the 11 research questions arranged under the four themes. This is followed by a discussion of the PICTL *Professional Learning Model*. Finally, recommendations arising from these findings and directed to planning and conducting project-based partnership investigations are presented.

8.2 Evidence of success and innovative approaches — responses to research theme

What does the evidence of relative success of the state and territory projects, based on the feedback of participants, mean for responding to the broad research theme?

Successes reported by the state and territory projects were around consequences for the broad research theme. The research theme was:

> How can classroom-based professional learning projects be collaboratively designed among pre-service teachers, teachers, and university lecturers to focus on quality student uses of ICTs within new curriculum reforms and pedagogical agendas, and which influence designs for professional learning for all stakeholders?

The evidence of success is described below for professional learning, pedagogical reform around ICT, and partnerships.

Professional learning

1. A positive culture of professional learning was generated through practice, conversation, collaborative projects, use of teachers' journeys to inspire others, and reflective dialogue.
2. A collaborative approach, involving pre-service teachers, teachers and teacher educators, and including pre-service teacher involvement in school activities, provided a strong structure in which projects involving innovative use of ICT could operate.
3. A model of continuous learning stimulated sustained and ongoing activities, especially when more than one teacher in a school was involved.
4. A variety of different implementations of the core *Professional Development Framework* with pre-service teacher involvement were possible. These depended on school needs, pre-service teacher interest, and university team approaches.

5. A traditional practicum experience was not always suitable for satisfying pre-service teacher and/or teacher educator needs in promoting positive attitudes about using ICT, or satisfying the requirements of school-based projects.
6. An opportunity to be part of school-based projects was valued by pre-service teachers.

Pedagogical reform around ICT learning

1. A design/implement/reflect/document cycle was successful in the development of collaborative environments.
2. A preparedness to undertake projects using ICT in the curriculum that were unique to a region established schools as leaders in innovation.
3. A willingness to rethink practice and try new approaches provided evidence of reform based on a recognised need to accommodate a wide range of (often idiosyncratic) learning approaches and pathways.
4. A potential existed for student learning to improve as a result of pedagogical changes and engagement in higher-order learning activities.
5. A focus on pedagogy and beliefs provided a more productive learning place for sustaining teachers' and pre-service teachers' approaches to ICT.

Partnerships

1. An involvement in projects exploring innovative technologies, engaging in educational debate and shifting teacher inertia provided a dynamic focus for schools.
2. An increased awareness of the value of partnership links between stakeholders developed, such as teachers developing positive attitudes about working with pre-service teachers, and universities developing increased confidence about offering quality professional development.
3. A focus on commonalities during projects and other professional learning events strengthened partnerships.
4. A measure of the success of partnerships was the preparedness to repeat activities, to recommend involvement to peers, to accept pre-service teachers as partners, and to expand the scale by including more teams.
5. An infrastructure system that is not easily accessible hindered project progress, such problems included the need for written agreements, clearances, specialised technologies, and technical advice.
6. A partnership involvement strengthened and consolidated existing links with the ICT industry.
7. A strengthening of networks, both systemically and socially, resulted from partnership activities.

Summary

Collaborative partnerships in ICT learning projects, based around real work, were a productive context for a model of professional learning for innovation because they provide a proactive opportunity for reflective dialogue rather than having participants react to other's issues. The projects provided an opportunity for pre-service teachers, teachers and teacher educators to rethink aspects of their teaching and learning, especially program design.

Quality planning led to quality implementation and the chance for quality learning. Clear starting points for projects were underpinned by beliefs and pedagogy. Careful choice of focus ensured that higher-order activities were used in the projects. The mentoring and development of new knowledge for teachers, about what to do with ICT in a pedagogical framework, were essential parts of improving the quality of planned ICT use.

A focus on pedagogical change provided the critical momentum needed to involve all stakeholders in a conversation about professional learning. Clarifying and affirming the partnership required the roles for each stakeholder: personal/institutional/industry. The reflection process embedded into the professional learning, assisted teachers to assess the quality of their curriculum and pedagogical ideas. Disseminating the professional learning was important for individuals, school communities and systems. The professional learning process is assisted when ICT pedagogy is given a central focus in pre-service education programs, including embedding ICT into teaching and learning. The current nature of the practicum complicated the project implementations. In particular, the assessment paradigm had an inhibiting effect on the nature of the partnership and ultimately the level of innovation.

8.3 Evidence of success and innovative approaches — professional learning focus

What innovative approaches were used, and how successful were they?

Innovative approaches were identified by the states and territories in terms of their professional learning and the learning context, rather than the ICT used.

Professional learning

1. A reflective component to the professional learning supported the rethinking of pedagogy, especially the planning and the articulation of practice.
2. A focus on leadership and on the roles of those involved in the projects promoted professional learning.
3. A culture of transformation and innovation was developed through the sustained momentum of teams, and by interacting with ICT and the latest ICT pedagogy reforms.
4. An action learning approach provided a short, intense, focused period of learning and support that enabled core learnings to be identified.
5. A culture of inclusiveness and equal status in the group affirmed pre-service teachers' professionalism that translated into the possibility of different approaches from the hierarchical approach of the traditional practice teaching being relevant.
6. A legacy of mentoring and time for professional contact with teachers was provided for schools and professional communities.

Learning context

1. A productive learning environment was created through greater ownership by participants, use of online learning tools, consideration of jurisdiction-encouraged pedagogical approaches, use of digital portfolios, and a focus on multimedia.
2. A sense of leadership within their region was created for teachers as they were encouraged to be innovate and creative, and to extend the boundaries of school experiences.
4. An identification of ICT leaders and champions in schools enhanced leadership, motivation and school capacity.
5. A school-based project was valued as contributing to the school's professional learning.

Summary

It is important to realise that 'innovation' can be a relative term. What is innovative for one community that has issues with resources and staffing may be different from what is innovative for a well-resourced and well-established professional learning community. However, there might also be implementations that are considered innovative across many, perhaps even all contexts. While there was some mention of the use of online tools and digital portfolios, the focus of the innovation findings was on the nature of the professional learning.

Teachers and pre-service teachers were learning together about new pedagogical approaches and using their personal, learning and pedagogy beliefs to interpret the use of ICT. The intense activity that resulted during the action learning helped to target ICT leadership and to place a focus on student learning.

8.4 Strategic partnerships — working together

To what extent do the various groups (schools, universities, government/ non-government authorities) succeed in working together to achieve the desired outcomes?

The success of the various groups working together was evident in the development, the maintenance, and the management of the partnerships.

Developing partnerships

1. A deeper relationship developed with partner schools when formal partnerships or personal relationships already existed.
2. A memorandum of understanding facilitated a supportive infrastructure that generated activities.
3. A common purpose of improving ICT use in schools provided a unified context for learning opportunities for pre-service teachers, teachers and teacher educators.
4. A focus on a particular approach to ICT pedagogy to address local issues allowed universities to develop strong partnerships with schools.
5. A certain level of school cooperation was needed to ensure pre-service teachers were supported.

Maintaining partnerships

1. A preference for supporting activities with a strong sense of community enhanced local loyalties and strengthened partnerships.
2. A mutual respect and a desire to provide collegial support between teachers and pre-service teachers were essential to partnerships.
3. A partnership built over time and through working together initiated new ideas and facilitated continuation of collaborative work.
4. A need for intervention or additional work by one partner to assist pre-service teachers strained relationships.
5. A less successful pre-service teacher professional experience was sufficient to cause schools to decide not to re-host, especially given that teachers did not always view the experience as an opportunity to renew their links with the profession.

Managing partnerships

1. A sharing of management duties within a partnership enhanced its overall operation.
2. A sense of sustainable activity was fostered by better involvement of systems to promote resolution of issues and generation of additional opportunities.
3. A regional systemic involvement, compared to a centralised approach, enhanced local impact and partnership value.
4. A formal steering committee, meeting regularly, added value to a project.

Summary

Partnerships were established through collaborative groups calling on expertise and infrastructures with the potential to enhance a sense of local community. Professional learning within a clearly defined structure that had the flexibility to solve problems was beneficial to all participants.

Formal structures such as management teams and steering committees or existing relationships provided a strong basis for partnerships. However, where they existed, local, less-formal relationships also supported partnerships. The partnerships allowed teachers to renew their commitment to working with universities and pre-service teachers, and the benefits of the partnerships extended beyond those involved in the project activities.

8.5 Strategic partnerships — challenges

What are some of the challenges in trying to implement successful partnerships between differing levels of educational bureaucracy (e.g., governance issues, organisational issues)?

The challenges of dealing with the different levels of bureaucratic process were greater than had been anticipated.

1. Diverse processes and procedures were needed to maintain integrity and capable management in the midst of bureaucratic university structures.
2. A separate contract was needed for each university to allow funds to be managed at a state/territory level.
3. A long lead-time to navigate bureaucratic processes (contracts, ethics, criminal checks, intellectual property) was a significant hurdle, even in the cases when government departments were the managing partner. Often the administrative effort was so great staff considered that this out-weighed the positive outcomes achieved.
4. A lack of access rights to the various education systems' networks and processes, for both lecturers and pre-service teachers, hampered collaboration.
6. A formal steering committee eased some of the difficulties encountered with the bureaucratic processes.
7. An existing personal relationship simplified the bureaucratic process at a local level.

Summary

The most significant challenges in achieving successful partnerships related to the incompatibility of bureaucratic processes. Project management teams were able to negotiate bureaucratic processes when sufficient time was allowed and the relevant education authorities provided support. The bureaucratic process was streamlined when formal agreements were negotiated between institutions. Partnerships supported by steering committees with clear terms of reference and expertise in ICT innovation had better capacity to solve practical and bureaucratic problems.

8.6 Strategic partnerships — transforming teaching and learning

To what extent was it possible or necessary to transform teaching and learning environments and practice?

The transformation of the teaching and learning environment and practice involves both the level of adoption of ICT in schools and the pedagogy to support the adoption. Necessary to this is the generation of enough momentum to ensure ongoing transformation and the establishment of suitable learning environments with ICT.

Level of adoption of ICT in schools

1. A sophisticated level of adoption was not widespread in the schools thus impacting on the nature of what could be achieved by ICT-related activities but providing the potential for context-related innovation.
2. A view that ICT was neither required nor necessary in classrooms existed for many pre-service teachers thus creating an 'avoidance' culture.
3. A mismatch existed between the celebration of work by early adopters of ICT and the general limited view of pre-service teachers about the applications of ICT.
4. A whole-school approach to change was created by the synergies and collegial support for ICT leaders and groups of teachers within schools.

Changing pedagogy to support adoption

1. A focus on new pedagogical frameworks or defined philosophies of teaching and learning generated deeper uses of ICT and influenced the outlook of pre-service teachers.
2. A transformation of pedagogical approaches individually, and in groups, was a catalyst for important changes in the way ICT is used.
3. A state and territory focus on pedagogical issues offered a timely opportunity to direct attention to ICT and changes in teaching practice.

Generating momentum

1. A change of teaching and learning culture was possible through a mix of the pre-service teacher/teacher/teacher educator learning community, an intensely targeted model of learning, classrooms as learning places, a philosophy of trying new activities and mentored reflection.
2. A deeper level of change was achieved by the use of quality learning programs, strong mentoring, and inspirational ideas and attitudes of participants.
3. A whole-school approach, with ICT leadership and multiple teachers in a school developing a professional community, created a productive momentum.

ICT in the learning environment

1. A lack of access to ICT in all projects resulted in difficulties for pre-service teachers and teachers to demonstrate their standard of expertise in using ICT for learning.
2. A lack of access to education jurisdiction networks restricted the activities that could be tried.
3. A high expectation by teachers of pre-service teachers' familiarity with ICT (e.g., specific software, logging in, accessing support, loading software, seeking file storage) caused frustration for pre-service teachers.
4. An in-school time before the main professional experience period allowed technical issues to be resolved in a timely manner.

5. A reliance on innovative environments outside the schools' networks was necessary for pre-service teachers, teachers and teacher educators to be able to use innovative ICT.
6. An exploration of collaborative online environments was restricted by primitive ICT services.

Summary

The need to activate pedagogical reform around the use of ICT was evident. A whole-school approach and focus on local issues facilitated adoption of ICT in learning and teaching in schools. However, a deeper level of change was achieved by improving the quality of professional learning and setting pedagogical reflection as a context. Many technical challenges were encountered by the various projects, including poor access to ICT and relevant networks, and lack of connectivity between the different jurisdictions' networks.

8.7 Strategic partnerships — barriers and successes

What were other barriers and critical success factors impacting upon the success of the strategic professional development partnerships?

Barriers and success factors were identified in the school community and university contexts, as well as in relation to communication, time and innovation.

In-school capacity barriers

1. A need to work with less-confident ICT users reduced the incentive for innovation.
2. A need to conform to school-based logistics and pre-service teachers' personal commitments meant that planning time was limited.
3. A chance to replicate experiences improved project uptake.
4. A high staff turnover and non-supportive whole-school culture impeded the in-school project progress.
5. An ICT leader facing reluctant peers, the notion that innovation was not for everyone, implementation issues adding another layer of stress, and the need to justify pedagogical approaches were all factors that impeded progress for teachers.
6. A lack of mentor training, absence of long-term planning, lack of online knowledge and limited pedagogical views of teachers hampered implementation.
7. A lack of role model when on professional experience and the growing unwillingness of teachers to take on pre-service teachers were barriers to integrating curriculum change involving ICT and different teaching practices.

University capacity barriers

1. A lack of time for project-related activities was a critical factor.
2. A lack of staff, intensification of workloads and staff turnover were significant factors in providing staff for the projects and necessitated persuading others to get involved.
3. A complex process to gain approval for online access and previous project failures influenced the capacity of universities to sustain the partnership.
4. A practicum structure that was too short meant that requirements, including project-based learning, could not be managed.

Communication barriers

1. A multitude of technical problems hampered online communication including the inability of pre-service teachers to work from home, an incompatibility of formats between organisations for materials produced, and a lack of a common technical system for pre-service teachers and teachers due to policy.
2. A lack of experience meant that pre-service teachers and teachers were not always sufficiently familiar with available online learning environments.
3. Frequent incompatibility between the variety of approaches to professional learning used by schools and universities impeded progress.

Time barriers

1. A lack of planning time was identified as an organisational barrier.
2. A mismatch of school and university calendars meant that suitably overlapping blocks of time were not available.
3. A lack of time for pre-service teachers to access schools in pre-planning hindered the achievement of outcomes.
4. A need to mesh the demands of a project with work and family commitments and be able to timetable travel to remote locations were added difficulties for pre-service teachers.

Innovation barriers

1. A lack of experience in online systems and instructional design and pedagogy, an unreliability of school networks, and a lack of access to ICT resources contributed to the lack of innovation within schools.
2. A view that innovation was a distraction caused teachers not to support mainstream uses of ICT.

In-school capacity success factors

1. A promotion of additional activities, positive attitudes, the notion that pre-service teachers have a role to play in ICT diffusion, and equality within the partnership all helped to strengthen partnership relationships and helped to promote success.
2. An allocation of sufficient time for planning, organising sharing days to develop ideas, and support from universities and steering committees were all motivating factors in project planning.
3. A focus on pedagogical frameworks and curriculum change generated opportunities for ICT applications.
4. A sense of belonging to a community, the sharing of the similar beliefs by teachers and teacher educators, and the reinforcement of the role of ICT leaders were successful in promoting partnerships.
5. A critical mass of teachers in a school to ensure professional growth takes place, a willingness to become involved and access to a range of ideas were integral to success.

University capacity success factors

1. A project-based learning approach with provision of mentoring was beneficial for pre-service teachers in their professional experience.
2. A common pedagogical and philosophical basis for schools and universities and a clear management structure to support innovation in schools strengthened university capacity.
3. A critical mass of teachers, sustainability through a number of partnerships, continuity of the projects to enhance teacher capacity, and pre-service teacher and teacher access to the same professional learning experiences all promoted success.

4. A capacity to build relationships and the provision of planning time and a period of awareness-raising about project-based learning promoted positive professional experiences for pre-service teachers.
5. References to ICT in professional teaching standards for pre-service teachers gave authority to the project.

Communication success factors

1. A feeling of being valued as a teacher, the passion of management teams, and a culture of mutual respect and collaboration helped to develop a sense of community through face-to-face visits.
2. A mix of online, face-to-face and telephone meetings provided an holistic support system for pre-service teachers and teachers to become involved in knowledge construction.

Time success factors

1. An avoidance of the first and last terms in the school year maximised the benefits of professional experience.
2. The short timeframe for the project meant that a defined structure was in place that provided a productive context for students.
3. A value-adding component to the projects was volunteer time, the enthusiasm of participants, and the expertise available through partnerships.

Innovation success factors

1. A culture of innovation in schools, recognising authentic needs, being ready, promotion within the school community, a passion for ICT in learning, and a commitment from universities were all factors that promoted innovation.
2. A depth of knowledge about pedagogical frameworks, experience in implementing ICT strategies, access to online mentoring, and being able to work with ICT leaders all strengthened the individual capacity to be innovative.

Summary

Barriers that impacted on the success of the partnerships were related to issues affecting people, the availability of time, and access to resources. Many of the issues were resolved given sufficient planning time. Pre-service teachers, teachers and teacher educators needed planning time to work collaboratively using a list of perceived constraints as a focus agenda and to establish a consensus about achievable outcomes for the project in the light of local conditions. Poor access to school and system level tools and networks significantly reduced the productivity of the partnerships.

Alongside the barriers a variety of success factors were identified. There was a number of contributing factors that strengthened partnerships but all success factors did not operate within the one context. Contexts differed within and across states and territories, and partnerships comprised not only the people involved, but also the support structures. A professional learning community was fostered through appropriate recognition of the needs of pre-service teachers, teachers and teacher educators and by structuring factors external to people, such as the professional experience, technical support and timetabling, to meet the needs of individuals. As a core concept for partnerships, collaboration contributed to sustainability over time and beyond the individuals involved.

8.8 Towards sustainable professional learning — education reform

To what extent is effective professional development in this area dependent on whole-school or system-wide reform? What change management issues were faced in trying to achieve these reforms? What cultural change was/is necessary?

There was a variety of indicators of dependence on whole-school or system-wide reform. Also evident were change management issues and cultural change needed to support that reform.

Whole-school or system-wide reform

1. A standardisation of policies and centralisation of ICT network services by departments of education fuelled conservatism and made it difficult for teachers to arrange to tryout web-based tools and services.
2. A lack of support through education authority policies hampered teacher attitudes to accepting pre-service teachers for professional experiences and other activities.
3. A lack of recognition of time spent mentoring and hosting pre-service teachers, as a contribution to professional learning in teachers' awards was an inhibiting factor.
4. An alternative to direct payment for teachers to take pre-service teachers could include access to professional development opportunities and access to ICT resources, as well as release days.
5. A commitment on the part of pre-service teachers to domestic or 'paid work' situations meant it was crucial that projects were embedded in university programs rather than provided as additional or optional activities.

Managing change to support reform

1. An increased amount of time was needed for teacher educators to work in schools.
2. A break in the cycle of low ICT use, in spite of observed practices, must be encouraged with pre-service teachers.
3. A research centre at a university can bring a greater focus and more resources to projects than individual lecturers.
4. A greater emphasis is needed on university-based mentor-training programs to be made available for teachers.
5. A greater level of access to technology, laptops, up-to-date software, services and support is needed if pre-service teachers are to achieve the expectation that they use ICT in teaching.
6. An inclusion of project stories into lectures and coursework material can raise the profile of ICT innovation in universities.
7. There is a critical need for pre-service programs to address the educational bases on which ICT-related activities can be justified. If this were the case it would address pre-service teachers having to 'prove' the value of an ICT-related activity.

Cultural change to support reform

1. An increased awareness was promoted of universities as places to seek professional development support.
2. A higher profile, as leaders in ICT innovation and thought, was developed by the universities.
3. A professional learning model was more successful when team building was involved.
4. A collaborative approach to planning with the partners, especially between teachers and pre-service teachers, was needed.

5. An effort by teacher educators to support and encourage pre-service teachers reduced the number of pre-service teachers "turned off" by the response of classroom teachers to attempts at ICT innovation.
6. A reversal of the fear that using ICT in teaching practice will disadvantage pre-service teachers must be facilitated.
7. A recognition that student work provides evidence of the value of ICT in mediating pedagogical reform is necessary.
8. An assurance from the school that pre-service teachers can explore and experiment, and that less conventional outcomes will be tolerated, examined and perhaps even valued, would promote innovation.
9. A culture of innovation and encouragement developed for all teachers will allow them to extend innovation past the ICT leader, who sometimes acts as a gatekeeper.

Summary

System-wide reform must address policy as well as recognition of the contribution of teachers in supporting pre-service teacher professional experiences. Managing the change necessary for such reform impacts significantly on universities, through staff workload commitments, research centre resources and technical provisions for pre-service teachers. Critical to these reforms are cultural changes from the perspective of pre-service teachers, teachers and teacher educators. Most importantly, teachers must be prepared to allow pre-service teachers to experiment with ICT innovation in the classroom.

8.9 Towards sustainable professional learning — strategies

What are possible strategies for sustaining the partnerships beyond the life of the project?

Those partnerships with strong purpose, functionality and management structures were more likely to be sustained beyond the life of the project. The nature of the implementation of the *Professional Development Framework* also impacted on extending the project.

Partnership purpose

1. An audience was provided to showcase ICT in the district and among schools.
2. A cycle of innovation and diffusion of new knowledge promoted sustainability.
3. An opportunity for pre-service teachers to take leadership roles in the community and manage their own projects was sustainable from the university perspective.
4. A culture of sharing and an awareness of the value of partnerships was generated by collating project documentation onto a website.
5. An invitation to schools to initiate projects was an important management strategy for sustainability.
6. An expectation that teachers mentor pre-service teachers was better supported when built into teaching standards and promotional pathways.

Partnership functionality

1. A multiplicity of professional learning arrangements was developed between schools and universities.
2. A willingness to build common ground and develop common cultural approaches to professional learning was required.
3. A strong communication system and an effective method of liaising with people were critical.

4. An inclusion of unions in developing partnership agreements facilitated negotiations about teaching conditions.
5. An involvement of a university with a school over a long period of time to build capacity for the school to host pre-service teachers helped sustain partnerships.
6. An identifiable benefit for teachers and lecturers, from the partnership, justified ongoing projects.

Management for the long-term

1. A recognised need, on the part of schools or school systems, for universities to instigate activities promoted partnerships.
2. A sustained submission writing process was possible in a university research centre situation.
3. A long-term project that contained many activities strengthened the partnership.
4. An excess of management energy for extra projects was rare in many schools.
5. A focus of university activity around existing innovative programs was sustainable because it minimised extra-curricular expectations on the pre-service teacher programs.
6. A greater involvement of teacher educators from a range of disciplines improved sustainability.
7. A project based on partnership agreement involving groups of participants in universities and schools rather than one of individual agreements between people reduced overly restrictive conditions.
8. A greater contribution at policy level from state/territory and commonwealth jurisdictions promoted effective management.

Professional Development Framework implementation

1. A project-based approach was a powerful model for pre-service teacher learning.
2. A model of delivering additional support to pre-service teachers before and during project implementation in partner schools was required for quality projects.
3. A funding contribution as an incentive made the project possible for schools.
4. The various implementations of the *Professional Development Framework* set a new standard for professional learning.

Summary

A clear purpose and the opportunity to share the outcomes related to that purpose sustained partnerships beyond the limits of the project. Partnerships developed a stronger profile when enough time was allowed for relationships to evolve, communication was nurtured, ownership was established and benefits for all participants could be identified. Although brokerage of partnerships by universities was the preferred option, the choice of project focus was best left to the schools. Facilitation of sustainable partnerships was enhanced through collaboration with unions, university faculties and education authorities.

8.10 Towards sustainable professional learning — wider scale

What are recommendations on ways to develop innovative professional development projects on a wider scale?

The lessons learnt by the state and territory projects provided the stimulus for their recommendations on developing wider-scale innovative projects. Ways to have professional development projects have a wider scale are considered under partnership functionality and management for the long-term.

Partnership functionality

1. An interrelationship between the types of partnerships, models of learning, and cultures of schools is critical.
2. A development of projects with districts rather than with individual schools should be a focus.
3. A nurturing of community groups including parents, teachers' aids and local businesses is needed to provide a greater range of opportunities.
4. A focus on ICT in schools for pre-service teacher professional experiences, especially internships, promotes ICT innovation in schools.
5. A focus on smaller groups of pre-service teachers and teachers who are specialists, such as ICT leaders, computing studies teachers or technology teachers, provides participants who are more likely to undertake self-motivated ICT use.

Management for the long-term

1. A streamlining of management strategies is needed to make it possible to maintain more projects.
2. An assessment strategy in pre-service programs that includes the use of e-portfolios would nurture ICT use.
3. An additional pool of funding for professional experiences, especially internships, is needed to support pre-service teachers in remote schools.
4. A restructuring of university programs is needed to include stronger components on new technologies.

Summary

Major impediments to reproducing, on a wider scale, the models of professional development trialled in state and territory projects, were the time and workload implications for pre-service teachers, teachers and teacher educators. The more activities and management responsibilities that could be built into normal workload for participants the more sustainable the project became.

8.11 Effective management — key issues

What are key project management issues (e.g., importance of defining scope, methodology)?

The issues faced by the management teams in the various state and territory projects were many and varied. Following are some of key issues that surfaced related to timing and personnel.

1. A complex initiation process was noted, requiring contracts and a range of permissions and clearances. Participants found these requirements time consuming to navigate.
2. An unanticipated restriction on the length of time available for the project affected possible outcomes.
3. A complication in meshing calendars for the different institutions involved in a project impacted on the flexibility of the activities that could be achieved.
4. A sufficient amount of lead-time was needed to be able to incorporate pre-service teacher professional experiences in projects.
5. A delay in communication between partners during project implementation impacted negatively on partnership management.
6. A cross-sectorial committee to address issues around bureaucratic processes and technical issues facilitated management.
7. A high turnover of staff, especially in schools, impacted on the management of projects.

8. A high cost in projects was the provision of release time to allow teachers and teacher educators to become involved.
9. A system of university-based rewards for pre-service teachers facilitated their buy-in as participants in projects.
10. A sharing of knowledge across sites and fostering of insightful reflection on results across projects complicated the management process for multi-site projects.
11. A national coordination process for management provided important direction for management at the state and territory level.

Summary

Sufficient time had to be factored into the life of the project to allow for contractual and other procedural matters. This planning time allowed for resolution of issues related to the length of the project to ensure quality outcomes and that the individual requirements of all partners could be met. When time-release and recognition for commitment to projects fostering professional learning were built into standard procedures in both schools and universities, teachers and teacher educators were more predisposed to become involved.

8.12 Effective management — online networking

What are the advantages and disadvantages of using online networking tools (e.g., online communities of practice, closed discussion groups, extranets) to support these partnerships?

The level of use of online networking tools to support the partnerships varied considerably between state and territory projects, with both advantages and disadvantages being recognised.

Advantages

1. A greater flexibility was provided for communication by online networking.
2. Online networking facilitated a record of the project being maintained which could be communicated to a larger group of people.
3. Online networking allowed a medium for contact across campuses and with remote communities.

Disadvantages

1. A number of policy and other technical issues for both schools and university networks acted as a barrier to collaborative use, particularly disadvantaging pre-service teachers who needed to move smoothly between sites and network systems.
2. A lack of an employee number prevented pre-service teachers from having access to education system networks and to work online with their students.
3. A lack of data transferability between systems made communication and sharing among pre-service teachers, teachers and teacher educators very complex.
4. A lack of the requisite tools in some schools resulted in the need to use external providers of online capabilities.
5. A communication culture in schools that did not include the use of online tools or videoconferencing hampered the promotion of online collaboration.
6. A lack of knowledge of relevant tools and a lack of technical help meant pre-service teachers were not comfortable with many of the online systems used.

Summary

Although the disadvantages appeared to outweigh the advantages, all partnerships valued the opportunity to use online communication. The many disadvantages, especially in relation to culture and accessibility, were frustrating for those concerned and not always under the control of the individuals or institutions concerned. Improved "conversations" at the systemic or institutional level are needed to contribute to equality of access for all participants. However, the strengthening of a school communication culture to include the use of online tools needs to be promoted from within schools or school systems.

8.13 The PICTL professional learning model

Professional learning needs to be facilitated. The context in which learning episodes are conducted is critical, as it needs to nurture learners and minimise barriers that impede learning. Partnership activities need to be purposefully crafted to achieve their goals. Clear pathways of learning need to be chosen to meet the precise purpose of the partnerships, raising awareness and knowledge of ICT for learning, gaining and maintaining participants' commitment, implementing activities associated with mainstreaming ICT and developing skills for sharing reflections and other evaluative comments.

In the PICTL study a core *Professional Development Framework* was offered as an initial platform upon which to develop a collaborative culture among pre-service teachers, teachers and teacher educators. There were five phases in the suggested core framework. These phases along with brief descriptions are:

Phase 1 Involving partners in direct awareness-raising events about ICT, curriculum frameworks, pedagogy or other relevant subject matter.

Phase 2 Selecting a specific student learning experience to plan and implement. This might be a unit of work, task, project or series of lessons where ICT would be used powerfully within a curriculum program.

Phase 3 Developing the curriculum unit plan including the detail of the pedagogical philosophy that would underpin implementation.

Phase 4 Implementing the plan in classrooms.

Phase 5 Reflecting on the experience.

The experience from the various state and territory projects brought to light the benefits of basing professional learning around the *Professional Development Framework* and important aspects of the context in which the professional learning takes place.

Benefits of the *Professional Development Framework*

1. An opportunity to engage with core learning enhanced projects and contributed to the formulation of quality ideas and an increased capacity to work professionally.
2. An involvement together in core learning activities allowed pre-service teachers, teachers and teacher educators to develop stronger relationships.
3. A collaborative approach to planning provided an opportunity to integrate curriculum/ pedagogical/ ICT paradigms and contributed to better professional learning outcomes and depth of collaboration.
4. An opportunity to implement projects provided stimulating professional dialogue and learning experiences and highlighted aspects of the practicum assessment paradigm.
5. A reflection component of activities provided schools with the opportunity to consider culture, professional learning models, and innovation uptake as part of their professional journeys.

Context to support the professional learning

1. A capacity and willingness to engage in professional learning are essential as a catalyst.
2. A formal partnership agreement sets in place appropriate structures at the organisational level for finance, human resource and technical infrastructure.
3. A linking of ICT and pedagogy forms a strong basis for relevant professional learning.
4. A focus on pre-service teachers as agents of change facilitates a change in the status of pre-services teachers in collaborative professional situations.
5. A change in school culture to be more accepting of ICT innovation provides a catalyst to engage in professional learning.
6. A whole-school focus rather than a teacher-level focus provides critical support for teachers in creating sustainable change in professional learning.
7. A willingness of educational institutions to rethink and streamline their current policies and processes fosters stronger and more timely collaboration in professional learning partnerships.

Given the experience from the PICTL study the phases of core framework proposed as a guide for the collaborating partnerships have been revised to become the PICTL *Professional Learning Model*:

Phase 1 *Explore new knowledge* — Involve partners in direct awareness-raising events about ICTs, curriculum frameworks, pedagogy or other relevant subject matter.

Phase 2 *Select a learning experience for students* — This might be a unit of work, task, project or series of lessons where ICT is used to enhance the learning experience.

Phase 3 *Plan the learning experience* — Develop the learning experience detail including the underpinning pedagogy.

Phase 4 *Implement the learning experience* — This might occur in a range of environments and should involve the pre-service teachers working with the students.

Phase 5 *Reflect and share* — This reflection should occur on the data, findings and collaboration.

The context in which the model is placed will be critical to it success in creating successful partnerships to produce effective and sustainable professional learning for our educators and innovative changes in the use of ICT in our schools.

Summary

There were several features about the *Professional Learning Model* that was appealing to the PICTL Management Team. The starting point was explicit and it involved identifying underpinning beliefs about ICT and pedagogy practice. It allowed the focus to be set on pedagogical change and the importance of involving all stakeholders in a conversation about professional learning. Opportunities were made available to clarify and affirm the partnership and in particular the roles for each stakeholder, participants, schools, system and universities and where appropriate industry.

Finally, four points are worth restating. First, there were aspects within the model that were seen as advantageous to all projects Second, the model was generic and seemed highly likely to be applicable to the variety of any future projects that might be expected to emerge. Third, the model was sufficiently tight to provide a strong structure for projects as well as allow a clear progression. Finally, and as balance to the above, the model was loose enough so as to allow project team leaders sufficient degrees of flexibility.

8.14 Conclusion and recommendations

Partnerships can be established through collaborative groups calling on expertise and infrastructures that have the potential to enhance a sense of local community and professional learning. Where there is just one university for the education jurisdiction (i.e., in regional areas) a degree of cohesion results that may be more difficult to establish in larger metropolitan areas where there more than one university exists. Projects undertaken within such a clearly defined structure have the flexibility to solve problems or address issues relevant to participants. Successes strengthen partnerships and are a catalyst for the partnerships to develop new projects.

It is unlikely that all success factors identified in the PICTL study can be guaranteed within any one context. However, there are a number of contributing factors that strengthened partnerships. Because contexts differ within and across states and territories, and because partnerships comprise not only the people involved, but also the support structures, the following recommendations concerning managing partnership projects are framed at a general level.

Three general areas generated barriers that impacted on the success of partnerships, and these relate to issues affecting people's workload, the availability of time, and access to resources. While it is important to address these individually, most issues can be resolved given sufficient planning time for participants to undertake the project.

Recommendation PM1: A project-based approach involving pre-service teachers, teachers and teacher educators should be used to establish a positive and productive culture of professional learning aimed at improving ICT-mediated approaches in the classroom. Such projects should:

- offer continuing and relevant learning for participants that contribute to the renewal of commitment to using ICT-mediated learning;
- be based around real issues and exploring authentic learning experiences;
- include more than one person representing each stakeholder group;
- be based on a core model of professional learning that includes careful planning, and a project design, implementation, reflection and documentation cycle.

Recommendation PM2: Projects should have ICT pedagogy as a central focus and pedagogical reflection set as a context for the widespread adoption of ICT learning. This focus should address:

- teacher beliefs about ICT-mediated learning within a context of improving student learning outcomes;
- teacher pedagogical practices;
- how to embed ICT into teaching and learning.

Recommendation PM3: Projects should be planned to include:

- clear terms of reference that take into account the level of adoption of ICT in the participating schools;
- formal agreements between institutions, schools and education systems to help streamline bureaucratic processes;
- aims that provide a unified context for all partners;
- aims that are 'innovative' (as they relate to participants' backgrounds), creative and extend the boundaries of current practice.

Recommendation PM4: Projects should have a strong management structure including:

- a project Team Leader who may require the support of a Project Officer;
- a project Management Team including representatives from each of the partner groups and supported by the relevant education authority;
- a project Steering Committee including relevant representatives drawn from school systems and sectors, universities and teacher registration with expertise in ICT innovation with capacity to solve practical and bureaucratic problems. The purpose of this committee is to support the work of partnerships.

Recommendation PM5: Project Team Leaders and Management Teams should ensure:

- sufficient planning time is set aside for pre-service teachers, teachers and teacher educators to work collaboratively;
- attention is given to perceived constraints on the project as a focus agenda to establish a consensus about achievable outcomes for the project in the light of local conditions;
- elements that sustain the momentum of change are articulated clearly and supported by realistic levels of resourcing;
- sufficient time allocation is factored into projects to account for bureaucratic processes;
- professional learning communities are fostered through appropriate recognition of the needs of pre-service teachers, teachers and teacher educators;
- supporting factors external to people, such as the practicum, technical support and timetabling, are structured to meet the needs of individuals.

Recommendation PM6: To maximise the benefits of the partnerships there should be:

- a focus on roles expected of participants, including those that are to take a leadership position;
- ICT leaders or champions should be utilised where possible to enhance motivation and school capacity;
- protocols that nurture equal status of all participants and that highlight the nature and importance of genuine collaboration among partners;
- a culture of inclusiveness and equal status is to affirm to all groups and facilitate a sense of ownership of the project;
- time allocated for professional dialogue and contact to develop the professional nature of the learning community established.

Recommendation PM7: The transformation of the teaching and learning environment and practice involves both the level of adoption of ICT in schools and the pedagogy to support the adoption. To facilitate an extensive and sophisticated level of adoption, partnerships should:

- be consistent with a whole-school approach to ICT-mediated learning;
- focus on new pedagogical frameworks, potentially proposed at a state, territory or education jurisdiction level;
- celebrate the contributions made by partners;
- proceed cautiously if the pre-service teachers involvement in partnership activities coincides or includes the practicum experience;
- ensure that approaches are evaluated and the findings promoted by partners in appropriate forums.

CHAPTER NINE

Principles and recommendations

9.1 Introduction

> Schooling should develop fully the talents and capacities of all students. In particular, when students leave school, they should: …
>
> … be confident, creative and productive users of new technologies, particularly information and communication technologies, and understand the impact of those technologies on society. (Section 1.6, *The Adelaide Declaration on National Goals for Schooling in the Twenty-first Century*, MCEETYA, 1999)

The vision of the impact of schooling in Australia, exemplified in the above quote, is just one of many challenges facing Australia in embedding ICT in learning. While Australia has made important advances in using ICT for learning across state and territory education jurisdictions in the past several years, especially in the area of ongoing equipment roll-out, much more needs to be done. This chapter provides a series of recommendations that offers a guide to how this progress, built around partnerships, might unfold in the areas of why and how ICT should be used, and to further develop ICT pedagogy.

It is inevitable that over the coming decades the use of ICT applications in learning will be more deeply embedded in the curriculum and take on a more significant role in the lives of students, teachers and teacher educators. Nevertheless, the direction, nature and practicalities of this emerging and evolving role remain unclear. Education authorities are responding to challenges by including ICT requirements in curriculum and pedagogic frameworks, and in professional teaching standards.

Data from the PICTL study indicate that progress in embedding ICT within the curriculum remains limited and when considered nationally, despite large investments of funds, the situation might best be described as being in the early phases of adoption. There are great differences in ICT take-up throughout Australia and in the use of, and knowledge about, ICT in learning within and between systems, schools and tertiary institutions, and between teachers and tertiary educators.

The situation in Australia appears similar to the United States and Europe. There is evidence of some enhancements and developments to the learning process but the teaching profession at large remains sceptical. Also, despite positive opinions being offered by proponents of ICT there are limited documented profound improvements across the curriculum in the areas of learning or teaching. However, as a balance, it must also be said that the evaluation of an innovation against benchmarks which pre-date it, cannot always hope to gauge its potential; and embedding ICT in the curriculum may well lead to significant reforms in ideas about learning, teaching and specifically assessment itself.

The views of participants in the state and territory projects, as well as discussions at the National PICTL Forum, established an experiential base for providing recommendations concerning ICT uses in learning. In particular, there was a strong feeling that the cultural change needed to support ongoing development and extensions of powerful ICT applications in learning involves:

- changing pre-service teacher, teacher, and teacher educator perceptions about the use of ICT in schools;
- helping teachers accept pre-service teachers using ICT approaches while on practicums; and
- incorporating content about ICT pedagogy more deeply into university coursework.

In considering the future developments of ICT within the curriculum we identify five main stakeholder groups. These are:

- *DEST*, as representative of the Australian Government;
- *Education authorities*, such as state and territory education jurisdictions, national bodies, including MCEETYA, AICTEC, and ICTST;
- *Regulatory authorities*, such as Teaching Australia, teacher registration boards and state institutes of teachers;
- *Professional associations*, including teacher and teaching associations (ACCE, principals' associations, etc), and teachers; and
- *Tertiary institutions*, representing universities, pre-service teacher educators and pre-service teachers.

Each stakeholder group has its own contributions to make towards future approaches to professional learning. While the PICTL study has demonstrated that partnerships in ICT learning involving pre-service teachers, teachers and teacher educators are one important way forward, there is potential for new or different partnerships involving these groups of stakeholders to make important advances. The formation of partnerships among such groups has the potential to move the field of ICT learning forward, for the benefit of education provision Australia-wide.

Clearly, a refinement and extension of the development of these types of relationships through DEST-initiated projects is one viable way forward and this idea is addressed within the recommendations proposed later in this chapter. Nevertheless, as embedding ICT in learning is a significant national issue, it requires input and support from all stakeholder groups. Indeed, if genuine, profound improvements in learning and teaching are to be advanced, a united, supportive and collegial approach needs to be adopted by many groups working in partnership.

The primary purpose of this chapter is to take up this theme of partnership cooperation and collaboration, and present a set of broad recommendations relating to embedding ICT in learning from a stakeholder perspective. In section 9.2 a broad context is established by considering 'pluses', 'minuses' and 'interestings' drawn from the findings of the PICTL study. This context leads to seven basic principles that underpin the general recommendations provided in the remainder of the chapter. Section 9.3 extends the seven project management recommendations provided in the previous chapter by offering two specific recommendations about partnership projects as a viable way forward to embed ICT within the curriculum. Both of these recommendations come with important caveats concerning possible extensions or developments in the area of considering partnership approaches involving pre-service teachers, teachers and teacher educators. The following four sections, 9.4 to 9.7, look at recommendations in terms of the involvement of different stakeholders and their role in developing the future of ICT in learning for Australia. The final section, 9.8, offers concluding remarks.

9.2 Seven principles underpinning ICT in learning

While the PICTL study was overtly about exploring different aspects of applications of ICT in learning, a deeper purpose was to draw from the actions, findings and discussions that surrounded the state and territory projects, ideas and principles to guide policy actions and decisions for Australia. In particular, it was expected that evidence would emerge from the PICTL study on which recommendations would flow: (i) about the nature and role of partnerships; and (ii) how Australia might better embed ICT uses in learning into mainstream practices in schools.

This section has two primary purposes. The first is to consider more holistically the findings detailed in the previous chapters by considering the numerous 'pluses', 'minuses' and 'interestings' associated with the conduct and findings of the state and territory projects. The second purpose of this section is the identification of seven basic principles that provide a strong context for recommendations in this chapter. These principles seek to take into account international trends as well as discussions with project team members, at Advisory Committee meetings and at the National PICTL Forum.

Pluses

Many 'pluses' emerged from the PICTL study. Strong collaborative strategies for planning and conducting projects, and for disseminating information were developed and described and these have been discussed and recommendations offered at the end of the previous chapter. Primarily, the PICTL study was significant in raising awareness of issues concerning ICT in learning across Australia. This occurred in:

- student-learning situations in schools;
- program development in initial teacher education;
- school professional experiences for pre-service teachers including, but not limited to, the practicum; and
- programs of teacher professional learning.

Participants reported numerous specific benefits that arose from being part of the PICTL study. These included:

- new ways to think about pedagogical approaches;
- valuable dialogue surrounding ICT applications in learning;
- pre-service teachers, teachers and teacher educators learning together, accelerating the learning journey for all groups;
- the role of personal beliefs about learning and pedagogy acknowledged as precursor to improved use of ICT;
- simple measures of assessment within a project designed to place a focus on pedagogy and student learning;
- targeting and utilising the expertise of ICT leadership and champions;
- a professional development framework available to help ground action learning;
- a narrative used to help make explicit participants' practice and thinking;
- existing programs of study used to explore the pedagogical potential of new technologies;
- on-line learning tools and digital portfolios used to invigorate student interest; and
- multiple starting points for the learning process.

Importantly, state and territory projects demonstrated that synergy is created in school-based explorations involving ICT amongst pre-service teachers, teachers, and teacher educators. There is no doubt that the overwhelming majority of participants found their projects to be useful, valuable, enriching and rewarding. Most indicated a strong willingness, if the context was appropriate, to be involved in similarly constituted partnerships and also to encourage their peers to be involved.

There was a strong belief among the participants that when ICT is embedded within teaching and learning programs there is greater student involvement in, and commitment to, the learning process. Consequently, there was strong support from participants that ICT use needs to become mainstream, i.e., given a central focus in learning in Australian schools. Some participants indicated the belief that embedding ICT into the curriculum in schools should be mandatory.

Principle 1: Re-invigoration of a national commitment to embedding ICT in learning

That there needs to be a re-invigoration of national commitment to, and realistic adoption of, embedding ICT in learning in Australia. At the centre of this work:

- are approaches that mainstream ICT both in schools and within teacher education faculties of universities so that the use of ICT becomes an accepted part of work culture;
- is the involvement of all stakeholder groups including key personnel from state, territory and national education jurisdictions, tertiary institutions and the ICT in Schools Taskforce; and
- is facilitation of the process by a National ICT Framework for pre-service teachers, teachers and teacher educators.

Minuses

As a balance to the positive comments provided above, the PICTL study revealed 'minuses' in the form of challenging issues. The study uncovered and documented, frankly and openly, many of the complexities surrounding strategies for teacher learning. This revealed the need for a much more serious investment of thought and funds to address difficult education concerns associated with using ICT in learning.

There was little significant innovation (in the sense of bringing in new methods or ideas) in the PICTL study. In the state and territory projects it was important to realise that 'innovation' was a relative term. What is innovative for one community that is under-resourced may be different for a well-resourced and sustained professional learning community. For many projects 'innovation' meant newness to the participants in that particular project.

This point highlights two issues. First, the PICTL study findings suggest that using the term 'innovation' and thereby expecting new methods and approaches to be developed may set the bar too high, though it indicates a level and direction for our aspirations. The second issue is that the state and territory project data suggest the need for a more appropriate term to use in bringing about change in current thinking and practice in ICT use in schools, one that is more achievable by, more relevant to, and better reflects the needs of, local groups of teachers and learners.

The PICTL data suggest that the impact of ICT use in schools throughout Australia may be more limited than previously believed. There were examples of teachers unwilling to be involved in projects because they saw ICT use as more work, peripheral to the 'main' game in schools, avoidable, not guaranteeing improved learning outcomes and outside their experience and expertise. Pre-service teachers often reported little use of ICT on their practicums. They expressed concerns about using ICT as it could mean that their practice was too different from that of their supervising teachers and this might impact adversely on the assessment of their teaching performance.

Most state and territory projects are yet to see the rewards of their efforts, particularly in terms of student-learning gains on such dimensions as improved understanding, higher retention and class involvement. This was partially due to the constrained timeframe for the projects, as well as projects having to span a financial, as opposed to a school, year. Nevertheless, it is the writers' strong view that in future activities involving embedding ICT in learning both processes and learning gains should be tested in some form. It is not sufficient to report that there are benefits to embedding ICT into the curriculum based on hunches or feelings that it was effective. The same is true for teacher beliefs. We need to know more about the quality of the learning rather than the fact that teachers enjoyed the experience and thought it was valuable. As useful as this information is, it is paramount that there is evidence concerning students and teachers about what changes have taken place and whether they have been sustained over time.

Finally, technical connectivity represents an issue for sustained future developments in ICT. There was poor access to school and system level ICT tools and networks. Schools had difficulty linking electronically with their university partners. Project leaders reported a lack of computers for pre-service teachers, difficulties in participants obtaining privileges in one another's systems, and incompatibility across systems. This issue compromised the productivity of state and territory partnerships. There is clearly the need for more open level access, for relevant personnel, to system networks and tools generally in education and specifically for individual projects.

Principle 2: Increased investment of thought and research addressing ICT uses in learning

That there needs to be a serious investment of thought and research within Australia into addressing difficult education concerns in embedding ICT in learning. Such investment must include education professionals, ICT champions and strong advocates of ICT uses in learning and teaching. In particular there needs to be a focus on:

- understanding and enacting innovation in Australia in embedding ICT in learning;
- acknowledging teacher efforts, particularly with respect to student-learning gains on such dimensions as improved understanding, higher learning outcomes, higher retention and class involvement; and
- collecting evidence concerning changes that have taken place in learning for students and teachers and whether these have been sustained over time.

Principle 3: Improved nation-wide access to ICT at personnel, system and ICT tool level

That technical connectivity needs to be improved nation-wide to provide better access for relevant personnel to system networks and tools generally in education and specifically for individual projects. There needs to be:

- improved access to a suite of online tools for school systems;
- improved access to school and system level ICT tools and networks;
- improved network services delivering at an appropriate speed;
- improved technologies linking facilities among schools, school districts and university partners; and
- improved access for pre-service teachers to obtain privileges in relevant education jurisdiction systems.

Interestings

The PICTL study alluded to a number of 'interestings' across many interrelated issues. These could profitably be the basis of further discussion and in some cases further exploration. Among those of most significance were:

- ICT-rich learning by participants and institutions;
- sparse resources (conceptual and strategic) employed by different partnership groups; and
- the nature of existing, entrenched cultures.

All of these have been mentioned previously. What follows is a brief consideration of three further issues raised by the findings: the practicum, pre-service teachers as leaders of innovation, and the critical role of learning theory.

There were important warnings about the use of the practicum for project-based learning activities in the reports, especially from pre-service teachers. It is clear that the practicum, as currently envisaged, plays an important role in the development of future teachers. It is also clear that there needs to be practicum assessment mechanisms in place that report pre-service teachers' effectiveness, strengths and areas needing attention. The issue is how to balance the need to assess teaching performance with action-research investigations that may be undertaken at the same time.

There were calls from both pre-service teachers and teacher educators that activities involving embedding ICT in learning should avoid the conventional assessment paradigm of practicums, as this would have an inhibiting effect on innovation. However, data from projects with certain pre-service teachers illustrated that this need not be the case. Nevertheless, concerns in using the practicum for new ICT-focused initiatives were widely and strongly held.

Some pre-service teachers were seen as leaders of ICT innovation. While many pre-service teachers reported greater comfort with technology use than teachers, the notion of new teachers or teachers in training taking a leading role in ICT learning within a school appears problematic. There is much more to successful teaching and successful incorporation of ICT into lessons than technical skill. Also, being familiar with the language and ideas of current pedagogic frameworks, while valuable, does not equate with years of experience where these ideas have been tested, refined and integrated within a teaching style.

Teachers take years to develop appropriate management, planning and presentation skills. Indeed some jurisdictions are attempting to reduce the workload on new teachers to facilitate the development of these particular skills. Expecting new teachers to undertake significant leadership roles in what is a difficult and demanding area of school development might not be in their long-term best interests.

A significant issue was understated, though implicit, in the projects. There was no reference to learning theory in any of the project accounts or interviews with project leaders. Granted, curriculum and pedagogic frameworks did figure, but learning models and theory are different from these. A critically important consequence of this omission meant that project teams had difficulty in recognising and describing learning when it occurred and therefore neglected learning outcomes in favour of a focus on other things (here, notably attitudes). Without a well-theorised approach to identifying learning, it is difficult if not impossible to make hard-edged conclusions about the educational power of embedding ICT in learning contexts. In addition, in the absence of theory, design principles are not easily developed for future ICT-rich learning opportunities or reliable control gained of the educational quality of such environments.

Principle 4: Care should be exercised in expanding the role of the practicum

That care needs to be exercised in utilising the practicum as a professional learning activity to improve the ICT-mediated learning contexts within schools. This may be possible with some pre-service teachers in some contexts but there were concerns about generalisability. The issues are to:

- balance the need to assess teaching performance with action-research investigations that may be undertaken concurrently;
- encourage combined professional learning activities that avoid the conventional assessment paradigm of practicums as this would have an inhibiting effect on innovation;
- create a situation where exploration of ICT uses in learning is encouraged; and
- create opportunities for pre-service teacher explorations, if different from that of the pre-service teacher's supervisor's practice, that do not impact adversely on their teaching grades.

Principle 5: Pre-service teachers' have a role in embedding ICT in learning

That there needs to be a revised view of pre-service teachers, not only as future users (leaders) of ICT-rich provision in schools, but also as sources of ideas and enthusiasm for change. To achieve this:

- schools and universities should jointly plan pre-service teachers' professional experience;
- universities should expect pre-service teachers to have the potential to become joint developers of ICT with experienced teachers, and eventually leaders of ICT-rich learning designs in schools;
- care must be taken not to expose pre-service teachers to expectations beyond their practical, theoretical or competence range, e.g., undertaking significant leadership roles in what is a difficult and demanding area of school development.

Principle 6: Student-learning gains through using ICT should be made explicit

That, as a matter of urgency a policy consensus needs to be established, informed by leading-edge ideas about learning, of what constitutes strong student-learning outcomes within the context of ICT uses in learning. Additionally, there is a need:

- for a more concerted effort both to understand and to enact highly innovative educational approaches of worth in this domain;
- to lead principled educational development in technologically-rich contexts; and
- to equip educators with an available, state-of-the-art underpinning theoretical framework so that they are better placed to guide teaching and learning efforts, to convert hunches and intuition into demonstrable student gains and, genuinely, to innovate.

Principle 7: ICT uses in learning should be supported by underlying models and theories

That ICT uses in learning need to be interrogated specifically for their underlying learning models and theories. While curriculum and pedagogic frameworks are useful they are different to learning models and theory. There is a need to:

- recognise and describe learning when it occurred;
- evaluate gains or progress;
- draw conclusions about the educational power of ICT-mediated learning opportunities;
- design principles for future ICT-rich learning opportunities and thereby gain control of the educational quality of such environments.

Finally, any guiding principles can only make suggestions about setting up the conditions that might be conducive to success. Such is the case here, although these principles do require action. Further, these principles should be seen in conjunction with the recommendations directed at stakeholder groups offered in the following sections. Mostly, these recommendations are about partnerships and we would encourage groups to build on existing local less-formal relationships as well as on any past successes. Genuine collaboration was a strength of all partnerships reported in the PICTL study and it is this important feature that offers the real chance of sustainability of growth in embedding ICT approaches in learning over time and beyond individuals currently involved in activities.

9.3 Creating ICT partnerships

Establishing projects

The PICTL study highlighted the possibilities of utilising the strengths and capabilities of pre-service teachers, teachers and teacher educators through collaborative ventures within a framework for professional learning. This collaborative project-based structure was seen to facilitate learning in classrooms as well as create a rich supportive learning environment for participants. The partnership approaches enabled teachers and teacher educators to rethink their practice, move beyond their current situation and re-focus on learning and teaching.

Three aspects were critical to success. The first was that participants addressed issues of concern or interest for them and the classroom. The second was the inclusion of capable pre-service teachers who were comfortable with technologies and hence made it more likely that authentic and appropriate educational solutions evolved. The third issue suggested that quality joint school and university activities need at least a six-month planning cycle and at least a calendar year implementation cycle to provide a context that best encourages success.

Recommendation 1

That DEST initiate a strategic funding program in which collaborative teams of pre-service teachers, teachers (within schools or school clusters) and teacher educators, and of professional associations, and industry and community groups can seek funding for projects to improve the application of ICT in student learning. Guidelines for the program require that:

- proposals be competitive and evaluated according to established criteria;
- projects be funded in each state and territory;
- a national coordination process/person oversee all projects;
- a project officer be appointed to record, monitor and evaluate project elements that contributed to success at the local level;
- funding complement existing resources provided to universities to pay for in-school experiences for pre-service teachers;
- funding, either included in projects or through other means, be provided to increase the opportunity for university staff to be involved in professional activities with schools;
- schools or school clusters applying for funding have varying levels of ICT resourcing and staff skills;
- projects be established for a two-year period, and 'on application' extension funding be offered to accommodate proposals to continue where they have achieved distinction — particularly, if they can address the need for strongly innovative, theoretically sound and demonstrably effective directions with respect to students', pre-service teachers', teachers' and teacher educators' learning;
- projects be designed as collaborative partnerships involving pre-service teachers, teachers and teacher educators;
- special consideration be given to projects involving remote schools, schools with high Indigenous enrolments, and schools in disadvantaged areas;
- specified contributions be made by pre-service teachers, teachers, and teacher educators;
- participants in projects contribute to the sharing of elements of success through nationally coordinated events; and
- participants be required to specify an appropriate theoretical framework to describe, analyse and understand student learning in ICT-mediated contexts, and by which to formatively and summatively evaluate student-learning outcomes.

There are many demonstrated benefits to the professional learning of participants in such project-based approaches if the activity is well planned and carried out thoughtfully. However, there are two important issues that need to be considered and these primarily concern sustainability issues.

First, in project-based research there is often much goodwill expected of, and offered by, participants. In the PICTL study this was due, in part, to the novel nature of the enterprise, the national perspective and the potential significance of the work to the greater good of Australian pre-service teachers, teachers, teacher educators and students. It is unclear how many times this level of commitment would or could be extended, without support in the form of funds for teacher release, travel and other expenses.

A second sustainability issue concerns the nature of follow-up activities. Participants in the PICTL study reported that they grew because of the experience. The implication being that future work would need to take this into account. However, the nature of this 'second' and any subsequent rounds is unclear, particularly if the membership composition changes.

Underpinning focus

Underpinning meaningful ICT approaches to learning, is a need for knowledge, competence and experience on the part of teachers. This professional background extends not only to proficiency in ICT use, and knowing when and how to employ ICT approaches to learning, but to the particulars of subject knowledge and the cognitive pathways taken by students in acquiring that knowledge. These needs also impact on teacher educators whose job it is to prepare future teachers to take up learning challenges by the careful and thoughtful application of ICT.

The activities of partnerships experimenting with embedding ICT in learning should explore a variety of learning resources and modes of instruction evident in classrooms. In doing this, the most important target for action should be improved learning environments for students leading to improvements in learning outcomes in some recognised or accepted form. These improvements in performance could include: improved levels of skill/knowledge; improved attitudes to learning; and, improved behaviour and attendance.

How the activity performs on such outcomes should be reported as part of the project. The production of academic publications and presentations should also be an outcome of the research agenda in order to produce examples of practice for other teachers to consider, and use, in their own situations. Furthermore, innovative and rigorous theory-based approaches to measuring such outcomes would be significant outcomes of such projects in their own right.

Recommendation 2

That all stakeholder groups ensure that any future activities directed at investigating ways of embedding ICT in learning incorporate a research component focusing on the benefits for school students of the learning activities, including:

- student-achievement outcomes;
- student-management outcomes; and
- student-affective outcomes.

This recommendation requires qualification. Quantifying and then analysing differences in either learning gains for students or improved teaching influences as a result of ICT-mediated instruction, is particularly difficult. In the former case, when identifying the nature of learning gains the metric used to gauge learning improvements can be problematic. If tests are constructed from a perspective of a traditional non-ICT instruction paradigm then the full impact of student improvements may not be

evidenced. As a consequence, traditional assessment approaches may require revision to enable the collection of more robust information concerning the true nature of the student learning that has taken place.

In the latter case of teacher actions, as applications of ICT use in learning represents only one of a number of teaching strategies that a teacher might pursue, it may be very difficult to find a way to measure or attribute the direct influence of ICT on learning gains. The degree of transferability of the findings associated with a certain teaching practice using ICT highlights a further difficulty. With ICT applications in learning it is not simply what technologies are used but how they are used and to what purpose given the particular context. For this reason, an holistic understanding is needed of ICT-mediated learning in those contexts in which it is judged to be significant.

It is the position of the writers that we are as yet at an early stage in collecting and making sense of the evidence for student learning gains or improved teaching practices in ICT-mediated learning. Hence, evaluations of these aspects must be pursued with diligence, imagination and above all patience, through comparisons and contrast in order to perceive the commonality that will, over time, allow us to generalise. On this journey it is critical that ideas are published and made available to partnerships seeking funding.

9.4 Sustaining professional learning partnerships

By foregrounding collaboration between pre-service teachers, teachers and teacher educators, the PICTL study offered a different focus on the professional learning experience for all participants. This study is significant as it represents a priority professional learning area for all levels of government. As we move to consider sustainable ways to encourage ICT learning, then there needs to be new thinking in terms of 'recognition' for members of the partnership and new forms of 'support' offered at system level. Providing opportunities for pre-service teachers, teachers and teacher educators to work together within the scope of their day-to-day duties and activities would clearly be more sustainable over time and be more likely to involve cohorts of pre-service teachers and teachers than merely individual early adopters and enthusiasts.

The system of rewards from this three-way collaboration needs to reflect the particular nature of the professionalism it offers, as distinct from the roles participants currently perform in a traditional practicum experience.

- For the pre-service teacher, such collaboration could become an integral part of their tertiary study program where there would be credit for the activity. Also, it could offer, at best, a leading-edge professional experience or, at least, additional in-school experiences.
- For the teacher, the change could be from a 'payment for services' model to one for creating opportunity for quality professional learning. Paying for teacher release could be a valued enabler to create time for teachers to support partnership activities and generate the quality of experiences where all partners benefit.
- For the teacher educator, the rewards have to do with the service component of workload and the opportunities created for school- and system-based research, and a flow of research-based writing.

Such a change in approach needs to be complemented by a robust and well-theorised professional learning framework, adequate mentoring and effective organisation for its value to be realised.

The use of powerfully embedded ICT in learning may have greater sustainability from a management perspective, when applied in the short-to-medium term to specialist groups of pre-service teachers and teachers; for example with ICT leaders, Computing Studies teachers, and technology orientated teachers. It is important to highlight a potential risk here. This identified group of teachers might be more likely to be interested in transmission-centred issues (e.g., focus on the software) before learning-centred ones. PICTL findings, and other reports in ICT education, suggest that not only is a subtle

partnership required between ICT and learning and teaching philosophy, but particular learning and teaching philosophies may well impede successful embedding of ICT in the curriculum. Smaller cohorts of school executives might also be targeted, as often they are self-motivated to support ICT use and might value the opportunity to be involved in new and interesting projects.

For partnerships to be sustained, continuous activities need to provide professional growth activities for all stakeholders. Building professional activities into the pre-service teacher program is one potentially significant way for the involvement to be justified and sustained over time.

Recommendation 3

That education authorities fund professional learning partnerships between universities and schools in the area of embedding ICT in learning. For professional learning to be sustainable:

- professional learning partnerships with universities must be promoted to schools as a model for professional learning of teachers and a strategy to mentor schools to develop a focus and direction for ICT pedagogy; and
- promotion must include the sharing of success stories and good practice in the professional communities of ICT leaders, professional learning coordinators and principals, and the building, thereby, of sound theories of professional learning that then guide future professional learning, including learning design, curriculum and assessment structures.

Recommendation 4

That tertiary institutions negotiate with education authorities to play their part in sustainable professional learning by:

- developing long-term partnerships with clusters of schools, districts or regions with formal agreements;
- establishing coordination positions, and sharing facilities, expertise and opportunities to circumvent the need for universities to seek permissions, obtain ethics clearances, and negotiate intellectual property rights constantly for each partnership activity;
- providing pre-service teachers with opportunities to be in schools through flexible program structures; and
- encouraging teachers to take advantage of pre-service teachers' activities in schools to develop new knowledge, trial new approaches and conduct action research into ICT pedagogy ideas.

Recommendation 5

That tertiary institutions, specifically those servicing the needs of rural and regional areas, build continuity into their relationships with clusters of schools, so as to overcome the difficulties of transient teaching populations by:

- rotating short-term projects amongst school communities;
- having partnership relationships in place for a number of remote schools so as to meet pre-service teachers' needs of experiences in these locations; and
- building relationships among teams of administrators and teachers over time.

9.5 Supporting professional learning

Mainstreaming ICT in learning into the design of professional learning programs and courses of tertiary study provides the opportunity for quality learning in the core business of pre-service teacher education and school professional learning. Three important aspects are the focus of the following recommendations. They involve timing, access to online facilities and tools, and the availability of implementation support. Of these three, timing is the most difficult to build into the working lives of participants and perhaps the most critical, as it:

- allows for contractual and other procedural matters to be dealt with adequately;
- allows quality outcomes to be met;
- ensures that the individual requirements of all partners are met; and
- enables benefits to student learning to become evident and even quantified.

Recommendation 6

That education authorities with cross-sectoral representation establish policies and procedures that enable cycles of professional activities to be designed and implemented, so that sufficient time is factored into the life of the project without excessive need for permissions and clearances at each iteration.

Recommendation 7

That education authorities and tertiary institution partners ensure equity of access to ICT systems for all participants and equity of school access to tools used in activities. All participants should be requested to strengthen the culture within schools concerning the use of online tools. This is achieved by:

- making use of the services of Education Networks of Australia (EdNA) as a common ground for collaboration for administrative, professional and curriculum use;
- developing strategies to provide pre-service teachers and teacher educators with access to their computer networks and services, and technical support, without undue bureaucratic process and at no cost;
- continuing to promote the use of online tools, networking and real-time communication tools for professional work at every opportunity possible;
- modelling efficient and effective online processes as a way of changing the culture of communication in schools;
- continuing to use online tools and videoconferencing, where appropriate, to communicate with pre-service teachers; and
- supporting teachers by modelling contemporary professional practice and encouraging people to develop knowledge and experience of these tools through the activities of school-university partnerships.

In most activities, schools are expected to provide the project venue and context. Involvement by a school creates the opportunity to showcase results and to take a higher profile in the local and broader educational community. Schools should elicit support from parent and community groups and, where possible, local businesses.

There should be financial and resource incentives for schools to reward involvement in activities, especially in the form of time release. Benefits should include:

- enhancement of a school's reputation in the broader community such as public recognition of school initiatives;
- improved student-learning and student-affective outcomes; and
- improved teacher competence in ICT learning.

This can extend to include public recognition of education authorities that achieve positive outcomes. Importantly, such recognition will increase the return on ICT capital outlay because of the improved incorporation of ICT learning in the school curriculum and teaching programs.

Recommendation 8

That education authorities provide a system of incentives to schools to encourage participation by a critical mass of teaching staff, as appropriate to school size and staff experience profile, in powerful ICT learning experiences. Incentives include:

- teaching relief (i.e., teacher time release);
- ICT resource allocation to schools for successful project completion; and
- an annual recognition/award scheme for schools that demonstrate excellence in ICT use as a result of participation in the activity or as a result of what has been achieved.

Teachers play an important role in project-based professional learning. It is their classes that experience the innovation. As a consequence they are in a very strong position to suggest project foci or to identify how such a focus is consistent with the learning program of their class. It is part of their role to mentor and assist pre-service teachers who are working with them on ICT learning implementation. Teachers are also strongly placed to liaise closely with teacher educators and to timetable visits from partners to the school.

There are many potential benefits for teachers in being a participant in such a project or activity. These benefits include:

- helping demonstrate professional teaching standards criteria in ICT implementation;
- helping demonstrate leadership by exploring innovative ICT practise;
- improving ICT knowledge and its application to learning;
- mentoring opportunities with new teachers;
- increasing status or pay;
- improving pedagogy knowledge and practice; and
- improving student learning and behaviour.

Recommendation 9

That education authorities provide formal recognition for teachers who participate in powerful activities that seek to embed ICT in learning:

- as contributing towards the attainment of ICT professional teaching standards; and
- as evidence of innovative practice in teachers' professional learning portfolios.

Traditionally, the membership of ICT professional associations consists of the ICT leadership and early adopters/enthusiasts, ICT coordinators in schools and computer studies teachers or teacher educators. These associations mostly have a membership category for pre-service teachers and have detailed an advocacy role for supporting pre-service teachers.

Increasingly, ICT professional associations are working collaboratively with other teacher associations to actively promote ICT in learning activities. Joint conferences, collaborate projects and participation in other association conferences have become common practice. Further, some subject and non-ICT associations have launched special ICT projects resulting in journals and conferences with an ICT focus. All associations show evidence of supporting improved ICT use in schools.

Recommendation 10

That professional associations support their membership in their participation in partnership projects by:

- modelling the state-of-the-art with respect to ICT-mediated business transactions in their communications with members and with other education, community and corporate sector organisations;
- nurturing the growth of diverse partnerships and forums for teachers, schools and school systems to collaborate in suggesting, discussing, prototyping, trialling and improving ICT-rich learning environments across a range of disciplines, fields of practice and educational levels;
- initiating, and helping resource and sustain research and teaching connections with organisations including education authorities, other professional associations, and the ICT industry. Such connections are likely to lead to the regeneration of members' knowledge with respect to ICT-rich learning and teaching opportunities;
- mentoring ICT leadership by allowing those involved with networks to share and explore ideas on technological and pedagogical issues and by publishing results of research and professional activities; and
- mentoring pre-service teachers by encouraging their participation in all association activities, and advocating among teachers the need for involvement of pre-service teachers in all levels of school activity.

It is our belief that universities should administer partnership activities. There is an administrative cost in this process. Hence, there is an expectation that there be some flexibility to realign dates or specifications to accommodate university timetables. Also, certain courses and assessments might be configured to accommodate projects, or at least allow some aspects of the projects to be embedded as an (ongoing) component of a particular course. Some accommodation to staff workload would be expected.

The benefits to the university would include increased research funding, improved quality programs that are cognisant of the latest activities in schools, and an increased university profile and partnership with schools. There is reason to believe that there would be increased pre-service teacher satisfaction as well as potentially increased post-graduate numbers from teachers/mentors as a result of being involved in a research activity.

Recommendation 11

That tertiary institutions negotiate with project Team Leaders with a view to recognising the school professional experience of pre-service teachers involved in using ICT in learning activities in schools. Where appropriate, tertiary institutions must:

- allow realignment of professional experience dates and specifications to suit activities;
- include aspects of activity participation in students' assessment requirements for related courses;
- develop ICT learning courses around participation in powerful ICT learning activities in schools and school systems;
- develop ICT leadership specialisation courses around managing the ICT learning process in schools; and
- promote, within universities, ICT learning activities as a pedagogical approach and a strategy to improve the use of ICT throughout faculty programs, for example, by using findings from various activities as relevant data for designing learning programs.

9.6 Supporting effective management

Effective management issues were clearly identifiable within the state and territory reports. These issues were directed towards two areas, national and local. The first centred on the development of a national community of state and territory project leaders. Of interest were the best ways to facilitate these projects and provide a context for them to achieve success. In state and territory projects it was local circumstances of participants that were the cornerstone of effective management. Both national and local issues are addressed in the following four recommendations.

Recommendation 12

That DEST and education authorities be formally recognised as activity partners and provide system support for project management as well as support for collaboration with partners. These partners provide:

- input into the scope and focus of projects;
- system support to participating schools;
- procedural support to university partners seeking permission for the research component of projects;
- administrative support with regard to pre-service teacher authorisations;
- a liaison person who has developed knowledge of the potential of projects as a professional learning approach for supporting ICT in learning; and
- support for initiatives to have education authorities recognise successful teacher participation in the ICT activities.

Recommendation 13

That tertiary institutions encourage teacher educators to take on several roles including:

- lead a project team to take major responsibility for writing proposals and subsequent reports;
- liaise with pre-service teachers and teachers;
- coordinate with education authorities concerning formal system support; and
- encourage wider use of school-based action learning among faculty members at their university and perhaps more widely through research publications and other professional activities.

Recommendation 14

That tertiary institutions acknowledge teacher educators for their professional leadership by the research dimension of activities, by the contribution of work with schools towards professional service, and by appropriate workload allocation. These activities if carefully planned and implemented should be seen to increase the research quantum for the academic and his/her institution. Tertiary institutions must provide teacher educators with:

- a reasonable formal workload allocation to encourage involvement in partnership activities using ICT in learning, and particularly recognising their roles as leaders;
- time and opportunity to distil the complex mix of theoretical and practical ideas in these projects; and
- relevant resources to address the obviously taxing pragmatic demands posed by a collaboration across different stakeholder groups.

Pre-service teachers can play several roles in school-based ICT learning activities. They can be innovation facilitators working collaboratively with teacher partners to improve student learning. They can also be Web documenters, with teachers or teacher educators, capturing the project in some electronic form for the benefit of others.

The possible benefits for pre-service teachers of their involvement in an activity include:

- increased opportunities for school experience;
- enhanced recognition of professional skills;
- course credit in tertiary study program; and
- improved self-esteem from facilitating innovation in ICT in schools.

Recommendation 15

That tertiary institutions encourage pre-service teachers by providing them with opportunities:

- to participate in powerful ICT-related professional learning experiences by formal recognition from universities, e.g., course credit for activities; and
- to undertake a range of ICT-focused studies, either formally offered within their universities by appropriate further-education providers, or as independent, self-taught studies.

9.7 Planning ICT learning activities and innovation

Underpinning the recommendations offered in this chapter is the ideal of reconfiguring learning goals in contemporary ways in different learning areas. The purpose is to develop technological fluency meaningfully at all levels of ability and hence address the notion that ICT is not an optional add-on to education. Clearly, the recommendations have centred on establishing and supporting school and/or cluster-based education partnerships. These endeavours, involving pre-service teachers, teachers, and teacher educators working alongside each other to achieve learning goals (for all participants and students) using ICT, are a worthwhile objective for Australian education. This section considers possible extensions to ICT related activities and potentially new ICT in learning initiatives. In particular, four visions are presented.

First, incorporation of powerful ICT-mediated approaches in pre-service teacher education, together with the recognition that technological fluency is basic to what it now means to be an educated person. This conceivably should lead, over time, to ways of reconfiguring pre-service teacher education at its core. Such activities might eventually be linked to other components of teacher education programs, most fruitfully pre-service teachers' choices of specialisation/major elective study, but later, foundation studies such as sociology, philosophy or psychology of education. It seems most likely that ICT in learning will not only be acknowledged to be much more than an optional component in education but that technological fluency might unify pre-service teachers' study of learning and teaching in both subtle and significant ways.

Second, as was foreshadowed, it is not hard to visualise how these beginning steps, within courses of study at university, might eventually lead towards a much broader and deeper reshaping of the nature of pre-service teacher preparation. Within this vision, sustained collaborative ICT-focused activities could form the core of a carefully planned learning study. This could span a set of university subjects within a teacher education program, aimed for pre-service teacher, teacher and teacher educator participants. Aspiring to such a scale of reform would entail much closer collaboration between partner institutions. Perhaps there might be joint appointments of staff, much like the clinical model successfully in place in hospitals and faculties of medicine. There could also be widespread changes to the ways educational knowledge is generated, as schools and universities share responsibility for understanding how pre-service teachers and students learn in situ.

Third, these visions raise another possible extension of powerful partnerships in applying ICT to learning. In this view, universities, not schools, are the context for the innovation. The focus here is on taking collaborative ICT approaches in learning within tertiary classrooms with pre-service teachers as learners and teacher educators as facilitators. Such an approach would involve different academic groups within a university and even different universities.

Finally, consideration of the interests of school students raises the possibility of a further new initiative that needs to be explored. It is evident that a great many school students, as the 'digital' generation, have high interest, confidence and capability with respect to the use of ICT in learning. A growing body of research attests to their ingenuity in a range of formal and informal learning contexts, strongly suggesting the worth of including them as collaborative partners in their own right. Such inclusion could provoke highly innovative, student-led implementations, assisting other stakeholders to reconfigure ICT-rich learning opportunities in ways that may not have previously been anticipated. Detailed accounts of such work could play a strong role in broadening and deepening the thinking of educators about the educational nature and purposes of technology-rich contexts for learning in schools and universities.

In summary, there is need for a broad discussion and debate about ICT learning in our culture leading to a possible nation-wide policy consensus. Such a focus has the potential to evoke strategies and approaches in bringing about sustainable change in current thinking and practice in ICT use in schools. These actions would be driven by visions of pro-active ways forward that better meet the future needs of Australian culture, teachers and learners.

Recommendation 16

That DEST convene a forum to discuss critical issues facing embedding ICT in learning. The focus of the forum would be:

- theoretical bases of ICT learning in terms of viable learning theories or models;
- what constitutes innovation in ICT learning;
- forms of information needed to establish the benefits of ICT learning to students;
- approaches needed to seed, support and sustain genuine ICT in learning innovation at all levels of education; and
- synthesis of information on ICT learning approaches that describes more clearly the nature of expected learning outcomes for students, teachers and pre-service teachers and, hence, assists in the crucial research-based development of valid and reliable assessment rubrics.

Recommendation 17

That DEST funds strategically targeted research studies, arising from the above forum, aimed at:

- exploring, in operation, those theoretical learning frameworks considered viable;
- targeting genuine system innovation in ICT learning in schools, school systems and teacher education programs, both pre-service and through professional development;
- addressing ideas about what constitutes strong student-learning outcomes, interrogating those assessment rubrics that hold the greatest promise for assessing the impact on student learning outcomes of the embedding ICT in learning; and
- piloting significant alternative visions for pre-service teacher education and professional development to support and enhance Australia's leading edge, technologically mediated educational provision for diverse educational populations, throughout peoples' lifespan, into the future.

Recommendation 18

That DEST, while encouraging stakeholder groups to mainstream ICT activities into their programs as appropriate, initiate projects to research professional learning models and theories, program designs and partnerships in order to inform:

- new models and theories of professional learning partnerships;
- innovative, future-oriented educational activities, with appropriately rigorous, well-theorised assessment structures behind them, that give power and meaning to the use of new learning technologies in schools; and
- university faculties', teacher professional groups' and education jurisdictions' refinement, in theory and practice, of using ICT in learning.

Most state and territory education jurisdictions have databases of ICT in learning exemplars. Education Networks of Australia (EdNA) also has a collation tool for providing access to a variety of exemplars. It is unclear whether there exists quality control measures for selection of exemplars and/or frameworks to justify the choice of exemplars for inclusion. Further, it is possible that not all exemplars may be able to sustain their position as suggested models/approaches given new information emerging from research.

Easy access to quality documentation sharing examples of validated approaches and experiences is needed that can be used to help teachers who are functioning at different levels in different learning areas. We advocate a strong, culturally validated form of communal knowledge building that seeks to encourage higher-order attributes and deeper forms of learning and knowing by teachers and students. This is more likely to encourage stakeholder groups to mainstream ICT activities into their programs as appropriate, initiate projects to research professional learning models and theories, program designs and partnerships.

Recommendation 19

That education authorities and professional associations ensure that the most recent developments in ICT learning are being considered and acknowledged, by using the findings and recommendations from major ICT research initiatives to inform the development and review of:

- teacher professional standards, including registration requirements;
- statements of learning for students; and
- curriculum and pedagogy statements or frameworks.

Recommendation 20

That DEST and education authorities work together to improve the accessibility and quality of ICT learning exemplars by:

- developing a central repository, or at least links to different databases, so that current collections are not fragmented;
- including detail about how these practices might be adapted or adopted by teachers; and
- developing frameworks, possibly based on national ICT pedagogy statements or statements of learning, to review exemplars and decide which are to be included.

9.8 Conclusion

The advent of the development of new technologies, and what we know about this generation's familiarity with new technologies, represent a serendipitous set of circumstances. Herein lies an opportunity to legitimately rethink teaching in much the same way as the professions of medicine, nursing or health, engineering and architecture have done. In this final section it is appropriate to look back briefly over the PICTL study and to look beyond this report.

Despite the small-scale nature of the state and territory projects, their diversity of focus, their commitment to the ideal of ICT learning embedded within the curriculum, and the willingness of pre-service teachers, teachers and teacher educators to work as genuine partners resulted in an impressive list of factors that contribute to collaborative endeavours. We now have data to confirm that partnerships are most likely to be successful if they involve:

- formalised arrangements;
- agreed outcomes;
- incentives for pre-service teachers, teachers and teacher educators;
- commitments from schools, education jurisdictions and universities;
- long-term relationships;
- proposals from school and university staff but managed by universities;

- collation and dissemination of knowledge managed by academics in collaboration with school partners; and
- long-term sustainability through collaboration with unions, tertiary faculties, education authorities and DEST.

These factors were particularly relevant to the state and territory projects in remote sites that are traditionally more complex to initiate and sustain due to high staff turnover. The learning benefit for the people involved, especially the remote school communities whose access to quality professional learning opportunities is limited, was reported as being worth the investment of time, energy and money. The use of remote settings for project-based investigations in this way also encouraged pre-service teachers to consider placements in remote locations.

The projects sought to be innovative. Innovation in the area of utilising ICT-mediated approaches was about bringing in new methods and ideas, and making changes to ICT learning within the context of the participants. While there is value in the findings for ICT learning outside of individual contexts, the main emphasis was on the learning journeys of participants. Overall, however, there was uncertainty in the projects about standards and quality learning outcomes generally and innovation in particular.

The recommendations made in this chapter strongly urge the extension of well-resourced professional learning in embedding ICT in learning throughout Australia. Such activities should evolve around partnerships in which each participant brings a particular valued set of ideas and competences that are shared and discussed. While the projects had strong leadership in terms of management teams and project team leaders, there was also a powerful cooperative and collaborative feel to the projects as members worked through their project focus. All members of the partnership took on leadership or facilitation roles where appropriate rather than relying on a single, omnipotent ICT leader as the sole source of wisdom.

Clearly, we are at a time in the use of ICT in learning when the focus must be on teachers' learning, and their beliefs and teaching approaches, as well as students' needs and learning outcomes. ICT is a tool that has strengths and weaknesses depending on the context and the manner of use. Facilitation of activities with a clear learning orientation will help provide valuable insights that will aid sustainability. Future activities that explore ICT uses in learning should explicitly target:

- the nature of innovation;
- an intensive focus on teacher and student needs;
- the degree of improvement of learning outcomes for teachers and students; and
- the setting of project plans and learning goals grounded in theory.

A developmental perspective is critical for at least two reasons. First, it is important to recognise that some teachers are more committed to and more confident in using ICT applications, less sceptical about the value of ICT uses in learning, and more willing to explore new ideas and approaches using ICT. Hence, some teachers would utilise only limited examples of ICT applications in their class, while others would be able to undertake numbers of applications under support or guidance and some would be able to modify and adjust different approaches depending on the class context. These teachers would require different professional learning strategies and encouragement from those who are able to genuinely transform their teaching practice. Hence, even given this simple four group analysis it is clear that a one-size-fits-all strategy for teachers would be counter productive.

Second, embedding ICT within the curriculum needs more than technical proficiency and competence. Using ICT applications does not preclude poor learning outcomes for students. Teachers need to make decisions on when, where, and in what ways ICT applications are needed. This implies that the teacher is at an appropriate level of development in the subject they are teaching as well as in knowing how

students learn the subject. The difficulty here is that to truly embed ICT use in learning, the teacher may have to reconceptualise their pedagogical approaches. It is our strong view that this is easier for those teachers who have strong subject knowledge, to achieve this over time.

While valuable for participants, innovation that simply moves individuals' or small groups' beliefs or actions from one position to another is not sufficient. At a national level it is important to seed genuine systemic educational innovation, and to test these ideas within a professional learning framework. What is genuine innovation in ICT learning? It is about embracing learning and teaching directions, that envisage ICT learning truly embedded in the curriculum and avoiding casting ICT as an add-on or an end in itself. Furthermore, the core PICTL study parameter — the notion of collaborative partnerships — highlights the worth of a targeted focus on collaborative, community-focused learning as a way of thinking about system reform and renewal. These ideas are urgent and timely, and should now be debated nationally.

Importantly, the actions of embedding ICT in learning should be subjected to high standards of evaluation. Information is needed on the benefits accrued for students' learning. Is it right to expect improved or higher-order outcomes as a result of using ICT approaches in learning? How do we account for individual differences? Similarly, it is important to know the ways in which teachers have benefited from this form of professional learning, how they have taken their knowledge and grown in imagination and critique, and how this new knowledge is manifest in their philosophical and practical orientations to classroom practice. We need information on approaches that describe both students' and teachers' work more clearly, and in terms that recognise and build on those sound, newly available ideas about how learning occurs as part of a lifelong journey.

Education is not a craft or a trade with well-honed and always-successful routines that are simply handed on to each new generation. It is a knowledge-generating profession and an empirical, scholarly field in its own right — with theories and models that can be tested and refined iteratively in practice. Much like the mediaeval cathedral builders who enabled an engineering science, and brain-imaging technologies that re-invigorated neuroscience, new ICT learning technologies have the potential to offer a much deeper science of learning. Moreover, as students are the 'digital' generation it is even possible that this new science will disclose a most subtle and profound understanding of what students know.

Overall, there is a need for broader and more thoughtful debate about using ICT in learning in our culture as a way of seeding much more radical and relevant ideas into learning and teaching. The level of discussion of ICT-rich and ICT-appropriate learning in education needs to become far more holistic, sophisticated and subtle. Clearly, further systemic renewal is dependent on the provision of a firm and educationally powerful theoretical basis for such learning, and a context for discussion and rigorous research investigation that prioritises future-oriented learning designs and organisational structures in schools. Given the urgent social and environmental challenges currently confronting future generations, there needs to be a much more concerted effort to encourage people's imaginative and rigorous thinking about viable alternative educational ideas and strategies.

ICT applications in learning have the potential to act as a positive force for addressing many challenges facing communities in education. Partnerships in ICT learning might well hold the most promising long-term solution for many of these challenges.

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Appendix A

Planning the projects proforma

1. What is the local curriculum reform and how will you design your project to meet this local need? (RQ 1)
2. What is the local pedagogical reform or framework that underpins your ICT pedagogy in your project? (RQ 1)
3. What will project participants learn?
   - Students
   - Pre-service teachers
   - Teachers
   - Lecturers

   How will you collect evidence about what they have learned and how they have learned?
4. What are the quality uses of ICT you seek to achieve in this project? (RQ 1, RQ 6)
5. What professional learning model will be designed into this project? (RQ 6)
   - Teachers
   - Pre-service teachers
   - University staff
6. What will constitute success? (RQ 8)
   - Goals?
   - Indicators?
7. What have you placed into the design to stimulate change?
   - What changed?
   - How can you manage change?
   - What creates a culture of change?
   - What is the context for change?
   - What teaching and learning environments and practice need to change?
8. What do you anticipate will occur during implementation? (RQ 2, RQ 3, RQ 8)
   - What are the barriers to project implementation?
   - What will contribute to successes?
   - Is there synergy in the partnership or is it just a location for this professional development model?
   - What are the issues?
   - Which ones should be answered nationally?
9. What sustainability factors will be build in to support project activity beyond the time frame on this project? (RQ 10, RQ 11, RQ 5)
   - How will partnerships be sustained?
   - Will projects be undertaken on a wider scale?
   - Is sustainability dependent on other reforms?

10. What project management measures have been designed into your local project? (RQ 4, RQ 9, RQ 5)
    - How will you meet bureaucratic challenges?
    - What is the local project management structure?
    - What support do you need from the national project management team?
    - How have you accounted for research clearances and other required permissions?

Appendix B

Interim project report proforma

Section A: Project progress

A1: Local project housekeeping checklist (tick or comment)

Contract signed	
First invoice sent	
First invoice paid	
University ethics completed	
Other school and system permissions	
Research plan discussed with project officer — confidence in baseline data collection and implementing the plan for collection of data throughout the project	
Local Steering Committee met	
Interim Report submitted	
Second invoice submitted	

A2: Activities register

Please note project activities completed and planned for remainder of 2005.

Activities completed	Activities planned for completion in 2005

A3: Maintaining the plan

Comment on your capacity to maintain the original timeline and if your target groups of pre-service teachers, teachers or university staff have had to change from what you described in your project plan. (Notes and bullet points are fine.)

A4: Uses of online environments and tools

Online spaces, systems and tools can support learning in classrooms, professional learning processes for teachers and university staff, and assist in the management processes in the local project. In your project to date, indicate how online learning is occurring.

Tool type	Brand name (if applicable)	Purpose	Who is involved?

Section B: Definitions

In visits to your state, the PICTL Project Officer discussed with you your perceptions of what your team considered to be quality uses of ICT in schools. This was documented at the time and may be valuable data when compiling our final reports in 2006. The interim report need not collect that definition. There are however other definitions that are core to your final report, that will be valuable to articulate now.

B1: Your partnership

In the final report we will need to reflect on our research and experiences of the partnerships in this project and make judgments about their value. It is important to describe what your partnership is and be clear about its purpose. An interim report is a great time to gain some feedback on how clearly you are articulating the core idea of your *Partnership in ICT Learning*.

We have participated in an online debate about a definition for partnership for this project and you may have aligned with a definition similar to the following.

A definition for a partnership is "Regular and sustained exchange of people, ideas and projects. People build relationships in the partnership through exchanges and use the synergy of the relationships and activities to initiate further ongoing and sustained activity."

- Describe the nature of the partnership in your project.
- What is the purpose of the partnerships in your local project?
- What is the evidence, that the synergy of the partnership is contributing to the project outcomes and helping all partners fulfil the project goals?

B2: Innovation

Innovation may be a local new idea, not yet tried or may be an indication of the next evolution of reform. Innovation provides freshness and enables early adopters to influence future thinking.

What innovative approaches are embedded in your project?

Section C: Reflection on the project

The final report will draw more substantial conclusions supported by the evidence you are collecting in your project. The responses to the questions below will assist you to demonstrate your progress in this project and enable the PICTL management team to capitalise on the synergies between the projects.

C1: Impact of the project

What are the early indications of the impact of this project on:

- The design, subject matter and implementation of future pre-service education programs at your institution?
- The design, subject matter and implementation of future professional learning programs in the schools in your pilot?
- The curriculum and pedagogical change in the schools in the pilot?
- The *quality* of uses for ICT in your pilot schools?

C2: Implementation

So far in the project, describe any:

- Barriers to project implementation?
- Contribution to successes?
- Issues arising? Which ones have national significance?

Section D: Preparing for the National PICTL Forum

You are invited now to contribute to the design of the National PICTL Forum, which will be on 26 and 27 April 2006 at University House, Canberra. Two people from each state and territory project will be funded to attend. You will need to develop a position paper a couple of weeks before the National PICTL Forum and then discuss/workshop the issue in your paper with the National PICTL Forum. The National PICTL Forum is both a chance to reflect on your project with peers and contribute to the national debate about the value of partnerships between universities and schools.

- What do you need from the National PICTL Forum to support the development of your final project conclusions? What other purposes do you have?
- What issues/topics/subject matter should be addressed at the National PICTL Forum?
- What models for activities suit your learning style and facilitate analysis of national issues?
- What issue/perspective/analysis to the National PICTL Forum are you thinking you might contribute? (Refer to your local research questions and the project research questions.)

Alternatively, consider what influence you want to contribute to the national debate?

Appendix C

Interview protocol

Michelle Williams will interview you to collect data for the national report. This process may also assist you to prepare to write your project report and shape discussions in your research team. The overall theme is sustainability.

We need to maintain a focus on the driving question for this research project:

> How can classroom-based professional learning projects be collaboratively designed to enable continuing and deeper professional conversations between teacher educators, teachers and pre-service teachers that focus on student uses of ICT within new curriculum reforms?

We also need to respond to the research questions in the contract (hence the references to RQ numbers below).

1. Innovative approaches and evidence of success RQ 1, RQ 6

RQ 1 What does the evidence of relative success of the pilot projects, based on the feedback of participants, mean for responding to the broad research theme?

RQ 6 What innovative approaches were used, and how successful were they?

- How successfully did your project achieve your goal and outcomes?
- What types of ICTs in learning activities were conducted? How sophisticated were they? Any student work and planning collected as evidence?
- What did pre-service teachers, teachers, teacher educators and school students learn?
- What strategies and activities (or their attributes) in the project design contributed to the level of learning? What evidence can be gathered to make judgments about success?
- How can pre-service teachers develop leadership capacity and illustrate their developing leadership in the activities of collaborative partnerships? What impact did pre-service teachers have on teachers' professional knowledge and schools' uses of ICTs in classrooms?
- How did this project design impact on local designs for pre-service education programs, strategies and activities?

2. Strategic partnerships RQ 2, RQ 3, RQ 7, RQ 8

RQ 2 To what extent do the various groups (schools, universities, government/non-government authorities) succeed in working together to achieve the desired outcomes?

RQ 3 What are some of the challenges in trying to implement successful partnerships between differing levels of educational bureaucracy (e.g., governance issues, organisational issues)?

RQ 7 To what extent was it possible or necessary to transform teaching and learning environments and practice?

RQ 8 What were other barriers and critical success factors impacting upon the success of the strategic professional development partnerships?

Purposes for partnerships

1. What type of partnerships and projects can be used to promote professional learning by all stakeholders about the shared goals of improving ICT in learning in schools and in teacher preparation programs?
2. How do partnerships inform constant review of teacher education?
3. How do these partnerships forward the agendas of curriculum reform in schools?

Collaboration in partnerships

1. What structures and processes enabled the various groups (schools, universities, government/non-government authorities) to succeed in working together to achieve the desired outcomes?
2. What are the challenges in trying to implement successful partnerships between differing levels of educational bureaucracy (e.g., governance issues, organisational issues, etc.) and university bureaucracy?
3. What do the stakeholders believe are the other barriers and critical success factors that impact upon the success of the strategic partnerships and were they experienced and overcome in local projects?
4. What are the disadvantages and advantages of using online networking tools?
   - What use was made of online networking tools within local projects?
   - How much were they used?
   - What quality of communication occurred?
   - What are the barriers to collaboration using network tools in a partnership between institutional groups?

3. Towards sustainable professional learning RQ 5, RQ 10, RQ 11

RQ 5 To what extent is effective PD in this area dependent on whole-school or system-wide reform? What change management issues were faced in trying to achieve these reforms? What cultural change was/is necessary?

RQ 10 What are possible strategies for sustaining the partnerships beyond the life of the project?

RQ 11 What are recommendations on ways to develop innovative PD projects on a wider scale?

- What strategies were designed in order to sustain the partnerships beyond the life of the project and is there any evidence of them yielding success?
- What recommendations do you have for designing innovative professional learning projects on a wider scale?
- How do we continue the conversation and research about these models?
- What are the links to curriculum reform — what spurns what?
- What national or broad changes are needed to the context?

4. Effective management RQ 4, RQ 9

RQ 4 What are project management issues (e.g., importance of defining scope, methodology)?

RQ 9 What are the advantages and disadvantages of using online networking tools (e.g., online communities of practice, closed discussion groups, extranets) to support these partnerships?

- What are the project management structures — decision making, research, logistics in schools, systems and universities?
- What external factors impinge on management change management issues?
- What online technologies support management?

Appendix D

Project report design from states and territories

Michelle Williams

11 February 2006

This is the design required for the Report from state and territory projects to PICTL Management, due electronically to Michelle Williams on 8 May. Your report will be included in Management Team report to DEST as a separate volume from the main *PICTL Study Report*. The Reports from state and territory projects will be analysed in preparation for the PICTL report to the Commonwealth. Some text from your report may be used in the final PICTL Study Report.

The following headings should be used. The nature of your project and the results from your research may require you to use subsections and include different ideas to those requested.

1. Introductory pages

   Title page, Project title, State, University hosting project: key contacts and key researchers including their affiliations and role.

   Table of contents.

2. Executive summary

   1–2 pages.

   Brief context, Aim of local project, Brief description of the professional learning projects for teachers, pre-service teachers and university staff. Research questions, Major outcomes, Issues raised, Conclusions.

3. Purpose of the project

   1 page

   Aims — with respect to professional learning programs, the partnership and the local research questions from the plan (or modified plan).

4. Context

   2–4 pages.

   Describe local curriculum reforms and programs, nature of pre-service education with respect to ICTs and the pre-service teacher education program, description of schools, university description, description of participants — characteristics. Significant factors and background impacting on project design, implementation and results. Include any background literature, reports, research and previous work pertaining to relevant themes in your research and project.

5. Partnership

   1 page.

   Describe the partnership between the institutions — the model or structure, the organisations and the purpose of the collaboration. Describe formal and informal structures for management (Steering Committees, etc).

6. Project design

   2–4 pages.

   Describe the general project design and professional learning models — i.e., ways people learned. Activities carried out (flowchart or timeline).

   Detail the scope of the project — how many schools, pre-service teachers and university staff, participant profiles (e.g., Secondary Bachelor of Education program third year students).

7. Data collection and analysis

   2 pages.

   Describe the data collection and analysis process.

   Tables and diagrams may help with the descriptive process.

   Include actual surveys and other instruments in an appendix.

8. Results

   No suggested length, but maintain brevity in report format.

   Data summaries and appropriate explanations.

9. Discussion and implications

   No suggested length, but maintain brevity in report format.

   Discussion and implications of the research questions in local project.

   Discussion of key issues using the headings; Innovation and evidence of success; Partnerships; Future of pre-service education and professional learning for teachers; Management of partnerships and professional learning projects. Refer to the Interview protocol for ideas.

10. Conclusion and recommendations.

    Conclusions of local research project.

    Implications for pre-service and professional learning programs locally.

    Implications for future partnerships.

    Implications for pre-service and professional learning programs nationally.

11. References

12. Appendices

Partnerships in ICT Learning Study: **Full report**