A SHIFTING LANDSCAPE:

Integrating Information Communications Technologies Into a Faculty of Education

The Final Report of the iTeacherEd Project

Dr. David Friesen, Principal Researcher
Dr. Vi Maeers, Dr. Kathy Nolan, Alec Couros
And
Saskatchewan Instructional Development and Research Unit (SIDRU)
University of Regina
Regina, Saskatchewan

April 2004

*A 2-year project (2002-2004) funded by a Contribution Agreement between Industry Canada, SchoolNet E-Learning Programs, and the University of Regina, Faculty of Education
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>4</td>
</tr>
<tr>
<td>PROJECT OVERVIEW</td>
<td>5</td>
</tr>
<tr>
<td>Purpose</td>
<td>5</td>
</tr>
<tr>
<td>Phases and Tasks</td>
<td>6</td>
</tr>
<tr>
<td>Timelines</td>
<td>8</td>
</tr>
<tr>
<td>Research Focus</td>
<td>8</td>
</tr>
<tr>
<td>Partners</td>
<td>9</td>
</tr>
<tr>
<td>A SHIFTING LANDSCAPE: THE TEACHER EDUCATION CONTEXT</td>
<td>9</td>
</tr>
<tr>
<td>CHANGING PRACTICES: PROJECT EXPERIENCES</td>
<td>14</td>
</tr>
<tr>
<td>Integrating ICT into the Preinternship</td>
<td>14</td>
</tr>
<tr>
<td>Project Year 1</td>
<td>14</td>
</tr>
<tr>
<td>Project Year 2</td>
<td>16</td>
</tr>
<tr>
<td>EPS Instructor Experiences</td>
<td>22</td>
</tr>
<tr>
<td>Integrating ICT into the Internship</td>
<td>30</td>
</tr>
<tr>
<td>The Internship Project: School/University Collaboration</td>
<td>33</td>
</tr>
<tr>
<td>Placement Concerns and Expectations</td>
<td>34</td>
</tr>
<tr>
<td>Intern Experiences</td>
<td>36</td>
</tr>
<tr>
<td>Cooperating Teacher Experiences</td>
<td>43</td>
</tr>
<tr>
<td>Other Teacher Experiences</td>
<td>51</td>
</tr>
<tr>
<td>Faculty Advisor Experiences</td>
<td>60</td>
</tr>
</tbody>
</table>
CREATING LANDMARKS: ISSUES, RECOMMENDATIONS, AND PRINCIPLES ......................................................... 61

Significant Learnings and Recommendations ...................... 61

1. The Concept of ICT Integration .................................61
2. Preparing Students to Implement ICT into Teaching .........62
3. Integrating ICT in the Internship .............................. 64
4. Preparation of Faculty to Integrate ICT into University
   Teaching ................................................................. 65
5. Enhancing the Faculty Environment for Change ............. 66
6. External Support for ICT Integration in Faculties of Education ....... 68
7. Addressing Scepticism toward ICT .......................... 69

Principles for ICT Integration in Faculties of Education ........ 70

NEW DIRECTIONS: THE FUTURE OF iTACHERED .......... 72

CONCLUSION .................................................................. 74

REFERENCES ................................................................ 75

APPENDICES ................................................................ 77

A. Technology Manual for Faculty Advisors of Preinterns and Interns. 78
B. GrassRoots Project Evaluation Rubric .......................... 96
C. Applecart Usage ....................................................... 100
D. Preintern Questionnaires .......................................... 102
E. Intern Questionnaire ................................................ 104
INTRODUCTION

A successful change project at the least requires a committed team, dedicated resources, a clear purpose and some reward and recognition. All of these were in place with the iTeacherEd project at the Faculty of Education, University of Regina during 2002-2004. The Contribution Agreement between Industry Canada, SchoolNet E-Learning Programs, and the University of Regina has enabled the Faculty of Education to focus on the integration of computer technologies and to research the integration process. The iTeacherEd team included: Dr. David Friesen, Dr. Vi Maeers, Dr. Kathy Nolan and Alec Couros. The team collaborated with school personnel, students and other faculty, to explore ICT use in teacher education. The recognition of the viability of the project by Industry Canada, by the collaborating school system, by interested faculty, and by audiences at various conferences has encouraged the iTeacherEd team in their work.

The iTeacherEd project was initiated in response to the shifting landscape of schools that the team has witnessed over the years. Schools are undergoing stresses of earthquake proportion attributable to changes brought about by globalization and technological change. The recent SchoolPLUS Report in Saskatchewan uncovers many of the factors arising from the increasing complexity of society that contribute to increasing demands on schools in meeting the needs of children and youth (Tymchak, 2001). One of those demands is the need to teach students to live in a technological world.

Although the Faculty of Education has been addressing our students’ needs to use ICTs in the classroom for about a decade, the need to further develop ICT knowledge and skills has become more urgent given the rapid development of ICTs in schools. More and more classrooms, especially at the elementary level, now have a small number of computers in the classroom (minilabs) that are used in less structured ways for learning than in school computer labs. Our students need to know how to teach in these kinds of classrooms.

The iTeacherEd project was established to accomplish two purposes: to assist future teachers to integrate ICT into their teaching in minilab environments, and to assist education professors/instructors to integrate ICT into university classrooms. We remain
convinced that education students need to see ICT integrated into both university classroom teaching and school classroom teaching if they are to learn how to use ICTs effectively for planning, teaching, student learning and professional learning.

This report reveals our journey as a team over two years as we attempted to create a new landscape for teacher education. Our efforts have identified not only some promising practices but also some resistance to change. Although two years is a short time to effect change, we are confident that our efforts have established some new landmarks in the journey towards new teaching practices in teacher education that others can follow.

**PROJECT OVERVIEW**

In 2001 a proposal was submitted to Industry Canada for funding for 3 years to integrate ICT into teacher education classrooms. The project was named iTeacherEd by the Faculty ICT Steering Committee.

**Purpose**

The purpose of the project involved faculty members engaging in action research in order to:

1. develop a model and supporting materials for the development of technology integration into curriculum in faculties of education
2. enhance knowledge of and ability of faculty to integrate technology into their teaching
3. enhance the integration of technology into school curriculum for preservice teachers
4. collaborate with teachers and preservice teachers in the field on the use of technology in teaching with respect to particular GrassRoots projects
5. research the impact of the project and the emerging model of development on the participants
6. study the impact of ICT integration on student learning (including high numbers
of Aboriginal students) in community schools

Phases and Tasks

Cycle One: Phase 1 (Year 3 Preinternship: Fall 2002 and Winter 2003 semesters)

1. Faculty: Some instructors working with preservice teachers in the Preinternship (Year 3) were given technical and pedagogical support to integrate technology into their Educational Professional Studies (EPS) courses. Faculty modeled the integration of technology for instructors using the university classroom mini-labs established for this project. The project team solicited the involvement of several instructors from each of the four sections (30 students per section) of elementary Preinterns. About 10 faculty and sessionals were involved in this phase of the project.

2. Materials and Mini-Lab Development: The technology modules were developed and put on a web page so that Preinternship students and faculty could access them in both mini-labs and larger labs at their convenience with appropriate support. The university classroom mini-labs were not set up until the second year because funds for the project were not accessible until the beginning of the second year of the project.

3. Preinterns: Preinterns were given 10 IT modules over the 02/03 academic year. In the second semester they were expected to add technology components to their teaching during the field experience (Winter 2003). The modules were intended to prepare them for this activity.

4. Research: Faculty involved in this project collected data related to Phase 1 documenting the experiences of faculty and preinterns.

5. Faculty Advisors: Several faculty advisors working with preinterns in the schools were oriented to the project in the fall semester and specifically prepared to monitor expectations related to the integration of ICT into the teaching unit (winter semester).
Cycle One: Phase 2 (Year 4 Internship: Fall 2003)

1. Interns: For the sixteen-week Internship, 9 interns were placed with 9 cooperating teachers who were selected on the basis of their use of computers in their classrooms (minilabs) and were willing to engage in a collaborative project utilizing the intern’s knowledge of technology integration into curriculum. Each pair were expected to participate in a GrassRoots-like project by collaboratively agreeing on a topic and a process to engage in to complete the project. Specific expectations for interns were developed at the Internship Seminar (3 and a half day retreat for interns and cooperating teachers) to ensure that projects would be completed. Teachers were solicited and screened by the technology consultant for the school division, and approved by the Faculty to work with interns.

2. Faculty Advisors: iTeacherEd team members took on the role of faculty advisor for the 9 interns. School division consultants helped interns by providing pedagogical support, that is, helping interns find ways to integrate ICT meaningfully into the subject areas of the units being taught at the time. Preparation for supervision of the internship projects took place at the Internship Seminar (August and September, 2003, 3 and a half day seminar).

3. Research: Data documenting the experiences of faculty, interns and cooperating teachers involved in the internship project was collected in Phase 2. A questionnaire was also given to all interns to determine the level of use of ICT by all interns during the Fall 2003 Internship.

Cycle One: Phase 3 (First year of Teaching: Fall 2004)

Initially the project was to be a 3-year project that would include following those students who had been involved in the internship project into their first year of teaching. This phase was dropped from the project when project funding was reduced to 2 years.


**Cycle Two: Phases 1, 2 and 3**

In the second cycle of research, the second group of preinterns from the elementary program were followed through their experiences in the Preinternship (Fall 2003, Winter 2004). Data from the first cycle was used to inform second cycle planning. For example, the 10 modules were reduced to 5 offered in the Fall 2003 semester of preinternship, and a WebQuest assignment was instituted in the Winter 2004 semester. The WebQuest assignment involved the iTeacherEd team designing a WebQuest on planning that took preinterns through a process of integrating ICT into their planning (see page 22).

During this cycle iTeacherEd team members initiated mentoring relationships with less experienced instructors involved in the preinternship.

**Time Lines**

**Cycle One:**

Phase 1: Fall 2002 and Winter 2003 (Preinterns)

Phase 2: Fall 2003 (Interns)

**Cycle Two:**

Phase 1: Fall 2003 and Winter 2004 (Preinterns)

Phase 2: Fall 2004 (Interns)

Although funding ended March 31, 2004, Cycle Two, Phase 2 will take place in Fall 2004 within existing resources.

**Research Focus**

Some of the questions explored in the research component of the project are:
What model of professional development can enhance the use of technology in teaching by faculty, preservice teachers and inservice teachers?

What are the forces for and against the development of technology integration for faculty, students and teachers?

How is learning enhanced for preservice teachers who are exposed to technology that is integrated with the curriculum in a mini-lab classroom situation?

What levels of technical and pedagogical support are needed by faculty to embrace the use of technology in thoughtful ways in their courses?

What meaning does ICT integration have for issues of diversity and equity in community as well as other schools?

Action research was used to determine how useful the ICT implementation model is to faculty, teachers and preservice teachers. Data from the first cycle informed changes for the second cycle. Regular research team meetings took place to direct the data collection and analysis as the project unfolded.

**Project Partners**

The project was managed by the Associate Dean with the assistance of SIDRU at the Faculty of Education. The project team consisted of 5 faculty members in the first year and 4 in the second, and 2 curriculum consultants from a large neighboring school division. Graduate students did not become a significant part of the research team as originally anticipated.

**A SHIFTING LANDSCAPE: THE TEACHER EDUCATION CONTEXT**

With the increasing availability of computers in schools and universities along with high speed internet access, and with a provincial curriculum calling for resource-based teaching and learning, possibilities for integrating technology into the curriculum are expanding. Unfortunately, teachers and faculty are generally ill prepared to adapt quickly to changing learning environments that technology demands (Cornell, 1999). Our experience as faculty members with Information Communications Technologies (ICTs)
over the past five years convinces us that preparation of teachers is not hierarchical; faculty, teachers and preservice students need to be involved in a partnership that explores the possibilities that ICT presents—we need to grow and learn together because individuals are at different stages of development (Browne & Maeers, 2003, Browne, Maeers & Cooper, 2000; Maeers, 2002; Maeers, Browne & Cooper, 1999; Maeers, Cooper & Browne, 1997). There is an immediate need to develop a collaborative model that addresses the development of these main players to use ICT in teaching, and to distribute that model to assist other teacher education institutions to incorporate this new paradigm in their programs. Collaboration has been identified as a key to ICT implementation for some time (Breuleux et al., 2001). Our experience also tells us that the combination of state-of-the-art hardware, connectivity, appropriate subject-related software and technical and pedagogical professional development must all be in place in a faculty of education in order for faculty members to feel comfortable in the use of ICT in their teaching. This project attempts to align these components in the Faculty; regular student and faculty access to university classroom mini-labs for coursework is therefore absolutely essential for students to experience inquiry and resource-based learning within their teacher education program in order to transfer that learning to school classrooms similarly equipped.

This project is an appropriate response to the demands of the New Knowledge Economy. It should have significant impact on the Faculty and its transition to ICT for teaching and learning, as well as for the preparation of teachers for a changing role in technology environments.

There are several contextual features that strongly influence changes in teacher education in our Faculty, specifically as they relate to the integration of ICT into teaching and learning. First, we have a long history of teacher education development that anticipates changing conditions and needs in the province and provides appropriate leadership. Over time, the Faculty culture that has emerged highly values the strategic place of teacher education in educational change in Saskatchewan. One of the most profound changes in teacher education in the University of Regina came in the 70’s with the advent of the
extended practicum or internship. This development created strong links with our partners in the profession that have continued to this day. It also pointed the Faculty in the direction of transdisciplinary understandings of teaching the natural linkages between subject areas. Our connections with the professionals in the field have strengthened as experienced teachers become committed to teacher education through active involvement in the program by taking student teachers into their classrooms. We are fortunate to have a large group of school-based teacher educators who understand and support both the program approach and the process of developing as a teacher. By associating closely with the “field”, we have helped shape the profession, and as well, have been shaped by our field-based teacher educators over the years.

Second, our Faculty belongs to a unique educational partnership that has direct input into our program development initiatives. These partners--external to the university (STF, SSTA, LEADS, TEP’s, Saskatchewan Learning)--play much more than an advisory role by their presence on major decision-making committees such as the Board of Teacher Education and Certification (BTEC). This Committee sets the general parameters for teacher education programming to meet provincial certification requirements. Meeting semi-annually, BTEC regularly reviews our programs; any program changes that add to or deviate from those approved must be presented and recommended to the Minister for approval. In effect, our curriculum is reviewed yearly. BTEC also holds an annual meeting with the Presidents of both Saskatchewan universities. The Core Curriculum (Saskatchewan Learning, 1984) promotes the integration of ICTs into teaching and learning in the K-12 school system.

Third, we exist in a milieu of provincial social change as evidenced in the Role of the School Report (Tymchak, 2001) carried out by this Faculty. The new realities for schools produced by changing demographics in this province spur us on to find ways to improve the lot of children and youth in our schools and in society. We continue to play a leadership role in broad educational change in Saskatchewan. This Report provides an impetus for change in the Faculty to meet the changing needs of schools.
Fourth, the Faculty of Education is well positioned to develop a model of preservice integration of technology with curriculum to enhance teaching and learning based on our experiences with ICT over the past decade. In an award-winning paper, Maeers, Browne and Cooper (2000), members of our Faculty, describe how IT has been integrated into the teacher education program over the past five years.

Fifth, the four-year program is structured in such a way that the development of ICT is possible. Programs contain significant field experiences so there is ample time for students and faculty to develop ICT skills and approaches and also work with ICT in school classrooms. The preinternship year (Year 3) contains specific methods courses as well as Educational Professional Studies (general pedagogy and field experiences) and Educational Psychology. It consists of the fall and winter semesters and is devoted to the professional development of the student. The first semester focuses on basic teaching skill development, becoming comfortable in the classroom, and learning processes to reflect on their knowledge and experiences. The focus of the second semester of preinternship is on more the sophisticated teaching approaches that are inquiry oriented involving resource-based learning in keeping with the Saskatchewan Core Curriculum. Students are in schools in the fall for 1 day a week, and in the winter for two 8 day blocks. At the present time, preinternship students in the elementary program are exposed to ICT modules in both semesters preparing them to use technology in their teaching (eg. web pages, WebQuests, e-mail, electronic portfolios etc).

The Internship (Fall of Year 4) provides students with an opportunity to integrate their learning in a classroom environment. During this time each “intern” is placed with a “cooperating teacher.” The cooperating teacher and intern attend a 3 day off-campus seminar to prepare for internship. The internship provides a significant period of time for the intern/cooperating teacher to engage in a GrassRoots-like project. The Regina school systems have been heavily involved in GrassRoots projects, so there are many teachers experienced in ICT who are willing to work with both preinterns and interns in this project. There are also a number of classrooms in the Regina area equipped with mini-labs (4-6 computers in the classroom) as well as larger school labs, providing researchers...
the opportunity to study increased use of classroom mini-labs.

It should be noted that a significant number of “community schools” have been established in Saskatchewan. These schools have higher proportions of vulnerable children and youth, many Aboriginal, providing the University of Regina with an excellent opportunity to study the equity aspects of ICT (a major theme of the University of Regina vision statement is social equity). Preinterns and interns often are placed in community schools.

In the past, the Faculty has made considerable effort to develop ICT skills and knowledge in undergraduate students. This has been possible because of a supportive environment including technological support to faculty, and well equipped labs for students. As well, several faculty have spearheaded an effort to integrate ICT modules into the Educational Professional Studies (EPS) subject area. A faculty IT Coordinator has been very helpful assisting faculty with ICT pedagogical issues. Several optional IT courses have been developed at the undergraduate level and these have become very popular. Recently, several graduate courses have been developed.

The literature on ICT integration in faculties of education suggests that faculty need to make significant shifts in teaching when first using ICT in university classrooms (Sherman et al., 2003; Terwindt, 2000). An increasing number of studies are beginning to determine the elements of professional development that need to be included in the professional development of our student teachers (Roberts, 1999; Kelly & McAnear, 2002; Fulford and Ho, 2002; Falba et al., 1999; Bullock, 2004). The Faculty of Education at the University of Regina is well positioned to develop new models of professional development to further the use of ICT with faculty and students.
CHANGING PRACTICES: PROJECT FINDINGS

Integrating ICT into the Preinternship

In terms of the iTeacherEd research team’s involvement with the pre-internship year (Year 3 in the program), there are two years of data and results to report and discuss.

Project Year 1

In Year I of the project, three different questionnaires were distributed to pre-interns: 1) a student self-evaluation rubric on the use of and attitudes toward information and communications technology (ICT), 2) a questionnaire to evaluate the Fall semester ICT modules, and 3) a questionnaire to evaluate the winter semester ICT modules and to gain insight into pre-service teachers’ views on the technology modules throughout the pre-internship year in general. In June of 2003, a report was written to share the data and analysis of these questionnaires administered to the students in their pre-internship year. This report (entitled Report on Student Questionnaires (Fall 2002, Winter 2003) is available on the iTeacherEd website (http://education.uregina.ca/iteachered). The central themes from this research are as follows.

1. “In later years…”

Time was definitely a factor in the pre-internship year and was discussed on many of the student questionnaires. Learning the skills and techniques involved in lesson planning, classroom management, and first time teaching in the classroom (for extended periods of time) appeared to be the issues first and foremost on the minds of pre-interns. They indicated that there were too many things to think about and too little time to think beyond survival of the basics, and most did not see the integration of ICT as part of the basics. One pre-intern commented that “… there’s just not enough time to do something of that magnitude in the semester, in addition to all of the other expectations.”
2. “At all different levels”

For those with ECMP355 (a course in Computers in the Classroom), the modules were repetitive; for those without ECMP 355, the modules moved too quickly and covered too much content. One pre-intern commented: “I think if you had taken ECMP 355 it was a lot of repetition. It’s hard to incorporate something like this when we are at all different levels.”

Students are “at all different levels” but students also have very different views on what is important for them to learn in order to integrate technology effectively into their classroom. Some students valued a session they had on the use of spreadsheets (in another class, not during the modules) more than the modules focused on WebQuest development.

3. In-between space?

Is there an in-between space where this diversity of experience and beliefs can be addressed satisfactorily? It appears that the diversity in experience might actually suggest that there can be no “module for all” approach taken in pre-service teacher education. As will be discussed later in this report, in Year II we adapt to these diverse conditions by incorporating more choice for pre-interns with respect to the technology modules and by developing a WebQuest for pre-interns on the integration of ICT into their planning and teaching.

4. University-schools links

Several questionnaire responses suggested that there is a need to explore and strengthen the link between the university teacher education program and the reality of the current situation in schools. Through their responses, pre-service teachers gave the general impression that the university’s expectations are not feasible given the actual state of technology resources in the schools. We do see from the intern experience questionnaires, however, that this “poor state of affairs” is not the case for all schools.
5. Many successes…

There were also many successes in the pre-internship year of the project. The responses on many of the surveys indicate that the ICT modules (especially the WebQuests) were very beneficial to pre-service teachers and that they were successful in expanding pre-service teachers’ knowledge and appreciation for the integration of technology into the classroom. Pre-interns commented that they tried many new things in their pre-internship experience that they would never have done before, including i-movies and WebQuests.

Project Year 2

Changes from Year 1

As a result of the analysis of the pre-intern questionnaires from the first year of the project, the iTeacherEd team responded to the call for changes by implementing two different approaches for the delivery of the technology modules. Firstly, in the Fall semester, students were provided with the choice of how they wished to participate in the technology modules in order to learn the module content. A form was distributed to all pre-interns outlining the content of each of the five Fall semester modules, asking them to indicate their preferred format for delivery of each module. They could choose to complete the modules individually online and at their own pace (“online” option), or participate in scheduled technology labs where they would receive instruction in a face-to-face manner with an instructor (“face-to-face” option). A third choice enabled pre-interns to indicate that they already felt comfortable with all of the module content and, therefore, did not need to complete the modules at all (“not at all” option). At the completion of the semester, questionnaires similar to the ones administered in Year I of the project were distributed to the pre-interns. The main aspect of the questionnaire that changed from Year I was to ask the pre-interns about their choice of module delivery and if, in retrospect, they still felt that they made the best choice for learning the module content.
The second change made to the delivery of the technology modules was implemented in the Winter 2004 semester. In the previous year during the winter semester, five modules were delivered in much the same way that the first five were delivered in the fall semester, that is, through face-to-face sessions with an instructor in the computer lab. The five modules in the winter semester focused on various aspects of WebQuests, which are web-based inquiry-oriented activities. Through these modules, students were able to review and explore existing WebQuest material, as well as develop their own original WebQuest. In the Winter of 2004, changes were made to this approach. While the iTeacherEd research team still felt the pre-interns should experience (and hopefully develop) a WebQuest, we decided that it might be more useful to ask students to complete a WebQuest on the integration of ICT into their teaching (see http://education.uregina.ca/iteachered/). In other words, the pre-interns were asked to complete a WebQuest designed by the iTeacherEd team with the ultimate goal of having the pre-interns integrate ICT into a unit plan that they were developing for their Educational Professional Studies class.

In review then, the two major changes made in Year II of the project with regard to the delivery of the technology modules in the pre-internship year were to provide the pre-interns with choice as to how they would learn the module content in Fall 2003 and to adapt the second set of modules in Winter 2004 so that pre-interns would complete a WebQuest to integrate ICT into their unit plans. These two changes will be discussed separately in the following two sections entitled Fall 2003 Themes and Winter 2004 Themes.

**Fall 2003 Themes**

When the forms for pre-intern choice of module delivery were collected, the iTeacherEd team was initially surprised by the results. A large percentage of pre-interns (36% of those responding\(^1\)) chose the option of face-to-face instruction for each of the modules.

---

\(^1\) The BAC pre-intern responses were not included in the data for this calculation since, even though they completed the modules in a face-to-face manner, they were not provided with a choice to do otherwise.
Our surprise was mainly due to the fact that the pre-interns in Year I of the project indicated overwhelmingly that they wanted to have an option to not participate in full-class sessions of technology module instruction. As indicated in the report for Year I, many of these interns had already taken ECMP 355 and they reported that the module content was redundant with their ECMP 355 learnings. Perhaps the most important issue for the pre-interns was to be presented with some choice in the matter, even if many would still choose the more traditional face-to-face approach.

When asked on the end-of-semester questionnaire about their choice for module delivery and if, in retrospect, they still felt they had made the best choice, several themes emerged from the responses. These themes are discussed in greater detail in a separate report, focusing primarily on iTeacherEd learnings from Year II of the project in the pre-internship year, but the following represents an overview of these themes.

1. **Refresher for ECMP 355**

The data from the questionnaires indicated that approximately 31% of respondents chose to complete the modules online and another 16% chose not to complete the modules at all. It is interesting to note that those who chose “not at all” did not necessarily choose it because they were confident with all of the module content but, instead, chose it because they were too busy to complete them in either a face-to-face manner or online on their own. In all cases, however, those who chose “not at all” or “online” because they already knew the material (as opposed to just not having enough time to complete the modules) indicated that they knew the material because they had taken ECMP355. These pre-interns either completed a few modules online as a “refresher” or they did not feel the need to complete any of the modules.

2. **Advantages of Choice**

For the most part, pre-interns were very supportive of being provided choice in the matter of technology module delivery. Some reported that without face-to-face instruction they would clearly have been lost and frustrated with the technology content. These pre-interns generally indicated that the ability to ask questions, receive handouts, and elicit
guidance through the module content was very beneficial. Others reported that they enjoyed the option of attending instructed sessions on a few of the modules while opting to cover the rest of the modules online because they felt quite comfortable with the content. There were a few responses indicating that there was just not enough time in the day to attend “optional modules” (since the pre-interns were provided with choice, they interpreted this as optional). The iTeacherEd team interpreted this to mean that if the modules (or extensive knowledge of the content) had been required then more of an effort would have been made to attend sessions and/or complete the modules online. This was an important learning experience for the iTeacherEd research team because it provided support for the notion that on-going expectations, or at least a cumulative end product, is key in motivating the pre-interns (in an already overly busy semester) to learn about and experience the integration of ICT into their teaching.

3. Learning and Regrets

Whether completed online, through face-to-face instruction or not at all, the comments from the questionnaires certainly indicated that the pre-interns understood the importance of the technology modules. There were a few comments suggesting that the content was covered too quickly, but in general there appeared to be less of these comments than there were in Year I of the project. Perhaps this difference is because the pre-interns understood that if they required further consolidation of the module content, they could always go online and complete the modules again. One pre-intern acknowledged this by saying “I never went back to them after the classes. I guess I would benefit more if I looked through the modules at home.” From the perspective of the iTeacherEd research team, this is a significant learning. If multiple avenues are provided to pre-interns for learning and experiencing the integration of ICT into their teaching, then the onus is on them to be responsible for making the best choices and to understand what conditions they require for their own professional growth and learning.
Winter 2004: WebQuest Preinternship Assignment

In Winter 2004, an iTeacherEd WebQuest was designed to assist preservice teachers through the process of integrating ICT into thematic unit planning. The complete WebQuest can be found online at:
http://education.uregina.ca/iteachered/EPS225-WebQuest

The idea for the WebQuest resulted from a brainstorming session by the iTeacherEd research group in November 2003. As reflected earlier by the preservice student surveys and other data, the group thought that a revised approach to the Winter 2004 in-services should be introduced. While the previous approach (technology modules six through ten) focused upon the study and development of WebQuests as an instructional strategy, the new plan placed WebQuests as a vehicle for a wider understanding of ICT strategies. By having students experience this carefully designed WebQuest, students would gain both the familiarity of the WebQuest design as a tool for learning, and as well, the content related to multiple strategies for ICT integration. In other words, the iTeacherEd group felt that this approach would help to deliver the intended content, but also would model an ICT appropriate strategy reflected by the process itself.

The iTeacherEd WebQuest itself was based on three major components related directly to the teaching process. These components include the preactive stage (planning), the interactive stage (instruction and student learning) and the postactive phase (professional learning). In the WebQuest, students were expected to explore a pre-developed, technology-infused thematic unit. The WebQuest revealed a step-by-step process of how technology was integrated into the unit and which specific resources were used in the preactive and interactive stages (planning, instruction and student learning). This helped students in understanding the process of ICT integration and as well, provided specific web-based resources for their own planning.

After students explored the unit, they were expected to integrate technology into a thematic unit. The development of this thematic unit was already a mandatory component of the EPS 225 coursework, so this technology integration component was not
meant as an add-on or yet ‘another’ assignment. Rather, it was developed to enhance existing course requirements and give students and instructors a stronger technology integration focus.

To collect data and to provide for student professional learning, an online form was developed which could capture the reflective nature of this planning. The online form focused on the following seven specific questions that were broken down into the categories of the planning phase, teacher instruction and student learning.

**The Planning phase:**
1) What are the websites I reviewed in planning the unit? (Indicate how each was used in terms of teacher background/content knowledge, lesson/unit plan knowledge, assessment ideas, or other).
2) How did I evaluate websites? (Provide evidence in form of criteria applied to evaluate).
3) How did I use the on-line curriculum and its resources in planning my unit?

**Teacher Instruction:**
4) Of the various modes of ICT - websites, presentation software (e.g. Powerpoint), video clips, audio clips, digital photography, e-mail, listservs - which ones did I incorporate for use in teacher instruction?
5) Why did I incorporate ICT in this way for instruction? How do I think it enhances the instructional phase of teaching and learning?

**Student Learning:**
6) Of the various modes of ICT - websites, presentation software (e.g. Powerpoint), video clips, audio clips, digital photography, e-mail, listservs - which ones did I incorporate into classroom activities for students?
7) Why did I incorporate ICT this way for student learning? How do I think it enhances the potential for student learning?

These questions were designed as they are for several reasons. First, the form is helpful in assessing the effect of the technology modules from the previous semester (Fall 2003), and to provide indirect feedback from those students who have taken ECMP 355. The
questions developed for the online forum were strongly associated with skills most students would have learned a semester earlier. Second, the questions were helpful to better understand the types of skills that the students had learned outside of the purview of the iTeacherEd project (e.g., in other classes, from peers, or outside of their formal education). And finally, the questions were designed to gather information regarding the attitudes and beliefs of these preservice teachers toward the use of technology in teaching and learning. While skills are important, the beliefs and attitudes of teachers is likely as, if not more, important than the technical skills they possess.

The online form can be found at the following web location.
http://education.uregina.ca/iteachered/EPS225-WebQuest/professional.htm

**EPS Instructor Experiences**

After completion of the preinternship year of Year 2 of the project, focus group interviews took place with the EPS Instructors. They were asked to talk about their experiences with integrating ICT into the EPS 215 and 225 courses during the two preinternship semesters. A summary of that discussion is presented here.

There are 6 sections of EPS 215 in the fall semester, and 6 semesters of EPS 225 in the winter semester. There is one Early Childhood section (Pre-K-Grade 3), taught by Treena; two Elementary sections (Kindergarten through Grade 5) taught by Christine, and by Lana; one Middle Years section (Grades 6-9) taught by Barry; one French (Bac) section taught by Vivian, and one SUNTEP section, taught by Walter. Other people in this interview are Dwayne, Andrew, Kate, and Mary (the four researchers for the i-TED project), and Susan, the Elementary Education program Chair (names are pseudonyms).

Generally, there was agreement that the IT modules are important, that ECMP is necessary, should be mandatory, and should be offered in year 2. Students are under a lot of pressure in year 3 (the pre-internship year), which combines all of the methods courses and also has a strong field component; this extra pressure in year 3 does not allow the
kind of time necessary to learn in depth and solidify learning in the skills associated with
the IT modules, skill learning which we hope will be applied in the classroom. Students
need more time to sort through and make sense of all their new learning.

There was discussion around the need for ECMP 355 to be mandatory—in second year;
this would take some of the pressure off the IT module work in year 3. Dwayne stated
that maybe we need to reconfigure the second year Elementary Education experience.
Barry suggested that the students have more WebCT experiences—this would help with
coop-operative planning (using technology to help in the planning process); having this kind
of experience would probably make it more likely that the students would do similar
things in the classroom.

Kate echoed Mary’s concern about the need for students to see instructors modelling the
effective use of IT in their classes, rather than talking about how to use IT—she stated
that maybe we have the same lack of experience in being educated to use it. Mary
emphasized this point—the students need to see it modelled and “we have to do it. I
don’t know how else we can get around it. But they need the skills to begin with.” Susan
told us that she was able to use computers in one of her Language Arts classes “because
they were in the classroom.” [note the classroom that Susan is referring to is one of the
classrooms we equipped this past summer with 4 networked PC computers]. Christine
agreed that having the set of computers in the classroom made it easy to have “one group
working on something at a centre” rather than bringing in the cart of laptops.

Dwayne prodded the above comments a bit further by asking if the classroom we teach in
and the accessibility of computers posed a limiting factor; he also asked about our
experiences in the Fall 2003 semester in using the i-Book cart with portable wireless
Macintosh laptops. Vivian told us that when she tried to use the i-Books, some of them
were not charged up and she couldn’t figure out how to get them working. However, she
stated that she considered this a good experience.
because students need to realize that when they do use the technology, there are
going to be bugs, . . . These are the realities of technology in the school and it’s just
as well that they see it before they go out, so they can prepare for it.

We also discussed that we may not know how to fix things by ourselves—we may have
the students’ help and engage them in problem solving the experience. Lana told us
about an experience she had with her class in the library; the computers were very slow
and they cancelled the class.

Dwayne challenged the group to look ahead to the Winter 2004 semester—to EPS 225
(the continuation of EPS 215), where the students go into classrooms for approximately
two 8-day blocks. Traditionally we have had 5 IT modules in the Winter semester—what
should they look like? Also, what other things should/could faculty be doing to enable
the pre-service teachers feel comfortable with and see the possibilities and potential of
effective and appropriate use of technology in teaching and learning environments?
Dwayne mentioned that the missing piece of the puzzle is

how do you move a faculty to a way of integrating IT into university teaching so
that they see it . . . who actually very easily and with facility can work with IT in
their own classroom in terms of a modelling approach, so that students have
actually been exposed to mini labs, . . . where computers are used every day or that
centres are used in kind of a natural way every day?

Dwayne asked us to consider a project idea where faculty apply for a small classroom-
based research project, where they would get a laptop and use it to integrate IT, they
would get some teaching release time, keep a project log and keep track of the project.
He talked about the “gap between what the students experience (at the U of R) and what
they actually have to experience in the classroom.”

Barry agreed with what Dwayne was suggesting. He also suggested that faculty could be
paired with the ‘hotshot’ teachers. Dwayne thought that idea could be part of the project
criteria. Everyone agreed that it would be an excellent idea for faculty to go out to the
schools and spend some time with teachers who are implementing best practices in the
classroom. Lana mentioned that she would like support with specific strategies to use for
upcoming units—about how to incorporate technology in, for example, Language Arts. Barry also suggested that we bring in some of the hotshot teachers to the EPS classes and have them talk about how they use technology in the classroom—many of the pre-interns are not seeing this integration—or planning—in the classroom. Barry said “I would like them to know that there are teachers out there who are using technology and hear how they use it, even though they may not get a chance to see it directly.” Walter agreed with Barry’s comments, saying that using best practices in IT was such a new field, that the pre-interns have not yet experienced it in schools—teachers should come in and talk about what they do. Mary urged the EPS instructors to visit two amazing school board sites that address differentiated instruction and technology integration [http://web.rbe.sk.ca/diflearn/ and http://web.rbe.sk.ca/Support/]. Dwayne stated that our students would be more likely to visit the websites of school divisions or boards that they are going to be teaching in.

Treena talked about the social studies methods course and the outdatedness of the hard copy curriculum (1995) and the need to know about some ways that technology could be used in the teaching/learning of the social studies curriculum in the Faculty of Education—she would like some inservice in how to do this. Mary mentioned that the elementary mathematics curriculum was last printed in 1992, but that periodically (about every two years) Saskatchewan Learning produces a hard copy bibliography of resources which includes children’s literature, software, and websites and also incorporates these resources into the online Evergreen Curriculum—which is continuously updated. Mary also mentioned that the differentiated instruction consultant, has a hotlist of websites for little people. Barry talked about the teacher who came in to work with Lana on music software—“we need to know those kind of people who are right on top of things.” The general feeling is that we need experts who can come in and talk to us about what they do, and why, but also demonstrate and work with us so that we know how to do it—a hands-on demonstration.

Dwayne also mentioned the need to
build in the connection to Aboriginal Education, because that’s becoming a real focus for the faculty and I think if the project is going to be successful, it has to link to the major themes as well. . . . This is where the complexity starts to take place, in terms of resources for Aboriginal Education and the link to IT.

Christine talked about the great web resources for Aboriginal Education, but she said she wasn’t sure how best to use it in the classroom.

Dwayne spoke about an idea he had for the Winter 2004 semester where the pre-interns do a thematic unit in groups, for internship, but with pieces of it used in pre-internship. He commented that unit planning in internship is “fragmentary—not much depth to it.” Maybe in pre-internship they could do one lesson from their unit. Dwayne’s idea is that each section could produce 4 or 5 collaborative units that would go on the web—for others to use and modify. Dwayne emphasized a small group rather than a pair, because of the need to go into depth in the unit. The resources would be developed together as a group and then be available for internship. Mary suggested that we set up all of the third year elementary EPS students into one large WebCT course and use the WebCT facilities for group planning and for posting work. Christine agreed with Mary but said that there should also be time during the EPS class time for students to work on these modules “because to add one more thing outside of class time is just too much.”

Walter also agreed that the students should work on group unit projects, but that they should be multi-grade projects, because the students don’t know yet where they will be interning. Walter talked about the survival mode of many students during the teaching blocks and how having a unit already planned would help them “in being very well prepared for their blocks when they go out, so that they can work on refining their management skills and, you know, all of those other things that they have to work on.” He also mentioned that the “key point to this is having the experience of planning, of pulling together a unit and understanding how to do that” but he also questioned how realistic it was to plan a group unit as it seldom happens that way in the field.
Dwayne stated that many students are pulling units off the Internet and adapting them for their classrooms and “we need to teach them how to do that because that’s the reality now. Nobody plans from scratch any more.” Dwayne again emphasized that it would be better for students to adapt a well thought out in-depth unit than to plan from scratch. He found “that the planning got in the way of their teaching, with so many of them, because it just wasn’t well done in the first place and nobody had time” but he also recognized the need to struggle—to know what is a good unit plan. Susan questioned taking units from the web as there “isn’t the mental engagement and the exploration of the different materials and ideas and so forth that you really need to do to own a subject before you get into the classroom and before you’re confident with that in front of the children in the classroom. It’s so easy for them to take something off (the web) and then understand it superficially, have something that looks so good that it looks like something that’s really going to support their teaching, and it would if you knew the subject better, or if you had made those decisions in light of what you, personally, really would like to do with those kids or what you really think they would love to do and you just want to make it possible for them to do that. It’s the connection of you as an individual, to the children, and also to the content.”

Dwayne took us in a different direction by asking how could we help the EPS instructors this semester with the IT modules, build in a reflective phase. We discussed an EPS Mini Fair that was being planned for all of the EPS students and how we could build into that fair some IT integration opportunities. Susan suggested that the students create a terrific unit and then that unit could be examined for different things—e.g., IT integration, Aboriginal content, and so on. Vivian commented that the first units the students create will not be publishable material, to her that is fine

that’s their first trial. We want to encourage them to learn from their weaknesses and their failures. And we need to model that, because that’s the attitude we want them to take out with their students, not to expect perfection on the first try, to realize that their students are going to make mistakes and that’s okay, that it’s going to take them maybe a long time to learn something, and that’s fine too.
Dwayne agreed with both Susan and Vivian—that the students have to go through the
process of creating unit plans, but that in internship there is very little time to do that.
Vivian commented that perhaps the co-operating teachers could work with their Fall 2004
interns before the end of the Winter 2004 semester, so that the students find out what they
have to teach. They would then have May and June and the summer to work on their
units. “They won’t know the classroom or the students, but they can have the goals set
and they can have the groundwork done, the resources and that.” The students know at
the end of May where they will be interning.

Some of the EPS instructors expressed concern about the IT expectations for pre-
internship—what should the students know in IT by the end of the Winter 2004 semester?
We further discussed the idea of doing a unit as the focus of all the modules and then
revisiting the Fall 2003 IT modules and linking then and reviewing them in terms of the
unit. Dwayne suggested that one module might address how we use IT in my
preparation; another might focus on “what are ways to use IT with the students in a unit
I’m preparing for blocks?.” Dwayne also suggested that some students might select to do
a WebQuest or a hotlist because they had learned how to do that in ECMP 355, “so it
would become much more variable in terms of their skills, their motivation, the
connection to the previous semester.”

The EPS instructors discussed having set lab times to work on the modules and the unit
work and were still a bit fuzzy about the actual content of the modules. Dwayne
suggested that the main question they address at the module would be “How am I going
to use IT to help me plan for this unit. . . . Then it’s more of a pedagogical thing, but
obviously it’s going to link to the skills.” Dwayne suggested that the module time be
used to work on the unit and link to some of the skills learned in the fall semester. Each
section of EPS could personalize the unit and module work. The first module might be
preparation; one might focus on technology (skills). The unit would not need to be
completed by the end of the semester, but any parts of the unit that would be taught in the
pre-internship classroom would need to be ready by the second block.
Mary commented that we usually provide the students at the end of the semester a certificate outlining their IT competencies. There would need to be some responsibility on Susan or Dwayne to sign the certificate—verifying that the students have completed what the certificate states. Someone mentioned that whatever is on this certificate should be known about now so that the EPS instructors can create a grid with the students’ names and check off that they accomplished these skills. Mary suggested that a rubric would also be helpful—we need a way of qualifying and evaluating the work—to meet certain expectations; there is a need to provide evidence of successful completion of the work. Someone commented that there should also be a self-assessment portion. Maybe the students could repeat the self-assessment from last semester—to see how much they have advanced from last semester. Walter suggested that the rubric self-assessment descriptors could have terms like “beginning,” “developing,” “feel very comfortable.” Vivian commented that the IPP has an area to complete with respect to technology use and the students want to be sure that this area is addressed well. Mary stated that the IT certificate template is already set up, that all that is needed is to add the skills and the students’ names and have someone sign them. Mary continued to say that it is important that we set expectations quite high this semester, that the students can’t simply be warm bodies in a room; “they have to provide some evidence that they have done the work.”

We discussed the senior undergraduate Computers in Education elective—ECMP 455, that students can take in the eighth semester, after they intern. The EPS instructors decided to meet as a group and decide how they were going to organize the IT module time. The instructors discussed some of the other module commitments (e.g., Focus on Forests) and that the first two IT modules (How am I going to plan? and how am I going to incorporate?) are critical ones to do. We discussed the annotated plan and how it could be modified for this semester. Dwayne suggested that we ask about how the students used IT in the preparation of their unit and that they could provide a description of how they used IT in the planning of their unit and they could also write about how they integrated it into their unit. The outcome of this discussion was that we would prepare a WebQuest for all the EPS students that would take them through the planning phases of their unit, at the end of which they would submit a form to us, completed with
descriptions for each field. See http://education.uregina.ca/iteachered/EPS225-WebQuest/index.htm for this WebQuest. The final section of this WebQuest is a submission page that each student must complete by the end of the Winter 2004 semester.

**Integrating ICT into the Internship**

During the internship semester, the entire group of interns were called back to the university for a full day of reflection and discussion on the internship experience thus far. The i-TeacherEd team used this time as an opportunity to ask interns to reflect on their experiences thus far with the integration of ICT into their internship. All elementary interns (approximately 140 in total) were asked to complete a questionnaire. Intern responses on the questionnaires provided a rich source of data as they painted realistic pictures of schools, students, computer environments, and pedagogical experiences and beliefs related to the integration of ICT. These responses can, by no means, be synthesized to yield one picture of ICT in the schools. If one were to attempt to describe the responses in a word, this word would be diversity.

(Note that the specific collaborative project with a school division involving 9 cooperating teachers and their interns is reported in the next section of this report entitled, The Internship Project: School/University Collaboration.

*Themes*

1. **Diversity of School Environments Related to Students, Computers and Expectations**

In an expression, one could say the internship experiences of school environments were “all over the map”. In terms of ICT equipment, some interns report fully equipped classrooms and computer labs, while others indicate there were not enough computers available and those that were available could not be counted on (computers freezing up, computers down). In addition, some interns report the availability of smart boards, data projectors, new computers, digital cameras and a high level of support by staff and
technology personnel, while others report old computers that are constantly not working, with missing chords, slow connections, and impatient students awaiting the elimination of “those little glitches”. It was clear that this latter situation created a fair amount of anxiety as one intern stated that they were surprised by “how easily technology can fail you and there is nothing else to turn to when your assignment is on the computer.”

In terms of the school environment for ICT integration potential, some interns report being comfortable with a mini-lab configuration in the classroom, while others indicate through their responses that they cannot integrate technology effectively because there is not one computer per student in the lab. For example, one intern responded: “There are not enough computers to have all the students working at the same time”. In terms of expectations and support, most interns describe their cooperating teachers as supportive and encouraging, but add that many of the cooperating teachers do not use or integrate technology themselves so they are not very helpful in this respect for intern growth and development. When students were asked about what surprised them so far about the use of technology and their internship, a common theme emerging from the questionnaires related to the diversity of students’ technology skills. Some interns indicate surprise at the advanced technological skills of their students, with one intern responding: “The kids are so smart, wanting to do more with technology than I know what to do”. On the other hand, several interns also report that they spent too much time doing basic keyboarding skills and teaching students “the basic things like how to move around on the Internet”.

2. Diversity of Student Pedagogical Experiences and Beliefs Related to Technology

Another aspect of crucial importance to the i-TeacherEd team relates to how prepared the interns felt in terms of integrating ICT into their internship classroom. As discussed in previous sections of this report, the focus of the i-Teacher Ed research team during the preinternship year was on the delivery of ICT modules to provide experiences common to all preinterns. Many of the students, however, gained extensive ICT experiences through a course on computers in the classroom (ECMP 355), leading to a wide range of skills and knowledge across the preintern, and hence the intern, population. It was evident that
many students learned from taking both the modules and ECMP 355 together, finding that the two experiences reinforced one another. Other students experiencing only the modules indicated that perhaps it was not enough: “I felt that what we did in those modules was helpful at the time, but most was forgotten; it didn’t teach me enough that I feel comfortable teaching it”. According to the questionnaires in general, however, very few interns report that they do not yet feel comfortable enough with their skills and ability to integrate technology into their teaching. One question on the intern questionnaire asked the students to indicate their level of agreement or disagreement with the statement: “I still do not feel comfortable enough with technology myself to integrate it into my teaching”. Only approximately 20% of interns agreed with this statement. It seems that, according to the interns, the limiting factor was not so much their skills and knowledge in ICT, but the school and classroom environments. Approximately 42% of preinterns agreed with the statement: “The conditions of my school and/or classroom are not conducive to integrating technology in a meaningful way”. The question of what interns believe it means to integrate in a “meaningful way” still remains, however. Based on the open response questions on the questionnaire, the i-TeacherEd team is inclined to believe that meaningful integration (according to the interns) is dependent on numbers and quality of computers available as well as the amount of time a teacher has to plan and implement technology focused lessons. Two questionnaire responses supporting this belief are:

We have only four computers in the classroom and no lab in the school, so it’s challenging to get them all on the computers.

I am surprised that time limitations made it such that I can’t use it as much as I wanted.

We believe that both of these comments speak directly to issues of pedagogical beliefs about ICT integration. Many interns still view technology as an add-on tool that can only be integrated into teaching once they feel comfortable with all the other basic teaching skills and concerns. This means prioritizing their time in such a way that they aim to understand and practice the basics first and then experiment with pedagogy that incorporates technology. It was also clear that many interns learned about ICT integration through (the wrong kind of?) modeling. In other words, their experiences of using
technology in teacher education courses primarily revolved around full class trips to the computer lab and so it follows that they view computer labs as a necessity. Requiring all students to be on the computer at the same time seems to parallel traditional beliefs about teaching all students the same concepts at the same time and expecting the same end product. As a research team, we understand that more modeling of the mini-lab environment by faculty at the university is a necessary next step in expanding student views on effective integration of ICT into the teaching and learning.

**The Internship Project: School/University Collaboration**

The collaborative project with the Regina Public School Division during the Fall 2003 semester, provided a wonderful opportunity to examine the opportunities and barriers that students have in the process of integrating ICT into their teaching. The iTeacherEd team established the fall project by approaching the ICT Coordinator and a Curriculum Consultant in the school division. We then met to develop the fall internship project.

The fall internship project involved placing 9 interns in the classrooms of 9 teachers, noted for their use of differentiated instruction including ICT in their teaching for the 16-week internship. The iTeacherEd members (4) participated as the faculty advisors responsible for the supervision of the interns. The school system consultants (2) along with the iTeacherEd members formed 2 leadership teams to work with 2 groups of intern/cooperating teacher pairs at the 3 and a half day internship seminar. The seminar was modified to allow time for pairs to discuss plans to develop “GrassRoots-like projects” to be developed during internship and to be shared at a major showcase at the end of internship. The school board consultants also played the role of providing technical and pedagogical support for the classrooms involved. Dr. Vi Maeers also took the role of lead researcher for the internship project. There were a number of findings that emerged from this project related to the pairing of cooperating teachers and interns, and GrassRoots project expectations.
Placement Concerns and Expectations

1. Pairing of Interns and Cooperating Teachers

Teachers from the “differentiated instruction” (DI) group volunteered at the request of the school division consultants. As part of a close-knit team, they attended a conference together in Cleveland during the summer preceding the internship to learn more about differentiated instruction. Some were experienced cooperating teachers; others volunteered to work with an intern for the first time. Since most of these teachers were at the middle years level, the number of interns who had selected the school division as their first choice for internship almost matched the number of teachers available. Therefore, students were not pre-selected using criteria related to familiarity with ICT. At the internship seminar, a significant amount of time was spent negotiating expectations related to ICT integration. The iTeacherEd team had to remove the expectation to do the “GrassRoots-like projects” since some interns considered these expectations to be above those normally required, and therefore possibly jeopardizing their final internship grade.

For the upcoming Fall 2004, the team has met with our partners in the school system, and in the Professional Development and Field Experience Office to decide how to select students. We have decided to invite students to apply who are seriously interested in focusing on ICT integration in the internship and who have taken ECMP 355. The application will include their accomplishments with ICT during preinternship. The students selected will be placed with a cadre of teachers willing to explore ICT integration with the interns who have been identified by our school system partners. Once placements are made in spring 2004, the team will meet with the cooperating teachers and interns to reinforce expectations for the fall internship.

Reflecting on this experience, we have come to realize that both students and cooperating teachers see the focus on ICT integration into teaching as an additional expectation for internship. Students become quite anxious and see this focus as jeopardizing their internship evaluation. We also now recognize that students who are not preselected as
“strong” in the classroom, may be diverted from an ICT focus because of the performance demands of internship; if classroom management is poor, a focus on it will detract from the ICT focus.

2. Specific “GrassRoots” Expectations for Interns

Interns were initially expected to develop a GrassRoots project as part of their internship. At the fall internship seminar, a 3-day retreat for cooperating teachers and their interns, time was taken to discuss the GrassRoots expectation. Interns had been in their classrooms for about 3 weeks prior to the seminar. They expressed a high degree of anxiety about the projects. Therefore the expectation was dropped and cooperating teachers and interns were encouraged to work on the integration of IT into teaching however possible.

At the internship seminar, interns agreed that ICT integration was an “add-on” to internship and might jeopardize the experience. They were afraid that their overall development would be affected by focusing on ICT. A number of the interns were unsure of themselves in the area of ICT integration even with the preinternship preparation. Several of the interns were in classrooms that demanded strong classroom management and they were struggling in this area. Others had significant lesson and unit planning problems to overcome.

The school division personnel involved objected to a GrassRoots approach because of the focus on technology instead of curriculum and student learning needs.

As teacher educators, we began to see that the introduction of the project orientation at the beginning of internship went against a developmental orientation. Interns need to become comfortable with all aspects of the classroom such as organization and planning, classroom management, and building relationships with pupils, staff and parents.
The iTeacherEd team constructed the following intern expectations for the upcoming Fall 2004 internship:

- Interns will be invited to volunteer for the Fall 2004 internship project and will be given the following information at that time
- Interns will be expected to collaborate with cooperating teachers in exploring the integration of ICT into teaching and learning
- Interns and cooperating teachers will be given time in the spring and at the internship seminar to outline questions they want to inquire into concerning ICT integration, and/or specific ideas they would like to explore
- Interns will be expected to document their exploration of ICT during internship in a written journal
- Interns and cooperating teachers will be asked to present their findings/experiences to interested teachers and faculty at the end of the semester.

**Intern Experiences**

In the Fall 2003 semester 9 interns were placed in classrooms where the co-operating teachers were well advanced in their integration of technology with the curriculum. These nine interns had been randomly selected from roughly 120 interns. One intern was placed in a Grade 4 classroom. The other 8 interns were placed in middle years classrooms (Grades 6-8). All 9 interns were interviewed close to the end of their internship to explore their experiences with ICT integration.

All of the 9 interns reported using ICTs—especially the Intern to plan lessons and units by accessing sites for background research for topics, and to access the Evergreen Curriculum to find the objectives and content to be covered at the different grade levels.

They also all had opportunities to use ICT in their internship placement classroom. These ‘opportunities’ were mostly self-directed—that is, the interns took the initiative to plan for and integrate ICT into their lessons.

The manner in which they incorporated ICT into their lessons depended on their comfort level with ICT. Five of the nine interns had taken ECMP 355 (an undergraduate
Computers in Education elective) and one intern had taken ECMP 355 AND ECMP 455 (a senior undergraduate Computers in Education elective). These five interns were quite comfortable and confident right from the start in thinking about ways to use ICT in their teaching/learning environments. The other four interns, who had never taken a computer class, were watchful of their co-ops and gradually became comfortable in using ICT in their lessons.

ALL 9 interns hoped to see their co-ops use ICT in interesting ways in their teaching. They wanted to see ICT modelled so they (the interns) would have examples to follow. Three of the interns reported observing their co-operating teachers use ICT in the classroom.

The following is a summary of some of the ways in which ICT was integrated into the daily life of the classroom. This summary is broken into A—the five interns who had taken ECMP classes, and B—the four interns who had not taken an ECMP class. The following symbols were used to differentiate teacher/student use: TD—teacher-directed/initiated (the ICT opportunity was planned and created by the teacher for the students—more of a presentation TO the students; SD—student directed/initiated (the ICT opportunity was still planned by the teacher, but here the focus was on the students accessing and using the information—hands-on)

A: Classroom ICT use by Interns with ECMP 355

- using websites to introduce a unit (e.g., NASA), (TD), for general research purposes within a unit (SD), to practice math facts/skills (SD), to access daily weather reports (SD)
- making hotlists to keep students directed in their research topic (e.g., science—machines), (TD)
- students doing their own personal web searches for information (SD)
- using a video camera and tape recorder for writing projects and literature circles (TD)
- using digital cameras, data projector, TV/VCR in class to complement lessons (TD)
- using StoryBook Weaver to write stories (SD)
- using word processing applications for writing purposes (SD)
- using a video to capture a catapult project (TD)
- creating a novel study in WebQuest format (TD)
• watching BrainPop movies in relation to topics being studied (TD)
• using e-mail (Gaggle) accounts to communicate with children in other schools, and within their own school (SD)
• engaging in keyboarding practice (Grade 4) (SD)
• students creating projects using HyperStudio (SD)
• students using PowerPoint for presentations (SD)
• students developed their own webpages (SD). Other class projects were then attached to these pages (SD).
• students created animations using Animation Maker and then explained the concept they animated (SD)
• interns wanted to make sure that the technology being used was enhancing the students’ learning

B: Classroom ICT use by Interns Without ECMP 355
• some frustration in finding appropriate site to complement their lessons—too much time involved in searching (TD)
• used the computer for math—kids excited about doing math at interactive sites (SD)
• used the computer for news groups and weather (SD)
• modified some lessons from the Internet (TD)
• the consultant demonstrated an electronic microscope and captured images on the computer screen (TD)
• students made commercials on peer pressure (SD)
• used cameras and made and edited i-movies (SD)
• made a class website (SD)
• used Puzzlemaker website to create word puzzles and check spelling (SD)
• students did Mad Minutes online (SD)
• students did a project involving GPS—this project was conducted cooperatively with the intern, co-op and students (SD)
• intern was involved in a high-tech unit taught by the co-op (TD)

The 9 interns were asked if they felt more comfortable using ICT in certain subject areas, or with specific teaching strategies?

The interns were all over the map with this one. Some stated that the Internet was used more for subjects that did not have a lot of obvious resources (e. g., Health); some used the Internet more for Math and Science because there were more resources available electronically for these subjects; some said that it was just simply easier to find resources online than going through the hassle of locating and in some cases ordering resources from other places. Some interns were concerned about creating website hotlists or WebQuests—structured web-based activities for children, where the sites had all been
evaluated and carefully selected and incorporated into the topic of study—thus narrowing the possibility of children accessing inappropriate sites. One intern stated that even with prudent previewing and selecting there is still the risk of students accessing inappropriate sites; a guided search is important. One intern said that she found it easier to use ICT for Language Arts—different stages of writing, editing, spelling; contrary to that comment another intern was concerned about deteriorating writing skills due to heavy word processing use—knowing when to use technology is the key. One intern spoke about Internet safety and having children and their parents sign an acceptable use policy at the start of the school year.

The interns were asked to comment on anything particularly effective that helped to enhance the ICT learning environment (e.g., modeling/demonstrating of ICT by your co-op, resources used, teaching strategies, support from your co-op, school board inservice, etc).

Very few interns saw any evidence of technology being modelled in the classroom. The co-operating teachers were generally quite supportive of any attempts by the interns to introduce technology into their teaching. Interns felt that there was just too much ‘going on’ at the start of the year with respect to ‘managing’ the class, helping children work in groups, organizing the day, and so on that the first month was just about ‘shot.’ Then the month of December was a ‘write-off’ with Christmas plans. That really only left October and November and for part of that time the interns were in their three-week intensive teaching blocks. The interns felt that in April they would see a lot more happening with respect to technology integration in the classrooms as the co-operating teachers would have their classes organized to work in groups and with technology. One intern (who had not taken a Computers in Education class) sought assistance from the Board Office technology integration support teacher; this support teacher modelled electronic microscope use. Almost all the interns commented on their teachers being technology hotshots and being ‘in demand’ around the school to troubleshoot technology problems—thus not having time to use technology or model it in their own classrooms. One of the cooperating teachers even had to help troubleshoot during his prep time. One intern saw
her co-op as being very effective with technology in her teaching. If the intern came up with an idea of using ICT in the classroom this co-op suggested many things that the intern could do with it (ICT).

The interns were asked to comment on anything problematic related to the use of ICT that did not appear to enhance the learning environment.

The interns felt that they should have more preparation at the university for working in a Macintosh environment. Even those who had the Computers in Education class mentioned that, as it takes time to figure out a Mac environment—time that most interns don’t have; for the most part any computer skill-based learning that was required of the interns was done on their own time; the co-ops did not have time to help them to make sense of the Macintosh environment. Some interns felt scared (mostly those who did not have ECMP) by the ‘hotshot’ aspect of the co-ops and felt that they (the interns) would be expected to do all these amazing things with technology during their internship; this put pressure on them initially. Some felt that their initial fear disappeared as they realized that they could progress slowly through the stages of introducing and using technology. One intern had lots of ideas, had no modelling from her teacher, very little support or encouragement, and had trouble with the hardware and wiring/networking of the computers (each computer seemed to have different configurations, which meant that one had to know which student would do what on which computer. Her co-op was new to the school this year and had low-end equipment). This classroom had no access to a digital camera and/or a data projector. One issue for another intern was that her students did not have access to a computer at home and thus required assistance in class with very basic problems (e. g., what’s an inbox?). This put extra pressure on this intern and made her think twice about using technology unless she had extra help or could be free to work at the computer centre. Another intern felt completely useless in the lab and needed the co-op to show her what to do so that she could help the children. Yet another intern mentioned that you always had to have plan B as no matter how much you planned on your own to use technology, websites etc it never failed that the sites you wanted to use
were not available when you needed them. Some interns mentioned the frustration with BrainPop and school licensing (only two BrainPop movies a day per license/site).

_We tried to determine if the interns felt that there was or should be any kind of ‘appropriate’ sequence to using ICT in the internship experience? For example, should it be used/worked with after basic teaching strategies and classroom management have been sorted out and successfully achieved, or can ICT be used right away at the beginning of internship? Should you first see and be involved in ICT activities initiated by the co-op, help out, debrief with the co-op, reflect on what happened etc. before you start to use ICT yourself._

The interns generally felt that there should be no prescribed pathway of technology use, both for type of use or for timing, there should be no linear structure of expectations for technology use. It basically depended on the intern’s skills with technology, what was going on in the classroom (problem children; management issues; grouping and co-operative learning issues; curriculum topics being studied requiring project-based learning), the degree to which the co-op modelled appropriate technology use (if at all), and how able the children were with technology to effectively use the technology for learning purposes. Technology has to be introduced on an individual basis. Obviously the Grade 4 children had a bit of a learning curve with some technology skills for them to be able to make effective use of the technology for learning. One intern was really concerned about grouping for instruction such that the computer group didn’t ‘miss out’ on what the other groups were learning.

_We asked the interns if the felt that going into internship they had sufficient ICT skills to implement and indeed integrate ICT in effective ways into your internship curriculum? If not, how could the university have better prepared you to be more comfortable and confident with your use of ICT in your internship?_

One intern suggested that the pre-interns should see all subjects integrated during the third year of the program; he stated that he never saw Language Arts integrated at all.
Another intern mentioned that although he would like to see all subjects integrated he also realized that most faculty would not be able to do it; faculty simply did not have the technology expertise. Most of the interns felt that we should have shown them how to use Macs at the university. They stated that they really felt disadvantaged not being comfortable with the Macintosh environment. Most interns felt that ECMP 355 should be compulsory. The after degree students felt that there was no way they could possibly have taken ECMP 355 before interning because of their program structure. Most interns felt that if they had taken ECMP 355, then the technology modules would have been useless. One intern, who had taken both ECMP 355 and 455, found the modules a total waste of time; the way they were delivered confused her and her time could have been better spent preparing for her teaching. Others also mentioned how the modules were a waste of time. Some interns, however, wanted to keep the modules as well as have ECMP 355 mandatory. One intern had suggestions for how ECMP 355 could be incorporated into EPS (Educational Professional Studies, generic teaching methods) courses; this intern also mentioned that the co-ops should come to the U of R and show the students how to apply the technology—even in the ECMP classes. Other interns agreed. The interns need to see the relevancy, or the reality of what is happening in classrooms; they need to see evidence that some of what they are learning at the U of R is actually happening in classrooms. Either take the students to classrooms or bring the classrooms (i.e., the teachers) to the students.

*We wanted to know if we do this same thing in the Fall 2004 semester with a new group of interns, what should we do differently?*

One intern mentioned that her ‘hotshot’ teacher didn’t want her because she did not have ‘hotshot’ ICT skills. Another intern said that we don’t want the ‘hotshot’ teachers—we need a random group of teachers (‘average’ teachers). Another intern commented that the growth of the intern depended on the co-op since you’re only as successful as your co-op is. One intern commented on the high expectations that she felt on her but also appreciated her ‘hotshot’ co-op who pushed her to meet high expectations. Another intern felt pressure because her co-op was so involved in everything, she felt that she also
had to do it. One intern stated that he had a very supportive co-op but that he still felt intimidated. The interns felt that the Faculty need to make it clear right at the start that the interns are not ICT hotshots and that the interns are working on more basic skills, while the co-ops are working on fine tuning their expertise. One intern stated that he did not feel intimidated—for him the whole thing was a learning experience. Another intern stated that first-time co-ops need help. They don’t know what to do.

**Cooperating Teacher Experiences**

The 9 co-operating teachers were well advanced in their integration of technology with the curriculum. All 9 co-operating teachers were interviewed close to the end of the internship experience.

The co-ops basically confirmed what they interns told us they had attempted to do with ICT in internship. The teachers who had interns with no ECMP experience reported minimal computer use.

*We asked the co-operating teachers to tell us about some of their experiences working with their intern to incorporate Information and Communication Technologies (ICT) into the classroom learning environment.*

Generally, the teachers reported that they tried to support whatever the interns wanted to do and to make suggestions about some things the interns could do. Some of the co-operating teachers modelled some ICT activities, but generally they responded to any ICT initiative generated by the intern. The teachers reported that throughout the 13 week internship time was an issue—the interns were so overwhelmed with everything they had to do; technology appeared to be an add-on; the focus was on classroom management—the technology would come after everything else was under control. The co-ops reported that if the interns were to come back after Christmas they would see much more effective integration of ICT, that there are so many things to deal with in September when the school year begins and you feel much more comfortable with your class “and you tend to become the teacher you want to be more in February, March.” The teachers felt that even
for the interns who were comfortable with the technology, there are many basic issues to address at the beginning of a year and that to effectively integrate technology in meaningful ways for learning requires not only a good understanding of technology skills, but also a solid understanding of how to teach, constructivism, experiential learning, how to group for instruction, manage a classroom, and so on. Most of the teachers adopted a supportive role, allowing the interns to initiate any technology-related activities, but did not proactively model effective technology integration within a constructivist, experiential classroom. Thus few interns actually observed how to do this.

Some specific comments are as follows:

- One teacher commented that his intern basically copied everything modelled for him, took little initiative to try anything different, and that he felt uncomfortable with the Macintosh computers. This intern decided on how he would use technology, but the teacher tried to model the structure.
- Another teacher modelled for the class and for her intern some strategies using ICT, encouraged her with ideas and resources, and gave her many options for how she could use ICT in the classroom—i.e., not necessarily with the whole class.
- One teacher mentioned that his intern did not want a lot of the teacher’s help with technology; he had skills with technology and jumped in right away to use it—he used the technology mainly for his own purposes (not part of the hands-on learning environment). However, the intern needed to focus on basic teaching strategies, cooperative learning, experiential learning. This teacher figured that even with his intern’s high technology skill level he had difficulty using technology (appropriately) in the classroom during internship (he was not using ICT in a differentiated way—but can we/should we expect the interns to do that?). Basically, if the intern has not yet grasped the essentials of teaching, how could anyone expect the intern to use the technology in pedagogically appropriate ways?
- One teacher brought in people to work with her and her intern in the classroom—people like the teacher-librarian and the Board Office technology support teacher.
- Another teacher mentioned that her intern struggled with classroom management and that the students were quite sophisticated with technology—they had computers at home. Thus some assignments required home technology use, which meant that the intern didn’t see a lot of it modelled in class. For this teacher the integration of ICT just became one more thing in a differentiated instruction classroom, but for the intern, chaos broke out when she tried to integrate ICT in the differentiated classroom. It just wasn’t realistic for her to use it.
- One teacher commented that he kept putting off modelling ICT and his intern jumped in and started doing things with ICT, but had some classroom management problems to deal with. This teacher felt that although his intern had
the technology skills he needed to better understand constructivism and issues around student autonomy.

- Another teacher mentioned that modelling of ICT in some subjects became problematic as she didn’t teach every subject (her intern picked up social studies right away) and that effective ICT modelling often involved projects incorporating multiple subjects. This same teacher mentioned that you can’t really model the complete interdisciplinary model of differentiated instruction because you (the co-op) do not have ownership of all the subjects.

We tried to determine if the co-ops felt that there was or should be any kind of appropriate sequence to using ICT in the internship experience? For example, should it be used/worked with after basic teaching strategies and classroom management have been sorted out and successfully achieved, or can ICT be used right away at the beginning of internship? Should the intern first see and be involved in ICT activities initiated by the co-op, help out, debrief with the co-op, reflect on what happened etc. before the intern starts to use ICT himself/herself?

Basically, the co-ops agreed that there was no ONE structure or sequence of events that would work for everyone. It would depend on the needs of the children and the interests and abilities of the co-op and the intern. In one school an intern could take charge of the class right away and have no difficulties with management, be interested in and knowledgeable about technology and be able to use it effectively almost immediately; in another situation, it might take a technically competent intern the entire semester working through management issues before he/she felt comfortable using technology. There are two ‘things’ going on here—pedagogy (including classroom management), and technology. Even for the technologically competent, the pedagogical issues had to be dealt with first. Even the technologically competent intern would be well served by observing the teacher’s use of technology and by working with the teacher to prepare learning environments rich in technology. The general sense gleaned from the discussion related to this question is that each classroom is unique, with a unique group of students, all with special, individual needs, and the first thing a teacher and an intern must do is to get to know the students and develop a good teaching relationship, establish good classroom management, and generally feel comfortable with the children. The children’s needs, managing the classroom, and implementing differentiated approaches, within a
constructivist learning environment, are precursors to effective and appropriate implementation of technology.

The teachers felt that internship should be a time to learn about an intern’s own teaching style and to figure out basic skills. It is a time to try out new things (e.g., new teaching approaches). These 9 teachers had all had a great deal of professional development around differentiated instruction and technology integration and they felt some pressure in having to model everything for the intern, especially if the students in the class were not ready yet to use ICT. Most co-ops reported that they felt this pressure because they were part of the project; they moved the children forward too fast (many of the BIG interdisciplinary, multi-media projects occur after Christmas—it takes time to work with your class to get them ready to use IT effectively). One teacher stated that it takes months to ‘shape’ the class and train the students on how to function in a differentiated classroom and to know where they are at with their needs and to expect an intern to come in and do that is unrealistic—internship doesn’t allow learning how to run a differentiated classroom. Another co-op mentioned that she didn’t force her kids to move forward and she didn’t feel like she was doing enough ICT modelling. The teachers stated that there are a lot of things an intern has to figure out (and the intern needs time to do that)—they need time to master classroom management and they need time to develop as teachers.

Most of these teachers had attended a conference on differentiated instruction in Cleveland in the summer. One teacher compared what she had learned about differentiated instruction in Cleveland to how she could now work with her intern and where she was at. Her intern excelled at being able to identify the needs of the students.

_We asked the teachers if at the beginning of internship they felt their intern had sufficient ICT skills to implement and indeed integrate ICT in effective ways into the internship curriculum? If not, how could the university have better prepared the intern to be more comfortable and confident with the use of ICT in internship?_

Generally the teachers were confused about the IT skill levels of the interns, thinking they would be coming into internship better equipped. The interns who did not have ECMP
355 were ‘disappointing’ to the co-ops until the co-ops realized they had to work with what they had and take the interns along their own internship (ICT) pathway; these interns were generally not prepared to work with technology in any meaningful way in the classroom at the beginning of their internship. The teachers felt that the interns who had taken ECMP 355 did come with the technology skills, but that they did not have the background and experience in knowing how to use these skills in the classroom learning environment. These interns mostly used the computer for their own work. One teacher told us that research states that children need to be in a constructivist classroom for about 2 years before they can function properly to achieve; this would lead one to think that interns and new teachers also need to teach and work in such an environment in order to know how to use technology appropriately in that classroom’s (constructivist) learning environment.

Generally, the teachers felt that there are many ways that the university could improve on its preparation of the interns for the internship experience, IT being one of these ways. As stated earlier, these teachers had all experienced a differentiated instruction conference in Cleveland this summer and came back with many great ideas to try out in the classroom. Then along came the intern (and in some cases not a very strong intern). Most of the teachers felt disappointed and also frustrated as they felt they had to put on hold what they wanted to try out as a result of then conference. Many teachers stated that the interns were just not prepared—with IT, with math teaching, with differentiated instruction, with addressing special needs kids—at both ends; some of the interns just didn’t understand what some of these teachers were trying to do, and didn’t understand the difference between evaluation and assessment.

The teachers discussed expectations—of themselves and of the interns, and that it would be good if the interns had an awareness of ICT and DI—at the end of the internship. One teacher felt that his intern was much further ahead (in ICT and DI) at the end of his internship than the teacher was when he interned. Another teacher commented that we need to distinguish between ‘expectations’ and ‘giving them a taste.’ The general sense was that co-ops should have ‘expectations’ but we need to differentiate from intern to
The co-ops stated that ECMP 355, the IT modules, and also application of integrating the technology into the curriculum should all be necessary experiences that the university should provide prior to internship. One teacher stated that even if all of the students get ECMP 355 they still need to know how to use it in the curriculum. The teachers told us that the university needs to prepare the interns with an interdisciplinary focus, demonstrating integration of ICT in all the methods classes. Another co-op questioned how the university could hire profs that are qualified in their area and also know how to integrate technology—how can they demonstrate effective integration when they do not have enough knowledge of the technology or of how to integrate it? The ECMP 355 class is needed to help us know the technology. Another co-op said, “with all due respect to ECMP 355, it’s not teaching DI in that classroom.” There needs to be something that connects all the subjects together. ECMP is technology skill-oriented. Another co-op said that it was not wrong to have ECMP—there just needs to be something to pull it all together. One teacher stated that a special university class on constructivism/DI would be ideal—or have the methods professors interweave constructivist ideas and the integration of technology into their classes; ECMP 355 is doing what we are trying NOT to do in our teaching. This teacher suggested that one day a week we (at the university) have an interdisciplinary class where students could discuss their learnings in the other classes and sort of bring everything together. The ‘class’ could have a facilitator who could bring everything together; it could also bring in guest speakers (e.g., multiple intelligences; classroom management, the whole learner approach)—maybe the class could have a project—where the university students could go to schools and work with students in classrooms—maybe on webpage work—where the university students and the kids actually work on the webpage “so that they have that experience prior to coming into their internship. In this way at least they would have some kind of hands on experience with technology and kids.” This teacher also mentioned that opportunities could be made for observation in TI/DI classrooms prior to internship—in March, April,
May, when teachers are feeling more comfortable with their students; her pre-intern got to see more last year. In pre-internship when the students are out one day a week or a week at a time they debrief that pre-internship classroom experience in EPS classes. This teacher, however, stated that EPS does not do enough to pull all that together—the methods classes were all focused (e.g., math) and EPS needs to have more of an interdisciplinary focus—or another special class (one day a week as stated earlier), where it’s about the learner not the subject. This teacher said that the interdisciplinary seminar class one day a week could bring everything together.

Some of the co-ops spoke of the need for the university to introduce the pre-interns to the Macintosh computers in the classroom (all the public elementary schools use Macs), as the interns had only experienced the PC world at the university. One teacher talked about the provincial Adaptive Dimension (AD) document and the need for preparation to use it—in action. DI is AD in action. Her intern did not know how to adapt her teaching to diverse student learning needs. The university needs to understand and make connections between the buzz words (e.g., AD → DI)—the different trends, what happened before and how it has changed, keep up to date with the terminology—but be able to deconstruct it and make sense of it. One teacher spoke about something that teachers do—look for that motivated student—“the one that’s excited about learning. We’re here because we made choices to do the PD. Can you turn around and give that to interns. I don’t know.”

**Summary:**
The Faculty needs to keep ECMP 355, hopefully make it mandatory; that way we know at least that all students will have a basic technology knowledge. But more than ECMP I needed; students need to see technology modelled, used, and integrated in meaningful ways in their methods classes and they also need this idea of an interdisciplinary class where the focus is on the whole child, DI/TI, the adaptive dimension, MI, etc—where everything comes together. This class would be immensely important, one that would need an excellent facilitator. This class would be especially effective if the students had all had ECMP 355 and if they all experienced DI/TI in all their methods classes. If these
experiences have not been available then this seminar class would need to expose students to these experiences.

Co-ops were told about recent experiences with the i-book cart (10 laptops)—more professors are using this cart than had previously used the lab or mini-lab. One faculty member will try to have his students connect their WebQuest project to the curriculum. One computer class is better than nothing (but the focus in ECMP tends to be on the technology and getting the curriculum to fit with the technology, rather than starting with the curriculum and seeing how the technology can fit). The big challenge is that many professors consider their subject important and indulge in ‘telling’ students the content, rather than enabling students to learn the content through a different medium. One co-op suggested setting up a simulated class—a virtual experience with students of diverse needs; our university students would have to figure out what to do in the different scenarios.

Teachers were asked if they had felt ‘resentful’ about having an intern—especially when they had just returned from a DI conference and were all pumped up to try out new things and they had to slow down or stop and work with their intern—who wasn’t there yet. One teacher (who did not go to the conference) said that if she had gone to the conference and had come back wanting to try out new things and had an intern—“it would have put a damper on things.” Another teacher, who was a new co-op and had a lot of questions about what her intern was supposed to be doing, feels that the co-ops should all get together and be on the same page with respect to intern expectations. Also, the interns would compare their expectations with those of other interns, resulting in the interns feeling discouraged and/or the co-op changing expectation. There was debate about expectations, keeping the expectations high, but also differentiating the expectations (e.g., if one intern had proved that he/she could write lesson plans, why make him/her do more of the same for 4 months). They discussed the notion of ‘compacting’ the work that an intern could do and enabling that intern to go onto higher things. One co-op reported that everyone has a different skill—“everyone is good at something and we have to allow them to use their multiple intelligence teacher skill and let them develop that as well as
develop others.” I spoke about the internship seminar and how the four of us iTeacherEd researchers had worked with all the co-ops and interns in this project, but the co-ops still felt that they needed more, perhaps a first time co-op handbook; one co-op found the IPP (intern evaluation) hard to follow; “outstanding” was way out of reach for her intern.

We asked the teachers if we do the same thing in Fall 2004 semester with a new group of interns, what should we do differently?

Suggestions were as follows:

- Take an intern every second year (whether part of this research project or not)
- Ask a wider section of teachers to volunteer (from across the province—teachers who are interested in integrating). Make sure there is no coercion (of teachers or interns).
- Ask teachers and interns if they would be interested in taking part in this project
- Randomly selected teachers and interns (no special matches)
- No special preferential treatment
- Pair a teacher with an intern within a specific ability range—an intern that can be ‘moved along’ by the teacher
- Don’t tell the interns that they are part of a special project as there is extra stress on the intern just knowing that they were part of this project. One teacher disagreed—the ‘stress’ bumped up his intern a notch. Another teacher stated that even when the IT focus was removed her intern still felt stress at being compared with the other interns in the project.
- The general feeling was that everyone—interns and co-ops should really want to be a part of this project. Some co-ops wanted to be co-ops but not necessarily to be part of this project.
- the university needs to be very clear at the outset regarding the expectations of this project. By reducing our expectations it reduced stress in some cases, but, according to one teacher, had the expectations remained, she would have worked with her intern to produce a GrassRoots project. But—the focus had to be on the intern and the intern’s experience—taking ownership of the project, and when the intern did not take ownership, the teacher backed off.
- Because of the consent issue everyone would have to know and consent to being part of a research project, but if we draw from a wider audience, and hopefully have more volunteers, we can interview, select and make better matches.

Other Teacher Experiences

This group comprised 5 teachers (names are pseudonyms):

Mary: the Public School Board technology integration teacher
June: the Public School Board differentiated instruction consultant  
Margaret: the Public School Board special needs consultant  
Rose: an elementary school teacher-librarian  
Jackie: the Public School Board technology consultant  

These above 5 teachers were all involved in the Fall 2003 semester special internship project. They either worked in schools where some of the interns were placed and helped these interns on technology-related projects, or they were called out to the schools by the interns or co-ops to assist with classroom projects. Their perspectives were more objective, but nevertheless quite valid.

*We first asked these teachers to tell us about some of their experiences working with the co-op/intern pair or either the co-op or the intern during the Fall 2003 semester to incorporate Information and Communication Technologies (ICT) into the classroom learning environment.*

Mary had e-mailed all the co-ops to try to establish visits; 6/9 wrote back and 4 co-ops asked her to visit and plan—with the intern. Mary sat down with each intern and helped them with their block and their planning. She discerned that 2/4 interns had some comfort level with the technology (they spoke about ECMP 355—not the IT modules). Mary worked most with a water and microscope project—which took weeks to get the right software to download the images and return them to the intern. Mary also worked with one co-op—who wanted to ‘do something with Hyperstudio.’ Mary was able to get this teacher thinking about the curriculum first. She came to this teacher’s room and trained some ‘experts’ in HyperStudio. Mary also visited the other classrooms that were part of this project, but the other co-ops and interns had no specific requests. Mary was surprised that when the teachers called for her help/support that they did NOT sit down with her as part of the team (co-op/intern/Mary); instead they were happy that she take the intern off to plan. Mary said that she thought the teacher had provided initial support and ‘planted some seeds’ and that the teacher would provide ongoing support whenever the intern needed it. She challenged one intern to do a hotlist first (from the handout she
had provided) and then ask the co-op for help. Mary considered that this intern was looking to Mary to provide ALL the technology support. Mary said the co-ops didn’t want to interfere with what Mary and the intern were planning—they wanted the interns to take ownership. Mary had to tell this intern that her responsibility was with the teachers, not the interns.

June agreed and told the teachers that she was there for the teachers—not the interns. June reported that she hardly ever saw computers being used; in one classroom she did see computers being used—by an intern. June thought that Rose had been influential in the intern using the computers. June was very pleased with what she saw in this classroom, but reported that the teacher wasn’t that pleased with some of the things her intern was doing. June reported that in another room nothing was happening with the computers—the intern just didn’t know what to do. June asked this teacher how she was modeling the use of IT and the teacher told her that we can’t get to that yet “because there’s too many other things to establish in classroom management.” June suggested that the teacher could assign the intern to a small group and have her do something special with this group while the teacher worked with other groups. June was “floored by how little modelling and team teaching the teachers were prepared to do or thought that they should do. And that was an ah-ha that I thought, we didn’t prepare these teachers.”

June and others spoke about the collaborative/team teaching potential during the internship AND during the block; the teachers seemed nervous about ‘leaving the room’ for 3 weeks. There appears to be a ‘tradition’ (from both interns and co-ops) that the intern is left alone (to sink or swim) during those 3 weeks. Margaret said that she didn’t understand why a teacher would leave the room—how could evaluation occur? June commented that one teacher had told her that she was looking forward to having her class back—it’s totally out of control right now—June thought that that was wrong—a class should not be totally out of control—that’s the teacher’s responsibility.

June commented that she didn’t understand why having an intern would prevent them from doing some of the things they would normally do in their classroom. It should enable them—an extra pair of hands—MORE opportunity. The internship seminar needs
to focus more on the “role of the co-op, the importance of collaborative planning, the importance of team teaching, the importance of modelling, the importance of dialogue in the classroom with the kids, with the intern.” June spoke of the need to individualize (or differentiate) the internship experience—figure out where the interns are coming from and what they need; maybe they would benefit from being part of a group of 3 or 4 students. June commented that she had never seen one specific classroom so traditional as in the last 4 months. We spoke about whether that was due to the teacher responding to her intern or to what she expected the university to want “but was that the intern’s initiative or was that the teacher’s reaction to what she thought needed to happen to maintain control?” June felt it was this teacher’s inexperience as a co-op: she was not ready; two other teachers were also not ready to have an intern. June spoke with one of the interns and was quite impressed with what this intern was doing with the students with respect to ICT but she was a bit concerned about what the students were doing in their groups (i.e., they were sitting in groups, but were they engaged in cooperative learning tasks?). This intern used the technology to help the students learn about things like carving and Inuit art—it seemed to be seamless. This intern got little validation from the co-op that what she was doing was helpful or ‘correct.’ We discussed the difference between the co-ops and whether they would be better coaches or had higher expectations etc and June commented that even within this group, “where we have a (coops name) and we have a (coops name) and no matter what intern they get, that technology is just seen like the pencil. It’s just seamlessly integrated into their practice. It’s not a big deal.” Rose reported that one of the co-ops in her school (an experienced co-op) used technology a lot in her classroom and her intern would get a little flustered but then would say she could do it—she went with the flow. This teacher modelled ICT and her intern “went with the flow.” Other (inexperienced) co-ops waited for the intern to initiate technology use. It is the co-operating teacher’s responsibility to realize that they are “providing a learning environment for those interns to grow. Not just that they let them go, but to establish that learning environment.” Someone suggested that good teachers, teachers who have been teaching 15, 20, 25 years, who are not familiar with the technology and don’t feel comfortable with it, can take an intern who has the ICT skills, and together they can integrate the technology and the pedagogy. “Technology
integration will not happen if Best Practices are not in place first.” Mary talked about the difficulty for teachers to change their mindset—to create multiple paths to learning. June said that she had asked two interns the most important thing to remember about teaching and they both said “if students don’t learn the way we teach, we must teach them the way they learn.” Jackie reported that in her school there are 3 interns (not part of our special project) and that one of the interns is using a lot of technology—because her teacher uses it all the time. Jackie thinks the

the approach of the co-operating teacher is very important and I think maybe it’s picked up almost subconsciously by the intern. Because this is part of what we do. Because in this case there never was a question of ‘what are you specifically doing to integrate technology?’ there was just an acceptance that ‘this is part of what we do in this class.’

Jackie also stated that she thinks that the teachers who tend to use technology more have ECMP in their background.

We asked these teachers if at the beginning of internship they felt the intern had sufficient ICT skills to implement and indeed integrate ICT in effective ways into the internship curriculum? If not, how could the university have better prepared the intern to be more comfortable and confident with the use of ICT in internship?

The teachers commented that technology is like a pencil—do we wait until year 3 to give the students a pencil? It should be part of what they do and use all through their program. I outlined our four-year plan and the different opportunities and experiences provided for the students. One teacher commented

This is the right way to do it, because it’s going to work differently for different people. But the more training they have and the sooner they have it, the better it will be, I think. I think it’s kinda like you would never think of waiting till the third year of something to give them a pencil, like all they have is paper for the first three years and in the third year they get a pencil. You would never do that.

Jackie stated that what they learn needs to be in context from the beginning, needs to be scaffolded, needs to be built into the student’s prior learning—this comes from brain
research. Students need to be able to make the connection between what they know and what they are learning. June and Jackie suggested that a differentiated instruction framework needs to be established at the beginning of a program—then everything else fits into this framework; technology integration then becomes part of that framework, as does students with special needs. We (university professors) need to be modeling differentiated instruction in everything we do—technology integration, purposeful use of technology to enhance student learning, etc. It’s not enough to talk about differentiated instruction—we need to model it. The teachers felt strongly that ECMP and/or the modules, without the technology integration in the methods classes, would be irrelevant; the modules are separating the technology from what is going on in the classrooms. They talked about integration beyond that of technology—to integrate mathematics, language arts, and social studies; everything needs to be integrated and we need to model it at the university. Technology would simply be part of that picture. Jackie said that “we need to prepare these teachers for the future” (THEIR future—not OUR past). She also stated that for now anyway ECMP 355 was important for the students to take, but even within ECMP 355 there are different experiences—depending on who teaches it; in some cases it focuses on the technology, in others it focuses on the curriculum. She feels that ECMP 355 has to be relevant,

it’s all got to be linked to the curriculum, and it’s got to be linked to ‘how can it enhance student learning in the classroom?’ These questions need to be asked: how is this going to enhance student learning? Why are you using technology? Because maybe technology isn’t the best choice in this lesson. And I think we need to teach them how to evaluate, how to question, how to reflect and evaluate.

The university students need to experience technology as “integral to what they are doing in class and not done in a way where it’s just sort of a gratuitous use of technology.” We compared the issue—at the university and in schools—where we have instructors who don’t know enough about technology to know if it will enhance their teaching, or how to integrate it into their teaching—they have a huge learning curve to go through to learn ABOUT the technology to be able to use it to learn with or to teach with. Some interns were more prepared than others to use technology. To be able to seamlessly integrate technology into the teaching/learning environment teachers need to have
PD/preparation/training in how to do this. Our students at the university also need to learn how to do this—by having models at the university to follow. We need people who “can model the environment that these people (interns) are being expected to teach in.”

June stated that she was disheartened with some of her ‘cream of the crop’ teachers, that some of them were still climbing the hill—they had not yet reached the plateau and rather than learning from and with the intern they did not continue to grow in technology integration/differentiated instruction but rather went backwards and waited for the intern to take the initiative. The teachers said that two of the co-ops were “on an island.” I asked why they are on that island. Mary said it was because they understood Best Practices and were reflective; they could take any intern and work with that intern and produce an excellent teacher by the end of internship. They have confidence and an inquiring mind. We talked about the need for teachers who have Best Practices in place and are confident in their practice. There was one teacher, in addition to the two mentioned above, who would fit this description but she did not model technology integration and she did not team teach with her intern; the feeling was that she felt insecure in her role as a co-op.

We asked this group of teachers if they had any ideas on how we would support the next group of co-ops better?

We had some discussion about how to select the interns

- ask students in March if they are interested in being part of this project; solicit volunteers; select from those students who volunteer to be part of the project and then find teachers to match the students with
- select interns from those who have had ECMP 355 (the 3 interns who did not have ECMP in the Fall 2003 semester were clearly at a disadvantage); Jackie added that they should have taken ECMP in context—the curriculum-based ECMP; that this ECMP class should focus on TIDI (we need accountability, need to get beyond the ‘whiz bang effect’ of the technology). Someone stated that the ECMP title and course description needed to change to reflect what this class needs to do. Jackie mentioned the need to start with the technology skills in ECMP but as soon as the students have acquired the skill there is the need to examine how to apply that skill in context. The end goal is to be able to examine the curriculum and take in all the factors—one of them being technology ‘and how could that be used to enhance the learning’; we need to initially focus on the technology. Half of ECMP 355 is the lab part “but the half of it better be pedagogical.” Jackie told us
that in her ECMP classes she had students who were in Year I and students who were in semester 8—post-internship.

- June proposed that the group of teachers we work with (Fall 2004) should be the TIDI group (Technology Integration/Differentiated Instruction)—they’re no rocket scientists—they’d be a better group to work with. “The TIDI and the interns would do a better job of going towards the top of the mountain (together) than joining the people that have already reached the peak.” The teachers this fall needed time to “enjoy the top of the mountain, . . . to refine their practice, and we didn’t give them the time to refine.”

- take the pressure of the special project away; one teacher commented on the negative aspect of the special project on the research; it seemed to heighten the expectations (of the interns and the co-ops); someone else mentioned that our expectations (in this project) are really our expectations of internship in general

- have co-operating teacher support group sessions, perhaps facilitated by one of the researchers, where specific aspects of the internship experience can be discussed, and where the co-ops can share what their interns are doing.

**Mary told her onion story.** This story relates to years of professional development offered to teachers in the public school system, professional development that has been designed and implemented by most of the teachers in this interview. Teachers have been able to participate in a variety of levels of professional development, each level of involvement and participation creating another layer of pedagogical knowledge. Initially there was the Cyber program, offered by Jackie, which focused on technology integration, authentic classroom applications, reflecting on improving student learning, and promoting constructivism in the classroom. Then there was the CyberMentor program, also designed and implemented by Jackie—growing the vision, which extended the learning of technology and reflective thinking on practice and looked for ways to encourage teachers to think about teaching and learning in new ways. This program also helped teachers to build confidence in themselves as teachers and as mentors for other teachers. June designed and implemented a series of PD opportunities around Best Practices. These opportunities focused on new instructional strategies, promoted constructivism in the classroom, and the development of innovative learning environments. June also worked with a number of local teachers to design a website that promoted all the different instructional approaches, with many classroom examples of these approaches. Many of the co-ops attended an international conference in Cleveland in July 2003, a conference focused on differentiated instruction. The teachers who attended this conference extended their repertoire of instructional approaches and also
had a stronger foundation on which to base these approaches. They also participated in all the sessions they attended and discovered that what they were doing locally was on the cutting edge of what was occurring nationally and internationally. The entire conference experience gave the teachers tremendous confidence in themselves as teachers and as mentors. Many of the co-ops are also in our university graduate studies program; many already offer professional development workshops for other teachers at the Board Office. All of these above experiences have contributed to the ongoing learning of each teacher, strengthening the learning connections and developing more layers of expertise, building upon yet connected to prior knowledge and experiences.

Not every co-op in our special internship project had been through all of the above experiences, but two of the co-ops had been through them all, while the other 7 co-ops had been through different combinations of the above experiences. All 9 of our co-ops are at different points on their professional journey—a journey involving technology integration and differentiated instruction. Each of our co-ops took an intern, which they saw as another opportunity to learn and to teach—to share their expertise. At this point in the story Mary used the term “onions in a hot house—when interns are placed in these environments, we are expecting more rapid and enhanced growth due to growing conditions.” Sharing of expertise and modeling of the TIDI concept did not occur in each classroom because some of the teachers were still working at trying to develop their practice; they had taken advantage of many PD opportunities, but they were still “climbing a mountain;” they had not yet conceptualized or solidified their practice to the point where everything they had been learning about TIDI was a natural and invisible part of their teaching repertoire. Mary suggested that for our special internship project to work well, to be able to “grow good onions” (develop good teachers), we—the Education Faculty—need to start with good seeds; we need to make TIDI part of what our students are doing throughout the Education program and we need to demonstrate how technology can be integrated into all the courses rather than teaching technology through separate isolated modules; we also need teachers who use a constructivist approach to teaching, who are confident in their practice and who are willing to go on a journey with the intern.
**Faculty Advisor Experiences**

The members of the iTeacherEd team functioned as the faculty advisors for the 9 intern/cooperating teacher pairs during the Fall 2003 internship. Over the semester each pair was visited at least 4 times. The following summary provides experiences of and suggestion from the faculty advisors.

- Most visits focused on general intern development rather than ICT concerns
- Inexperienced cooperating teachers required visit time to talk about general internship expectations
- Faculty advisors did not feel part of an overall ICT project and therefore had difficulty moving pairs forward in ICT use except in cases where there was a confident intern and cooperating teacher actively engaged in ICT use
- Faculty advisors saw little regular use of ICT although the teachers were “GrassRoots teachers” (all had previously been involved in GrassRoots projects)
- Planning, classroom management, instructional strategies and assessment were specific needs that required faculty advisor time that detracted from a focus on ICT integration. In some cases faculty advisor were able to integrate the ICT focus into these other concerns.
- Someone at the school board should be involved in helping to make internship pairings
- Selection and pairings for internship should be done earlier.
- The faculty advisors believe experienced co-ops, not first timers, should be used in projects. Some of the co-ops had difficulty determining their role as co-ops.
- Co-op teachers need a mentor, someone to facilitate discussion and review expectations.
- Students, as part of the practical component for ECMP 355, could visit and observe in some of the ‘hotshot’ teacher classrooms.

The iTeacherEd team decided that regular faculty advisors will be appointed to intern/cooperating teacher pairs and that iTeacherEd project members will focus on ICT integration specifically to see if the increased attention to ICT will help move ICT use by interns ahead.
Significant Learnings and Recommendations

The iTeacherEd team has learned much about the integration of ICT into a faculty of education during the 2-year iTeacherEd project. In this section the team categorizes and summarizes significant learnings and recommendations that flow out of the project experiences. These learnings constitute new landmarks to guide successive journeys in ICT projects in teacher education.

1. The Concept of ICT Integration

Reflection on the meaning of ICT integration needs to be part of the development of a model for integration of ICT in teacher education. What it means to integrate ICTs appears to be individually interpreted depending on previous experience. Many of the following recommendations relate to this primary learning. The integration of ICT must be understood as a part of a larger whole—differentiated instruction to meet diverse learning needs.

We recommend that:

1.1 students in faculties of education be exposed to a host of examples of ICT integration in school classrooms, and provided time to discuss the reasons for ICT integration in planning, teaching, student learning and professional learning.

1.2 faculty be provided with examples of best practices of teaching using ICTs at the university level.
1.3 time be provided through project funding to engage faculty in discussion and reflection on ICT integration in their teaching.

1.4 ICT integration concepts and ideas be presented in the context of constructivist learning theories and the need for differentiated instruction to meet diverse learning needs.

2. Preparing Students to Implement ICT into Teaching

Preservice education students require significant preparation in both technical knowledge and skills, and pedagogical know-how before they are confident integrating ICT into all the phases of teaching. Students having taken a course in computers in education (ECMP 355) reported using ICT in more ways and in more sophisticated ways than those without the course. Also, ICT use in university and school classrooms appears to be more meaningful in classes with a constructivist learning orientation.

We recommend that:

2.1 teacher education programs offer a mandatory course dedicated to technical concerns including the use of different computer platforms, exposure to applications and activities such as web page construction and WebQuests, and Internet skills, along with their pedagogical uses. Alternatively, such a course could be required for entry into a faculty of education.

2.2 teacher education programs integrate ICT technical and pedagogical knowledge and skills into curriculum instructional courses, and that the technological components learned in the mandatory course (2.1) be utilized in these other courses.
2.3 a generic curriculum and instruction course be taken by students before the internship/final practicum that focuses on differentiated instruction and constructivist learning theories, and that explores experiences with ICT.

Significant time in the project was spent designing assignments that required students to integrate ICT into their plans and then implement these plans in the field experience component in school classrooms. Students were more comfortable using ICT to locate resources for their planning than they were using ICT in their teaching in a minilab setting. The preintern WebQuest assignment (see Appendix B) appeared to achieve a higher level of ICT integration into planning.

We recommend that:

2.4 assignments in education curriculum and instruction courses (which have a field component) be structured so they that require ICT integration in lesson and unit plans, and experimentation with these plans in school classrooms.

2.5 students be given a range of opportunities throughout their program to learn about, work with, and teach with ICT, and that a specific plan for these opportunities be developed by the Faculty. This plan could include a set of competencies to be assessed throughout the program.

2.6 to ensure a strong link between coursework and practica, extensive ICT preparation of students occur before the final practicum and that expectations for ICT use in the final practicum be closely linked to prior experiences and assignments in the faculty.
3. Integrating ICT in the Internship

Specific ICT projects such as GrassRoots projects are extremely complex for interns to initiate during the process of learning to teach. Interns report a need to address the “basics” of teaching before they feel safe enough to explore ICT integration.

We recommend that:

3.1 volunteer interns be selected who have the desire and interest to work with GrassRoots-like projects, who are committed to integrating ICT into their teaching, and who are strong in terms of other developmental aspects (planning, instruction, assessment, classroom management and relationships).

3.2 volunteer cooperating teachers be selected for GrassRoots-like projects who have an interest in exploring ICT integration collaboratively with interns, who have some experience working with interns, and who have some experience teaching in a minilab environment (several computers in the regular classroom).

3.3 an information session be provided for cooperating teachers and interns before the internship semester begins to clearly set expectations and provide time for appropriate preparation.

3.4 cooperating teachers and interns be given specific ICT curriculum integration support throughout the internship apart from regular faculty advisor supervision.

3.5 cooperating teachers be expected to model ICT integration for the intern throughout the internship in the planning, teaching, student learning activities and professional learning phases.
4. Preparation of Faculty to Integrate ICT into University Teaching

Interns require both modelling of ICT integration in their university courses and in school classrooms. There are more and more school classrooms that now have a minilab environment and teachers who are integrating ICT into their teaching. Modelling at the university level is more problematic since there has been little research about this kind of modelling, nor is a lot known about constructivist teaching in teacher education.

We recommend that:

4.1 some university classrooms be configured with networked minilabs (4-6 computers) to reflect emerging school classroom environments, and to study their effects on student learning.

4.2 instructors be provided with opportunities and incentives for professional development focusing on integrating ICT into their teaching.

4.3 special projects be initiated in faculties of education to increase the use of ICT by instructors; these projects must provide incentives and support for change such as laptop computers, conference funding and course release time.

4.4 special collaborative projects be initiated between faculties of education and school boards during field experiences in order to link students with best practice ICT classrooms.

The move to new ways of teaching with ICT at the university level involves a high degree of change involving a paradigm shift in beliefs and practices related to teaching and learning. Professional development that promotes this change must be based on what we know about how people learn. Learning theory alerts us to the importance of learners constructing knowledge (constructivism) by sharing their experiences and ideas within
groups of individuals with common needs and interests (reflective practice within a community of practice).

We recommend that:

4.5 the principles of constructivism and reflective practice underpin the professional development processes employed to change university teaching to incorporate ICT.

4.6 communities of practice be established to support change. These communities could be developed at the university to include faculty and students, and should form strong links to schools.

4.7 technological and pedagogical support be provided on an ongoing and strategic way to the communities of practice that are being established.

4.8 time be provided to instructors for required course changes and experimentation related to using ICT in teaching at the university.

4.9 research be conducted into the use of constructivist approaches and reflective practice in university classrooms to determine possibilities for integrating ICT into teaching.

5. Enhancing the Faculty Environment for Change

The Faculty environment must be one of support for ICT change. ICT projects must be supported by faculty administration. Resources must be allocated in order to sustain change.

We recommend that:
5.1 resources be allocated to major change projects related to ICT integration.

5.2 documented change in teaching related to ICT integration be especially recognized as scholarship in teaching for tenure and promotion purposes.

5.3 ongoing and strategic technical and pedagogical support be readily available to faculty members.

5.4 computing equipment for faculty be updated on a regular basis.

If there is one word to describe ICT experience in a faculty, it is “diversity”. Students are at so many different levels not only in terms of technological and pedagogical ability, but also in terms of beliefs and values related to ICT. Faculty also reflect this range of knowledge, skills and attitudes. Many faculty members are resistant to change because they do not see technology enabling them to teach better; in fact technology may mean more time devoted to teaching detracting from other responsibilities such as research.

We recommend that:

5.5 faculties provide a variety of ways to address the breadth of instructor ICT needs such as: supporting major ICT projects for interested faculty members, seminars for faculty members to share experiences, one-to-one support and mentoring, and regular technological and pedagogical workshops to address specific ICT needs.

5.6 small communities of faculty using ICT provide leadership to faculty by offering seminars and one-to-one mentoring.
6. External Support for ICT Integration in Faculties of Education

The implementation of ICT in a faculty of education is a developmental process that appears to start with a long period of infrastructure development before teaching innovations can be sustained. In the 10-year development period in our Faculty there has been significant exposure to technology. Faculty have been able to “soak up” technology to the point where computer use for e-mail, word processing, and internet searches is commonplace in their work including preparation for teaching. ICT must be in place for a considerable period of time before it is easily integrated into teaching.

We recommend that:

6.1 major funding agencies establish intensive projects at several teacher education sites to research, develop and provide models of change.

6.2 ICT integration be a high priority for the Canadian Deans of Education group to consider possibilities for collaboration among faculties of education in Canada.

6.3 research funding councils provide funding for collaborative project development as well as university-based academic research.

The challenge to provide teacher education faculty with ICT knowledge and skills, as well as engendering commitment to ICT, is inextricably linked to the nature of the academy. The value of scholarship and research as represented in published books and articles has commonly overshadowed the value placed on teaching. Innovation in teaching is generally more difficult to measure leading to this overshadowing by scholarship and research. Initially innovative teaching requires an increased investment of time to establish new patterns and routines. Since teacher educators should be master teachers, teaching in faculties of education should be valued and rewarded at least equally if not more than scholarship and research.
We recommend that:

6.4 new faculty members in faculties of education receive intensive preparation in the use of ICTs.

6.5 new faculty members be given sustained assistance with the integration of ICT into their teaching.

6.6 appropriate career rewards be given for innovative teaching and that innovative means be developed for “measuring” such teaching.

6.7 research release stipends (not unlike “course release stipends”) be provided to faculty to pursue their teaching interests.

7. Addressing Scepticism toward ICT

There are faculty members who are sceptical about the claims being made for ICTs, believing that technology has not necessarily improved society, schools and learning. They are critical of the seemingly uncritical adoption of ICTs in society, schools and universities. They are suspicious of the reasons for the increase in ICTs use in education and are critical of the proportion of resources being used to support their use.

We recommend that:

7.1 major faculty projects include a critical component that addresses issues related to ICT integration such as: media literacy, equity accessing resources, and commercialization of ICT.

7.2 major funding agencies sponsor ICT projects that link faculties of education to schools with economically and geographically disadvantaged
students including Aboriginal students in order to determine promising practices to enhance the academic achievement and social development of these students.

**Principles for ICT Integration in Faculties of Education**

The following principles emerge our of and summarize the learnings presented in the last section. Recognizing that faculties of education are structured in many different ways, these principles are designed to be adopted by faculties of education in general to guide the development of ICT use in faculties of education.

**Principle 1: Communities of practice should guide the development of ICT use in faculties of education.** These communities should occur in a variety of ways: faculty groups, student groups, faculty/teacher groups etc. These groups provide a networked opportunity for those interested in integrating ICT into teaching and learning to share experiences and to learn from one another, and to generate further enthusiasm and excitement for the potential that technology can offer to enhance learning. They provide living examples to others around them. They are able to transcend subject area discipline content, specific programs and institutional boundaries.

**Principle 2: A high profile leadership team should facilitate the ICT development process.** Members of the leadership team should be active in using ICT in their work, and should be able to assist others in ICT development. Such a team can attract attention to ICT development and garner resources and support. The faculty administration should recognize and support the leadership team.

**Principle 3: Modelling of ICT for preservice teachers should take place in both school and university classrooms.** Students should engage in significant learning experiences in ICT integrated classroom environments, based on constructivist and reflective learning principles, both in schools and at the university.
Principle 4: The critical issues of social justice and equity related to ICT need to be an essential component of teacher education programs. The place of ICT in social justice and equity issues needs to be explored by faculty and students. ICT projects should have specific components related to social justice issues so that this component is addressed through dialogue and specific action.

Principle 5: The implementation of ICT into faculties of education is a developmental process and requires significant time. Elements of the developmental process include: a) the development of infrastructure including ICT technological and pedagogical support, b) providing ICT related content through courses and modules for students, c) providing professional development for faculty on ICT integration into teaching, and d) incorporating ICT into a broad range of curriculum courses. These elements are not necessarily sequential but are dynamic and fluid.

Principle 6: A broad range of technical and pedagogical experiences and support for students and faculty must be provided to meet the wide diversity of knowledge, skills and beliefs related to ICT. ICT must be integrated into all aspects of teacher education so that students and faculty learn from, about and with technology at a level meaningful to them. The degree to which ICT integration occurs must be understood to be informed by an individual’s beliefs and understandings of ICT integration.

Principle 7: Successful implementation of ICTs into faculties of education demands an exploratory and dialogical approach that critically examines the usefulness and appropriateness of the use of ICT in any given context. Since both faculty and students have different levels of understandings, much dialogue and exploration is required for substantial change to occur.

Principle 8: A supportive faculty and university environment is required to nurture the potential of ICT to enhance teaching and learning. Dedicated resources for ICT integration are required. The reward structure for faculty should support ICT development.
NEW DIRECTIONS: THE FUTURE OF iTEACHERED

This is a time of change in the Faculty of Education at the University of Regina. A strategic plan for change called Taking Action has been developed and is in the process of being implemented that generates and sustains curriculum renewal and faculty development. Over 10 new faculty have been hired in the last 5 years. It is a good time to be working with faculty members on ICT integration into teaching.

The iTeacherEd team would like to focus more strongly on the faculty in the next phase of the project. The team is convinced that the critical element in the integration of ICT into teaching is modelling—both by university instructors modelling the integration of ICT into their teaching for the benefit of the preservice teachers, and by cooperating teachers modelling the use of ICT in school classrooms. This next phase will focus on supporting university instructors to model ICT integration in their university classrooms.

Learning from the GrassRoots school projects and our own experiences these past 2 years, we would like to use the funded project approach to encourage experimentation with ICT integration into teaching and learning. We propose that a select number of grants be awarded to faculty members who apply to the project. These awards would provide a lap top to be used exclusively by the faculty member in their teaching. Along with the equipment would be some course release time, and conference travel funding. The professor would be paired with a teacher in the school system who is recognized for their work with ICT. An iTeacherEd project team member from the Faculty would work on a one-to-one basis with the professor. Workshops would also be provided to them to address issues of using appropriate internet resources in their curriculum areas. It is hoped that this kind of approach would create a community of learners much like the community built by the iTeacherEd project team. Faculty involved in the project would be expected to develop a teacher education “GrassRoots-like project” that would result in research, conference presentations and possibly publications. The iTeacherEd team would monitor the projects and continue to develop a model for other faculties of education in Canada.
Over the past 2 years of the iTeacherEd project, a faculty member from the Saskatchewan Urban Native Teacher Education Program (SUNTEP) has been involved in inservice given to faculty and sessionals involved. In this way, the project has attempted to see that Aboriginal preservice teachers consider integration into teaching and learning. In the next phase of the program, team members would like to involve more Aboriginal teachers in the schools, and follow students who have been placed in core city community schools to determine how Aboriginal pupils in classrooms use ICT to learn. The iTeacherEd team is also looking for ways to work more closely with SIDRU and their current Industry Canada funded ICT evaluation projects involving Aboriginal schools.

Funding for the next phase would need to cover the following items:

- Lap top computers to be assigned to project participants
- Course release stipends
- Inservice and mentoring support
- Conference travel
- Research assistance

Funding would also be required for the student teacher secondary focus of the project. The iTeacherEd team would continue to work with new groups of preinterns, interns and their cooperating teachers. The following items would need to be supported:

- Ongoing development of preinternship modules to help students plan and deliver ICT integrated lessons and units
- Continuing internship studies to determine what works in assisting interns and cooperating teachers with ICT integration
- Development of faculty advisors to work with student teachers in the ICT domain
- Expansion of the project into the secondary teacher education program.

The goal of this next phase of iTeacherEd would be to develop a larger cadre of faculty who are committed to exploring ICT integration in their teaching, while continuing to work with student teachers and their cooperating teachers, and to promote the experiences in the Faculty across Canada. Funding would be required for:

- Holding regional workshops with faculties of education
- Developing and presenting papers at national and international conferences
This next phase is a grand undertaking that would put the Faculty in a leadership position in the area of ICT in teacher education in Canada.

A major concern for the iTeacherEd project is sustainability. Phase 1 has moved the Faculty along the path of permanent program change related to the integration of ICT learning for students in the Faculty. However, significant input into professors’ use of ICT in their teaching is required. Phase 1 of the project has at least kick started the infrastructure changes required to ensure that the physical classroom environment can accommodate ICT integration into university teaching. Several classrooms now have minilabs; however, much remains to be done to prepare professors to teach using the equipment available. Phase 2 would be a big step in the direction of sustainability of ICT integration in teacher education.

CONCLUSION

The iTeacherEd project is an ongoing attempt to more strongly integrate ICTs into university and school classrooms. The first two years of this action research project have provided the team members with a clearer focus of ICT integration for the future. At the completion of Year 2, the team is convinced that although there are many areas of focus, the one that cannot be neglected in a faculty of education is the focus on faculty modelling. There is much work to be done in preparing students, but much more in preparing faculty.

The teacher education landscape has shifted significantly even in these two short years. We thank Industry Canada, SchoolNet E-Learning Programs for their support with this venture. Their support has propelled us forward in the integration of ICTs in the Faculty of Education.
REFERENCES


Saskatchewan Education. (1984). Directions. Regina


APPENDICES
APPENDIX A

Technology Manual for Faculty Advisors of Preinterns and Interns
Technology Manual for Faculty Advisors of Preinterns and Interns

Faculty of Education, University of Regina

September 2003
Introduction

For over twenty years, the members of the Faculty of Education at the University of Regina have been working together to prepare beginning teachers who will be able to use technology in their teaching. Through innovation and experimentation, the goals and methods have changed in response to the educational context and the changing technologies. The current educational context includes: the K-12 curriculum; school administrative decisions that affect technology teaching practices; the technology experiences that learners bring to classrooms; and the context within our faculty. This has been a period of continuous change, given that in the 1980's word processing, learning games and software applications were the leading edge, whereas currently there are e-mail and the Internet (which are global phenomena), object-oriented graphics, user-friendly multi-media programs, wireless, and hand-held media.

As teacher educators (both university-based and field-based), we are challenged to prepare teachers who are capable of coping with and thriving in these new environments. We find ourselves working to design sequences of appropriate teaching and learning experiences that will give preservice teachers the ability to see through the novelty and hype so that they can think creatively and critically about the educational possibilities. Preparing teachers in this environment is a collaborative venture between universities, schools, and faculty advisors (who provide the liaison link between the two).

University instructors can begin the process of preparing preservice teachers to think about this resource-rich environment, but we understand that we rely on faculty advisors and cooperating teachers to ensure that preservice teachers apply and assess these ideas in their work with learners. As university instructors we have endeavoured to model appropriate and effective uses of technology in our teaching so that the preservice teachers understand how these can enhance conceptual learning. We have continually challenged each other and our students by asking pedagogical and critical questions. This manual is prepared as a linkage so that field-based teacher educators can continue this process of supporting preservice teachers in the selection and implementation of diverse resources, and in the questioning of their impact. It is not intended as a how-to manual, but rather an array of
ideas that can be selected as needed to support intern and pre-intern school teaching.

**Teaching in a Multi-Resource Environment**

Saskatchewan’s K - 12 Evergreen Curriculum employs a resource-based approach, and it is the view of the Faculty of Education that Information and Communication Technologies (ICT) are another set of resources that exist within this context.

### The On-line Integrated Saskatchewan Curriculum

The pre-K-12 context which we are preparing teachers for is shaped by a
- conceptual curriculum that is on-line and linked to suitable Internet resources,
- curriculum delivery that is to be experiential (active) and
- resource-based approach, where technological literacy is seen as essential learning that threads through the curriculum.

The curriculum also mandates that gender equity, teaching for diversity, and Indian and Metis perspectives are to provide lenses for selecting resources, teaching approaches, and for evaluating outcomes. There are curriculum supports inside the curriculum itself, such as the Virtual Resource Centre, as well other online supports: Saskatchewan Learning's the STF Stewart Resource Centre (http://www.stf.sk.ca/teaching_res/library/), Grassroots (which is an Industry Canada project) and many others.

Saskatchewan Learning has recently developed Information and Communication Technology Skill Checkpoints (2003) [http://www.sasked.gov.sk.ca/docs/policy/ict/index.html](http://www.sasked.gov.sk.ca/docs/policy/ict/index.html) which were established to guide educators in the integration and application of technology skills and tools in Saskatchewan classrooms. Its goal is the inclusion of prescribed technological skills in all subjects and grades where they will enhance the teaching/learning process.
There are two main types of hurdles that we encounter as we work with preservice teachers around technology and pedagogy.

1. **Thinking that technology is at the center.** Most preservice teachers have high school experience with technology and are immersed in the youth culture and its technological milieu. Many show comfort and skill using ICT resources, and this sometimes causes teacher educators to heave a sigh of relief that they “will be fine with technologies in their classroom”. As indicated earlier, it is easy for preservice teachers to focus on the technology, to perceive that technology in the classroom is desirable, and as a consequence include technology in everything that they do, or worse, make their educational plans based on the technology resources that are readily available. While these might seem extreme, technology hype affects us all and it is important that faculty advisors observe carefully, watching for these technology-centered pedagogical positions and being prepared to challenge them.

2. **Avoidance.** There are a few preservice teachers who are overwhelmed with the array of possibilities and the technological skills that accompany them and, as a result, display anxiety-related avoidance.

Both of these stances require a **conceptual leap:**

**Conceptual Leap #1**
Those who are overwhelmed by the range of possibilities need opportunities to learn that technological skills are like other skills: we work at them one step at a time and we gradually become more skilful. The reality is that some preservice teachers will have their first opportunities to use technology in their internship classroom. These preservice teachers need to know that we are not impressed by razzle dazzle, and that we are looking for thoughtful planning and teaching that centers on curricular content.

**Conceptual Leap #2**
Those preservice teachers who are well-adjusted in a technology environment or who see themselves as tech-specialists, need to understand that the focus is appropriate pedagogy, and that technology is a tool and not the goal. This may require careful watching and listening on the part of the faculty advisor, to discern the thinking. It is our goal that preservice
In research regarding the impact of technology in teacher education classrooms (Browne, Maeers & Warkentin, 2002), we have identified four issues which are also relevant as we consider the role of technology in teaching and learning as it applies to pre-service teachers.

(1) **Use of instructor time and class time.**

Integrating technology into a classroom can often require additional preparation time on the part of the preservice teacher and also lengthen the amount of time needed for class instruction. These issues need to be considered very carefully before deciding to include the technology. Is there some other more time-efficient way of achieving the same learning goals? What might be reduced if technology takes more time than anticipated? Are there learning gains which can be attributed to the integration of the technology?

(2) **Frustration due to the amount of invisible work.**

Planning lessons and units and grading students’ assignments are time-consuming, invisible components of a professional teacher’s work. Preservice teachers often require much more time for these activities than experienced teachers. Pre-service teachers are developing their skills in estimating the time needed to plan, and may underestimate the time needed and then find themselves unable to meet all of the expectations/plans that they have committed to. If a lot of time is spent in preparing teacher-made multi-media resources, for example, the preservice teacher can be consumed with work that is invisible to the teacher or faculty advisor (or the learning outcomes). Preservice teachers need to have an opportunity to discuss the time demands of various types of planning and assessment, so that they are realistic, given their time available and other demands.

(3) **Issues relating to experiential and transmission teaching and learning.**

The Saskatchewan curriculum lists five categories of instructional strategies: Direct Instruction, Indirect Instruction, Interactive Instruction, Experiential Learning, and Independent Study. It is important that preservice teachers consider what instructional strategies are employed in ICT resources because many rely on direct instruction. Preservice teachers need to think about the strategies employed in the ICT resources and ensure that there are a variety of instructional approaches.
Age of the learners is another factor in selection of instructional strategies, young children need hands-on experiential learning, active and interactive methods more than they need virtual environments, simulations, etc.

(4) Dealing with Frustration due to equipment failure. Whenever teachers are embarking on complex plans that involve complex technologies, there are more chances for the unexpected to occur. This is a natural part of the resource-rich environment in which we live and teach. Preservice teachers need to have back-up plans when they are relying on external resources of any type. If there are equipment problems to solve or deal with on a regular basis, preservice teachers will need help in accepting this as part of the environment. Such support will give the preservice teacher opportunities to learn flexibility and problem-solving. Frustration is sometimes a common by-product of a steep learning curve.

**Technology and the Teaching Cycle**

We think that we might be on the edge of a transformation in learning and teaching in schools. In preparing teachers for future classrooms, we understand that graduates from our programs need the pedagogical means for negotiating this time of change and growing through it.

In order to assist preservice teachers in understanding our professional expectations and their professional development, we sub-divide pedagogical concepts and expectations into a 4-component teaching cycle. They are learning to plan, learning to teach, learning to reflect, and learning to relate to others. This component approach is used to assist preservice teachers in understanding the complexity of teaching, and has also been used to organize the teacher education content (related to teaching with technology) that is provided for faculty advisors in this manual.

1. **Learning to Plan**

   **Selecting Appropriate Resources**

   Instructors in the Faculty of Education teach the following resource selection process (or one similar to it) in preparing preservice teachers for the multi-resource environment.
When beginning to plan, preservice teachers need to start with the curriculum and the concepts that are to be taught and learned. Selection of resources involves several steps.

1. Gather the resources that might be appropriate to teach the concept. This would likely be a wide range of resources that might include: manipulatives, print materials, audio/visual materials, objects, laboratory equipment, instruments, software and web-sites, etc.

2. Scrutinize and evaluate the resources in relation to the sequence of curriculum concepts, the students, the classroom environment, and time available. Some of the resources may be selected to provide the teacher with background knowledge for teaching.

3. Choose the resources that are most appropriate for this particular conceptual learning. Available technology and Internet resources can be considered amongst the array of suitable resources. Consider all of the resources in answering the following questions.
   - Which resources would have the most positive impact on learning?
   - How much teacher preparation time is needed to make the resource classroom-ready?
   - Which resources provide an alternate or enriched way of understanding the concept?
   - Which resources bring added value? (i.e., add additional concepts or enrichment)
   - Which resources would the learners find most engaging/motivating?
   - Which combination of resources provides the optimum sensory-motor engagement of learners?

4. Summarize the results of the above questions to determine if technology can bring added value to this set of learning experiences. If not, that is, if using technological resource would have similar results to using a ball of string, a few overheads, or a poster, then select the non-technological resource(s). **Pedagogical appropriateness is the key.**

Sequencing Resources in Learning Plans

We have observed that some beginning teachers who have recently learned arrays of methods and become familiar with a wealth of material frequently introduce too many novel variables at the beginning of a new unit, and stimulate the students with such a diversity of experiences that learners are slow to discriminate the concepts (to be learned) from the multi-media sensory input. With the availability of multiple technological resources, it is easy for a preservice teacher to create an environment that is too resource/activity-abundant, especially for younger learners.

For example, we have seen elementary classrooms set up with stations in several subject areas/topics and have seen children do very interesting activities, but we also observe that teachers have difficulty assessing the conceptual learning that is occurring. In our view, they are trying to do too much to start and there is simply too much distraction of variables for the children to attain depth and strength of crucial concepts. A multi-variable approach is better suited to the end of a unit.

Again, we use a step-wise process (adapted from Zoltan Deines) to explain planning in a resource-rich setting. Deines identified two groups of variables (they are interdependent) that teachers need to manage so that children know where to focus for learning. One set of variables is the learning media/manipulatives. Deines termed these perceptual variables. The other set of variables are the invisible “conceptual” variables, that is, the concept(s) that are to be considered/taught. Deines suggested that at the beginning of a unit of study, or when developing a new concept, that teachers reduce the number of perceptual variables. The following step-wise process illustrates this dual focus.

The Steps
The first step is to determine the introductory concepts. Which concepts are foundational, required and/or advance organizers, that is, necessary for further conceptual elaboration to take place? These concepts need to be introduced without too many perceptual variables.

The following table (developed by Vi Maeers) illustrates a possible way to introduce and then build on concepts. This example addresses fractions.
<table>
<thead>
<tr>
<th>Perceptual Variability</th>
<th>Conceptual Variability</th>
<th>Teaching Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>one variable (e.g., pattern blocks)</td>
<td>one concept—equivalence</td>
<td>teacher-directed/whole class--everyone doing the same thing/hands-on; experiential</td>
</tr>
<tr>
<td>two variables (e.g., pattern blocks; geoboards)</td>
<td>one concept—equivalence</td>
<td>teacher works with one group; other group works independently</td>
</tr>
<tr>
<td>Multiple variables (e.g., pattern blocks, play-doh, paper coverings)</td>
<td>one concept—equivalence</td>
<td>interactive-- indirect teaching; small groups; stations</td>
</tr>
<tr>
<td>one variable (e.g., paper coverings)</td>
<td>two or more concepts (e.g., equivalence; comparing fractions; addition of fractions)</td>
<td>teacher-directed/whole class--everyone using the same material--perhaps going through each concept with teacher and/or working in groups with task cards to explore the different concepts</td>
</tr>
<tr>
<td>Multiple variables (e.g., paper coverings, games, software, children’s literature, play-doh, geoboards, cuisenaire, etc.)</td>
<td>multiple concepts (e.g., equivalence; area concept; part of a set concept; measurement concept; comparing; addition and subtraction, etc.)</td>
<td>small groups working at stations-- rotating: this is a useful strategy at the end of a unit and can be effective as performance stations</td>
</tr>
</tbody>
</table>

We advise preservice teachers to start with one perceptual variable and one conceptual variable and then build each as they and the students they are teaching grow comfortable with both the materials and the conceptual material. In this case, a multi-variable (multi-resource) approach is more appropriate at the end of a unit of study as it serves to enrich the children's
well-founded learning and supports the teacher’s summative evaluation of what has been learned.

While this is outlined in a very step-by-step manner, it is not a recipe but an illustration of one way of helping beginning teachers to look at their planning through two lenses simultaneously in order to plan appropriately for the children’s conceptual development in a resource rich environment.

Develop a Plan B
Equipment failure is a normal part of using technology. When technology is included in the lesson plan, it is important to also include an alternate activity (optional section) that can be inserted if the technology does not perform as expected. As well, teachers can anticipate what technology challenges might occur and plan how they might be diagnosed and fixed.

Media Awareness
Media awareness is an important part of teacher education and also classroom teaching. Teachers need to gradually educate their students regarding use of public sectors, like the Internet. Teachers also need to understand various ways of monitoring the computer activity within classroom to ensure that the learning is curricular — this may include software that monitors the computers or room arrangement. Saskatchewan Learning links to the following site regarding media awareness at http://www.media-awareness.ca/english/index.cfm. Understanding issues regarding media awareness constitute important parts of the teacher’s planning process if public sector media are to be used.

2. Learning to teach

This part of the cycle focuses on developing the ability to make a written plan come alive in a classroom with children. Learning to teach with technology does have sub-sets of skills, for example, speaking to the class while using presentation software; monitoring computer stations while circulating in the classroom; assisting students in searching and operating programs. Some preservice teachers will have had opportunities to teach
using multi-media formats in their own presentations in university classes and/or in preinternship.

**Dealing with Equipment Failure or Internet sites that are Down**

There are additional aspects to learning to teach: learning to adapt to the need for equipment adjustment while teaching, and learning to cope when the websites are not functioning or equipment fails. It is important that teachers are prepared to teach through times when things do not go as planned. This requires a professional confidence that one does not have to be perfect, that dealing with the unexpected (crisis) is a part of life. In this way, students see that in dealing with plans that go awry teachers model problem-solving and coping. Preservice teachers will need support as they learn to adjust their plans and proceed.

3. **Learning to Relate**

Preservice teachers know that some learners in their classes will have expertise in computer applications and using the Internet that exceed their own. Also, learners often bring an advanced facility in learning things that are technological. As a result, some preservice teachers are intimidated or afraid to talk to students in a technological milieu. If this might be the case, it is important to provide the preservice teacher with emotional support and with effective strategies (for example, Community of Learners) so that they can teach and learn with and from their students.

If learners bring advanced technological and/or curricular knowledge and expertise into the classroom, preservice teachers can be prepared to build on their advanced knowledge by: teaching using questions; teaching by connecting learners with experts outside the classroom; and/or having the learners teach some aspects to the teacher so that the teacher can help students make the conceptual linkages.

*Comment:* This ‘where’ doesn’t work. Suggest: “...can be prepared to build on their advanced knowledge by: teaching using questions; teaching by connecting learners...classroom; and/or having the learners teach...”
Community of Learners Approach

Barbara Rogoff’s work outlining characteristics of a community of learners provides a framework for structuring teaching and learning situations where expertise is resident in children in the class. It provides preservice teachers with ways of understanding and structuring their classrooms so that expert students are seen as an advantage rather than an obstacle. If preservice teachers have strategies for optimizing students’ knowledge and expertise, they are more likely to take advantage of the available technological resources and feel successful. The community of learners approach is very useful in several aspects. It acknowledges that:

- Learners bring knowledge to the classroom that is pertinent to what is to be learned.
- Both teachers and students are learners, and both can recognize and acknowledge the learning of others.
- Learners may bring or develop expertise that is valuable to the classroom.
- Expertise is defined differently in different contexts.

4. Learning to Review/Reflect

Developing a Critical Perspective

It is important that preservice teachers learn to think critically about the impact of technology on the learning and lives of learners and schools. Questions and discussions are useful ways of beginning to develop analytical and critical perspectives. Some valuable questions are included to start discussions.

Where is the focus? Are we sometimes so consumed by the pedagogical and technical demands of being up-to-date that we fail to observe or understand the dynamics of the learners around us?

Who is really benefiting from learning and interacting in a technological environment? Which learners are being disadvantaged? How can this inequity be addressed?

Some research suggests that boys tend to control use of the higher tech computers in the classroom—To what extent is that what is happening in my classroom? What can I do to counterbalance this tendency?
How can I support children who have little computer experience at home to become more assertive in classroom discussions regarding computers? Can they become experts in the community of learners?

How can I implement technological resources to validate the experiences of children who might be on the margins?

How can I use communications technologies to help learners understand the perceptions and experiences of people who live in other regions of the world?

Teacher Development and Technology Integration

In the educational literature, technology integration is used to describe a host of educational practices. Saskatchewan schools provide a particular context where integration has several specific meanings. For example, we have an integrated curriculum. Resources are to be integrated into the curriculum.

Integration Literature

Beginning in 1985, Apple Computer Inc. partnered with public schools, universities, and research agencies to study how the routine use of technology by teachers and students might change teaching and learning. One of the research findings was the observation that technology integration is a developmental process marked by five stages of thought and practice among experienced teachers (Apple Computer, Inc. 2000). We understand that in educating preservice teachers to integrate technology, many aspects of the following stages are superimposed.

1. Entry - Teachers experiment with technology for their own personal and professional use.
2. Adoption - Teachers have experienced enough success to introduce technology into their classrooms.
3. Adaptation - Teachers try to fit technology into what they already teach, turning technology into a solution in search of a problem. As a result, many teachers remain at this stage.
4. Appropriation - Teachers begin to harness technology’s capabilities for improving the learning process.
5. Innovation - Teachers become comfortable enough with the use of technology to broaden their thinking about its potential.

Several of these are important components of preservice teacher development: experimentation, some success, improving learning, broadening thinking. As teacher educators working in school settings, we understand that we are trying to support several types of growth simultaneously. We are making big demands on the preservice teachers because we want to ensure that they are well prepared for the first class of students that they teach, and that their professional growth will continue.

Conclusion

Technology integration requires a planning intensive approach so that preservice teachers:

- Become familiar with a wide range of curriculum-related resources that involve technology
- Understand the teaching strategies that accompany these technological resources
- Can prepare integrated thematic plans that use a variety of appropriate resources
- Use the technological resources that are available in their field experience classrooms (these may be supplemented with library and university-owned resources) to support curricular learning
- Reflect on their teaching using technology, exploring how it complements and supplements other resources, and how multiple resources can interact to enhance learning
- Understand how to question and critique teaching to improve learning

Thank you for embarking on this journey with our future teachers.
### Expectations for Field Experiences Regarding Technology

#### Elementary Preinternship

<table>
<thead>
<tr>
<th>Time</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Prepare a lesson plan demonstrating competence incorporating an aspect of instructional technology.</td>
</tr>
<tr>
<td>Winter</td>
<td>Develop and implement a mini-unit plan choosing from a wide range of resources (technology and other) which are appropriate for the content and context.</td>
</tr>
<tr>
<td>Internship</td>
<td>Use instructional technology to enhance learning.</td>
</tr>
</tbody>
</table>
Appendix

Elementary Preinternship Modules

Module #1: Overview of the Saskatchewan Evergreen Curriculum, provincial Grassroots online projects and the Virtual Resource Centre. In this module, students will experience an "electronic scavenger hunt" which will lead them through the online curriculum documents as well as key basic resources which are available to all Saskatchewan K-12 teachers. These are basic resources that all preservice teachers should know well.

Module #2: Assessing Online Resources. In this module, students will be taken to several educational websites that range from poor to exemplary in overall quality. Students will learn how to distinguish the 'bad' from the 'good', and will be given examples of evaluation rubrics, and will have the opportunity to develop their own for future use.

Module #3: Gathering Online Resources. In this module, students will be shown how to find additional educational websites and will learn how to compile these resources to create Internet Resource Packages. Students will also see examples of more advanced Internet based resources such as WebQuests.

Module #4: Creating Online Resources (using Filamentality). This module gives students an alternative approach to compiling and hosting (creating a webspace) online resources. In this module, students go through the process of creating a hotlist through a web service called Filamentality.

Module #5: Integrating Educational Technology. This module gives students the experience of creating their own website, hosted either at the University of Regina, or alternatively, through free services such as Geocities. This module encapsulates the work of the four previous modules and allows students to begin to see how resources can be compiled, hosted and integrated into classroom experiences.
References


APPENDIX B

Grassroots Project Evaluation Rubric
APPENDIX B

Grassroots Project Evaluation Rubric

In order to assure consistent quality in the production of iTeacherEd associated Grassroots projects, the following rubric was developed to compliment and extend the Grassroots’ proposal and report rubrics found at:

http://www.schoolnet.ca/grassroots/e/project.centre/

This is not meant to replace what has been already developed by the Grassroots project, rather, it looks more specifically at the requirements throughout the internship experience.

The General Requirements (below) must be met by the Grassroots’ Projects. Additionally, all other criteria must meet a minimum of a level three (standard). The iTeacherEd research group will support the projects so that this appropriate level is met.
<table>
<thead>
<tr>
<th>General Requirements</th>
<th>Required Criteria for iTeacherEd Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Final Product</strong></td>
<td>The final product is a shared resource, is published on the Internet and is easily accessible to others. Due to the nature of these requirements, issues of copyright clearance and student privacy/confidentiality must be addressed before publishing.</td>
</tr>
<tr>
<td><strong>Intern Participation</strong></td>
<td>Collaboration between the cooperating teacher-intern pair is essential for professional growth in many aspects of the Internship experience. As an extension, extensive intern participation in all areas of the Grassroots project process and development is a requirement.</td>
</tr>
<tr>
<td><strong>Student Participation</strong></td>
<td>The project is to be implemented by the cooperating teacher, intern and students. Grassroots requires that there is evidence of student production throughout the final project, and that there is evidence of age-appropriate ICT skills.</td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td><strong>Level 1: Beginning</strong></td>
</tr>
<tr>
<td><strong>Originality</strong></td>
<td>The work is a minimal collection or rehash of other people’s ideas, products, images and inventions. There is no evidence of new thought.</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td>Information showcased is minimal. There is little evidence of student work or how this has been organized by the developing team.</td>
</tr>
<tr>
<td><strong>Curriculum Relevance (as outlined by the project proposal)</strong></td>
<td>The subject areas and selected outcomes, expectations/ skills have a limited connection to the project activities. Few of these specified will be addressed in the project.</td>
</tr>
<tr>
<td><strong>Scope (Breadth/Depth)</strong></td>
<td>The project focus/theme has been developed with limited depth and breadth.</td>
</tr>
<tr>
<td><strong>Design and Function</strong></td>
<td><strong>Level 1: Beginning</strong></td>
</tr>
<tr>
<td><strong>Visual Design</strong></td>
<td>The project reflects little thought or research in practices of visual design formats and techniques.</td>
</tr>
<tr>
<td><strong>Organization of Content</strong></td>
<td>No logical sequence of information; menus and paths to information are not evident.</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Use of Enhancements (when appropriate)</strong></td>
<td>No video, audio, scripting, or other suitable and/or appropriate enhancements are present.</td>
</tr>
<tr>
<td><strong>Commitment to the End-User and Usability</strong></td>
<td>The project shows no commitment to the intended end-user of this project.</td>
</tr>
<tr>
<td><strong>Future Growth</strong></td>
<td>The project has been developed so that there is limited adaptability or growth potential.</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td><strong>Level 1: Beginning</strong></td>
</tr>
<tr>
<td><strong>Documentation</strong></td>
<td>There is no documentation regarding the Grassroots development process.</td>
</tr>
<tr>
<td><strong>Collaboration (as evident from the documentation and supervisory visits)</strong></td>
<td>There is little evidence of collaboration between the intern/teacher pair and the students.</td>
</tr>
</tbody>
</table>
APPENDIX C

Apple Cart Usage
APPENDIX C

Apple Cart Usage

In the summer of 2003, the Faculty of Education acquired a specialized ‘Apple Cart’ consisting of the following components:
- 11 wireless notebook computers (Apple iBooks with OS X)
- 1 portable Bretford cart for storage and charging of the iBooks
- Microsoft Office 2003 for OS X
- 1 Portable HP LaserJet Printer
- 1 Hitachi XGA Data Projector
- An assortment of educational software titles.

While this specialized Apple Cart came with an AirPort system (a wireless Internet hub), this was seen as being insufficient for our long-term needs. Instead, two professional grade, ceiling-mounted wireless hubs were installed to provide wireless Internet connections to our most frequently used classrooms within the Faculty of Education classroom space.

When the Apple Cart was received, there were several steps necessary to prepare them for classroom use. First, the hardware was prepped by our full-time technicians in the Education Computer Centre. This work included software installation (e.g., Microsoft Office), configuring each machine to work with the University of Regina wireless network, setting up the LaserJet printer and data projector, and general troubleshooting. Second, the procedure for booking the hardware, and tracking its use was developed. As the use of the cart is somewhat a pilot project, it was important to gather information regarding what ways and how often the hardware is being used. Third, a manual for use of the hardware was developed. This manual included information such as procedures for booking the hardware, steps for powering up and shutting down the iBooks, general use of the Macintosh OS X system, connecting the iBooks to University of Regina computer accounts, etc.

Initially, the use of the Apple Cart by Faculty members was infrequent. Reasons for this may include (but is not limited to): the perceived risk of a new technology, unfamiliarity with the use of the system, little understanding of or experience in how the iBook cart could be beneficial in the classroom setting, or simply, individuals may not have known about the new equipment. In a years time, use of the iBook cart has increased, however, the use of the cart is dominated by a relatively small group of instructors.

<table>
<thead>
<tr>
<th>Month</th>
<th>Sept /03</th>
<th>Oct /03</th>
<th>Nov /03</th>
<th>*Dec /03</th>
<th>Jan /04</th>
<th>Feb /04</th>
<th>Mar /04</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Times Used</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>1</td>
<td>9</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td># of Instructors</td>
<td>4</td>
<td>7</td>
<td>13</td>
<td>2</td>
<td>18</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Total Hours Used</td>
<td>16</td>
<td>11</td>
<td>28</td>
<td>5</td>
<td>35</td>
<td>19</td>
<td>36</td>
</tr>
</tbody>
</table>
APPENDIX D

Preintern Questionnaire
APPENDIX D

Preintern Questionnaire

Evaluation of Technology Modules
For Students

This is an anonymous questionnaire that asks you to reflect on your experiences with the technology modules during the Fall 2003 semester. It should take about 20 minutes to complete. Your participation is completely voluntary. If you choose not to participate, your decision will not influence or jeopardize your course grade. You may refuse to answer any items. Completion of this questionnaire implies consent to participate in this project. This project was approved by the Research Ethics Board of the University of Regina. If you have any questions or concerns about your rights or treatment as participants in this project, you may contact the Chair of the Research Ethics Board at 585-4775 or by e-mail: research.ethics@uregina.ca. If you have any questions regarding this questionnaire, please contact Kathy Nolan at 585-4516 (e-mail: kathy.nolan@uregina.ca) or Alec Couros at 585-4739 (e-mail: alec.couros@uregina.ca).

1. For the delivery of the Fall 2003 iTeacherEd technology modules, did you choose to complete the modules on your own (i.e. online) or with an instructor in a face-to-face manner? Now that the modules are complete, do you feel this was the best choice for you? Please explain why or why not.

2. What is your general perception of the value of the technology modules as presented? Did you find particular modules to be of more or less value? What changes might you suggest to the content, scope and/or sequence, and expectations of the technology modules?

3. Did the technology modules have an effect on your understanding and perceptions of technology use in the classroom? Do you feel that the modules have affected your perceptions of teaching and learning styles?

4. What are some preliminary changes that you feel should be made to the use of these course modules? What changes do you feel should be made in regards to using technology in the education of pre-internship students.
APPENDIX E

Internship Questionnaire
APPENDIX E

Internship Questionnaire

Internship Experiences with Technology Integration

Fall 2003

The i-Teacher Ed research team is interested in knowing about the extent to which you have been able to integrate technology into your internship classroom thus far. We ask that you take approximately 15 minutes to respond to the questions included so that we might understand more about your ideas and experiences relating to the integration of technology into the classroom.

This is an anonymous questionnaire and your participation is completely voluntary. If you choose not to participate, your decision will not influence or jeopardize your course grade. You may refuse to answer any items. Completion of this questionnaire implies consent to participate in this project. This project was approved by the Research Ethics Board of the University of Regina. If you have any questions or concerns about your rights or treatment as participants in this project, you may contact the Chair of the Research Ethics Board at 585-4775 or by e-mail: mailto:research.ethics@uregina.ca. If you have any questions regarding this questionnaire, please contact Kathy Nolan at 585-4516 (e-mail: kathy.nolan@uregina.ca).

Question 1
Have you taken ECMP 355

<table>
<thead>
<tr>
<th>yes</th>
<th>no</th>
</tr>
</thead>
</table>

Question 2
After reading each of the following statements, please circle one of the choices given: SA (strongly agree), A (agree), D (disagree), or SD (strongly disagree). Please choose NA (non-answerable or not applicable) only if absolutely necessary.

I am comfortable with the extent to which I have used technology in the classroom so far this semester

| SA | A | D | SD | NA |

I would be interested in integrating technology into my classroom more but I have not had enough time to spend on it

| SA | A | D | SD | NA |

Presently, I am not interested in integrating technology into my classroom

| SA | A | D | SD | NA |

The integration of technology has been a natural part of my lesson planning

| SA | A | D | SD | NA |
My students have responded well to the technology components in my lessons

When I attempt to integrate technology into my lessons, it feels more like an “add-on” than a natural part of the lesson

I still do not feel comfortable enough with technology myself to integrate it into my teaching

I feel that my students have more technology experience than I do

The conditions of my school and/or classroom are not conducive to integrating technology in a meaningful way

My cooperating teacher supports and encourages me to integrate technology into my teaching

Last year’s EPS technology modules have had a positive influence on my use of technology during my internship

**Question 3**
In terms of integrating technology into your teaching, please comment on anything particularly effective that helped to enhance the teaching and learning environment (e.g., resources used, teaching strategies, etc.).

**Question 4**
Comment on anything problematic related to the use of technology that did not appear to enhance the teaching and learning environment.

**Question 5**
Describe the availability of technology in your internship classroom and/or school in general.

**Question 6**
Has anything surprised you thus far about the use of technology and your internship experience? Tell us about it.

*We appreciate the time you have taken to respond to our questions… thank you*