DR. STIRLING MCDOWELL
Foundation
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RESEARCH INTO TEACHING

TEACHING AND LEARNING RESEARCH EXCHANGE

Nourishing Growth:

The Search for Effective Technology Professional Development

Wendy James, Karen Schmidt Henderson and René Cannon

Project #119
June 2004

This research was partially funded through a grant from the McDowell Foundation. However, the points of view and opinions expressed in project documents are those of the authors and do not necessarily reflect the views of the Foundation.

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Executive Summary

Nourishing Growth: The Search for Effective Technology Professional Development was a voluntary online survey of teachers participating in two eLearning initiatives: Web-Based Learning Resource Development (WBLRD) and Distributed Online Learning. The participants completed a pre-survey at the beginning and a post-survey at the conclusion of these respective eLearning experiences. Twenty-two of the respondents (roughly half of those involved in the initiatives) completed both the pre-survey and the post-survey, becoming the study group for the key issues of the report. The responses of these teachers were utilized to explore the effect of involvement in the projects on level of teacher computer skill and classroom practice with technology. These results were compared to the findings of an earlier online survey, *Beyond the Mouse and Modem*, to provide a comparison to teacher skills and practice in the province in general.

Teacher Skill Level

The initial level of skill of the 22 respondents who completed the *Nourishing Growth* pre-survey was dramatically higher than the level of those in the province in general. In *Beyond the Mouse and Modem*, a majority of the teaching population surveyed reported mastery of 6 of 14 basic skills, 2 of 10 intermediate skills, and 0 of 2 advanced skills. In contrast, the majority of the 22 common respondents who completed the *Nourishing Growth* pre-survey reported mastery of 13 of 14 basic skills, 6 of 9 intermediate skills, and 1 of 2 advanced skills. These teachers also reported mastery of 10 of 16 other skills in the *Nourishing Growth* pre-survey that were not assessed in *Beyond the Mouse and Modem.* In the post-survey, the majority of the common respondents reported mastery of all 14 basic skills, 7 of 9 intermediate skills, 1 of 2 advanced skills, and 14 of 16 other skills. Teacher skill levels improved through participation in the eLearning projects.

Teacher Belief in the Value of Technology Implementation

Provincial and pre-survey respondents both felt that the use of computers in the classroom improved learning. Provincial respondents in *Beyond the Mouse and Modem* believed teaching with technology improved student learning, but they had less conviction than the pre-survey teachers. Eighty-nine percent of provincial teachers felt their "current use of technology actually improves student learning". However, of these, 30% felt that it improved student learning only "somewhat". Of the pre-survey teachers who responded in *Nourishing Growth*, 97% felt that "current use of technology actually improves student learning", 38% felt that technology improved student learning "a great deal", 41% felt that it improved student learning "generally" and 18% felt that it only improved student learning "somewhat". Results for post-survey respondents were very similar to those of the pre-survey.

Level of Confidence and Implementing Technology in the Classroom

Teacher confidence was a problem for teachers throughout the province, but not for the people who participated in the eLearning initiatives. Provincially, 59% of teachers stated that lack of personal confidence was a barrier to implementation. In the first *Nourishing Growth* study, only 26% of the respondents stated that lack of confidence was a barrier. None of the pre-survey teachers who had already been developers or online teachers identified lack of confidence as a significant barrier, and only two identified it as a problem at all. These results indicate that as skill level and familiarity with technology grows, so does confidence.

Despite the personal confidence of the pre-survey teachers, they were still concerned about being unsure how to effectively implement technology in their courses. Fifty percent of teachers in the pre-survey identified this as a barrier to developing and implementing technology knowledge, skills and abilities. However, in the post-survey, only 31% of post-survey respondents felt that being unsure how to implement technology was a barrier. Teachers' confidence and their knowledge of effective integration improved through involvement in the eLearning initiatives.

Effective Professional and Classroom Use of Computers

In *Beyond the Mouse and Modem*, teachers as a group reported that the use of computers in 10 or more lessons per year was limited to primarily 3 of 20 areas. While teachers reflected some frequency of use in the class where they used computers the most, they did not reflect appropriate diversity for effectiveness as a method of instruction. In *Nourishing Growth*, teachers reported both more use and more diverse use.

Another method of examining teacher use is to look at objectives for students. In Beyond the Mouse and Modem, of the 10 objectives for student computer use available for selection in the survey, the majority of the province's teachers identified 6 objectives. In comparison, in the *Nourishing Growth* surveys, 50% or more of the educators in the common respondents group identified all 18 objectives available for selection.

Perception of Barriers

In *Beyond the Mouse and Modem*, teachers were asked to classify a total of 11 barriers to developing and implementing their technology knowledge, skills and abilities. Provincial teachers identified lack of time in school, confidence, quality professional development, software, and being unsure of how to implement technology in the classroom as barriers. Of these, the most significant barrier identified was lack of time.

In the *Nourishing Growth* surveys, teachers were asked to rate the same 11 barriers, in addition to several others. Some differences were noted. As a group, the 22 common pre-survey respondents were much less likely than the provincial

respondents to report a lack of confidence (32%, down from 59% provincially) and lack of interest (14%, down from 33%). They were much more likely to report a lack of vision in the school or division (50%, up from 26% provincially), and technical support (68%, up from 49%).

Perceptions of several barriers were reduced strikingly among post-survey respondents. When responses to both *Nourishing Growth* surveys are compared, post-survey respondents were less likely to perceive lack of knowledge as a barrier than were pre-survey respondents (50%, down from 77%). A similar decrease is noted for the barrier "unsure how to effectively implement technology" (23%, down from 50%) and for "lack of vision in school or division" (36%, down from 50%).

The Role of Support

The teachers in all three surveys indicated they needed technical, planning and instructional support, although the *Nourishing Growth* participants recorded needing it less often. The 22 common respondents were more likely to identify lack of technical support as a barrier to development and implementation than the provincial teachers, but with more experience, greater confidence, and a stronger skill set, fewer of the post-survey respondents found the lack of technical support a barrier than did the pre-survey teachers.

Professional Development

In the provincial results, teachers assessed their technology professional development as ineffective. Participants in the two eLearning initiatives identified two forms of professional development as most effective in the *Nourishing Growth* surveys, time for independent learning and professional development directly related to the task. Although time for independent learning was seen as most effective in terms of degree of application of learning, a lack of time in school remained the largest barrier to the development and implementation of technology knowledge, skills and abilities.

Conclusion

Despite the greater initial abilities of those surveyed, it is clear that the impacts of the eLearning initiatives were positive. More teachers used computers for a wider variety of tasks after completing eight months of development or online teaching, and they used computers with greater frequency in a number of different ways. In addition, as the teachers became more skilled and more confident, their computer use with their students was both greater and more varied. Following their time to learn about technology and apply that learning, teachers stated the value of technology enhanced learning more strongly. Teacher confidence also improved. As professional development, the eLearning model included all key elements and was effective in improving teacher skill and quality implementation.

Acknowledgements

We would like to thank the Dr. Stirling McDowell Foundation for the financial support that made both *Nourishing Growth* and *Beyond the Mouse and Modem* possible. Mourad Benyakhlef and the Learning Technology Unit of Saskatchewan Learning provided technical and administrative support.

We would also like to thank our husbands: Michael Diakuw, David Henderson and Devin Cannon. We are indebted to them for their encouragement and for the resources at home that allow us to pursue our research.

Finally, we would like to dedicate this project to Jim McLeod. After 33 years of giving his life to his students, Jim's passion for teaching and learning found a new home in the Learning Technology Unit of Saskatchewan Learning. Jim was the first manager of the Web-Based Learning Resource Development initiative and now leads the Distributed Online Learning initiative for the Saskatchewan Educational Technology Consortium. Jim's vision of open source resources designed by teachers for teachers has not only made this project possible, but also changed the reality of education in Saskatchewan. Each of the educators involved in every part of this project has been touched by Jim's ideas.

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Researchers

This research was conducted by three people: Wendy James, Karen Schmidt Henderson, and René Cannon.

James is a teacher from Saskatoon. She has taught English, Drama, and Practical and Applied Arts for the past nine years. Currently teaching at Saskatoon's Walter Murray Collegiate Institute, James has developed a Web-based resource for the Saskatchewan Educational Technology Consortium entitled Drama 30. She is a member of the Consortium's Professional Development Advisory Committee and a technology mentor. She was a key member of the *Beyond the Mouse and Modem* project. James is the project lead for *Nourishing Growth*, and she is currently developing Web resources for Journalism Studies 20.

Henderson is a Web-Based Resource Development Consultant in the Learning Technology Unit at Saskatchewan Learning. She was a high school Chemistry, Science, and Practical and Applied Arts teacher for sixteen years. She has taught online and has developed Practical and Applied Arts and professional development Web-based resources for the Consortium. Henderson is a member of the Consortium's eLearning Advisory Committee and the Consortium's Professional Development Advisory Committee. She is also co-lead of the Saskatchewan Institute for Research in eLearning Integration and Support (SIReNS). Henderson was the project lead for *Beyond the Mouse and Modem*.

Cannon is in her sixth year of teaching and is currently teaching English Language Arts 10, 20 and 30 in addition to Creative Writing at Carpenter High School in Meadow Lake. Cannon worked on *Beyond the Mouse and Modem*, and she is currently developing Web resources to support Journalism Studies 20.

Survey Background

Nourishing Growth began in 2002 as a follow-up to the online survey *Beyond the Mouse and Modem*. *Beyond the Mouse and Modem* established a number of key barriers that have impeded teacher development and implementation of technology knowledge, skills and abilities: lack of time in school, support, confidence, software, and quality professional development.

Time: Insufficient time at school was identified as the most serious barrier. Ninety percent of teachers in the province cited lack of time as some degree of barrier, with 51% reporting it was a significant barrier, the strongest rating allowed by the survey.

Support: Many teachers reported receiving technical support, but not the "just-in-time" technical support that increases classroom use. (Just-in-time support is support available at the time it is needed, as opposed to later in the day or week.) Forty-nine percent identified a lack of technical support as some degree of barrier. Teachers also reported less than adequate levels of planning and instructional support.

Uncertainty About How to Effectively Integrate Technology in Instruction and Lack of Confidence: Fifty-eight percent of surveyed teachers in the province stated that being unsure of how to implement technology in their courses was a barrier for them, and 59% of teachers stated that lack of personal confidence was also a barrier to implementation. There was a correlation between being unsure how to implement and lacking personal confidence.

Software: Fifty-eight percent of teachers in the province reported that a lack of software was a barrier to their development of technology skills and the subsequent implementation of technology in the classroom. Thirteen percent of these respondents rated the barrier as "significant".

Professional Development: The final barrier to implementation identified by 61% of provincial respondents was a lack of quality professional development. Additionally, *Beyond the Mouse and Modem* found that there were no technology professional development topics which more than 50% of the teachers recalled being a major focus in their school division.

eLearning Initiatives: At the conclusion of *Beyond the Mouse and Modem*, the fact that technology was not effectively implemented by the majority of teachers was clear. While teachers were interested in using the technology, there were a number of barriers, including lack of time in school and lack of quality professional development, which impeded the widespread, effective use of technology. While it is easy to establish things that do not work, it is more difficult to find models that are genuinely effective.

Initiatives that involve teachers province-wide, require substantial use of technology and provide extensive professional development opportunities are a natural focus for research regarding effective technology professional development. Two eLearning initiatives, funded by the Saskatchewan Educational Technology Consortium, incorporate all of these elements. These initiatives are Web-Based Learning Resource Development (WBLRD) and Distributed Online Learning, and they became the venue for *Nourishing Growth*.

The Web-Based Learning Resource Development initiative, which began in 2000, involves teams of classroom teachers in the creation of Web-based resources that support Saskatchewan curricula or teacher professional development. Each teacher team is required to create an extensive Web site; significant technology skill development in the teachers is expected. Consortium funding is used to provide year-long release time to teacher teams for resource development. The amount of release time per team is determined by the project category. A Category A project requires the equivalent of one full-time equivalent (FTE) of release time distributed among team members. Category B projects require the equivalent of 0.5 FTE release time and Category C projects require 0.25 FTE release in total for team members. Because teams in each category may be different in size, there are considerable variations in the amount of release time each individual receives. Teams also use their funding to attend 8 to 10 days of project-related pedagogical and technical professional development, including retreats. A significant focus of the professional development is the hands-on development of skills on the Macromedia software which the developers are given, including Dreamweaver (an html editor) and Fireworks (a graphics editor). Ongoing support for both the technical and pedagogical development is available to the developers throughout the development year. The Learning Technology Unit provides this technical support, in addition to any support available within a developer's school division.

As the objective of the WBLRD initiative is to build both Web-based resources for teachers to use and increased capacity in the teacher-developers, there is a clear preference for selecting applicants who have not been previously involved in a WBLRD project. As well, specific existing technical expertise is not required of the teachers who apply. WBLRD resources are available on Central iSchool (http://www.centralischool.ca).

Distributed Online Learning involves teachers from a variety of schools across Saskatchewan instructing students from across the province. The initiative began in 2001. The teachers teach one, two, or three asynchronous online classes in their area of expertise while teaching the remainder of their time in their local schools. School division administrators supervise the instruction of their online teachers. Many of the teachers have been WBLRD developers prior to their online teaching. Novice online teachers are required to attend two days of professional development, while experienced online teachers are required to attend one day of professional development. In 2003-04, online teachers were encouraged to attend a three-day Online Learning Institute. All teachers are trained in the use of a learning management system; the system currently being used is Blackboard. Effective practices in online instruction are also a focus of the professional development of the online teachers. Each online teacher has access to $4000 to purchase release time for required professional development, course preparation, marking, and interaction with students. They may also use these funds to attend conferences or other forms of related professional development. In addition, the Learning Technology Unit provides ongoing technical support throughout the school year, and funding is provided for the purchase of a laptop computer for each online teacher.

Methodology

Nourishing Growth examined the impact of being involved in eLearning initiatives that offered quality ongoing professional development, long-term release time and continued technical support for teachers while requiring productivity (Web resources or instruction). This impact was considered in the context of building technology capacity and increasing effective technology use in the classroom. The questionnaires for teachers who taught online or developed Web resources were designed to explore the efficacy of involvement in extended technology-related projects and to establish effects on teacher skill level and classroom practice.

Nourishing Growth was comprised of two online surveys. The surveys remain available online at http://www.saskschools.ca/~techpd/. The initial survey, or pre-survey, was completed in September 2003. The follow-up, or post-survey, was completed in May 2004. Participation by the online teachers and WBLRD developers was voluntary. Twenty-two respondents completed both surveys. This allowed for comparison of skills and perceptions both near the beginning and end of involvement in the eLearning initiatives. Twelve additional respondents completed only the initial survey in September, and five additional respondents just completed the post-survey in May.

The pre-survey consisted of 34 questions. The post-survey contained 38 questions. One of the four additional questions offered respondents the opportunity to provide comments about how their involvement has affected technology integration in their teaching practice. All of the quotations in this report are taken from this question. Teachers responded to all questions by either selecting appropriate buttons or entering text.

The data collected from the *Nourishing Growth* participants has been compared with the data garnered from teachers in the province in general through *Beyond the Mouse and Modem*.

Participant Profile

Beyond the Mouse and Modem was an online survey of Saskatchewan teachers in 2002-03. A total of 2,172 of approximately 11,500 teachers completed the survey. Ninety-seven percent of these teachers completed the survey because their school division requested their participation. Respondents came from six of seven education regions across Saskatchewan: 65% reported teaching in a rural setting, 35% in an urban setting and less than 1% on a reserve. Of those who completed the survey, 68% were females and 32% were males, which is similar to the composition of the province's teaching body. The *Beyond the Mouse and Modem* data serve as a point of reference for comparison with the *Nourishing Growth* data.

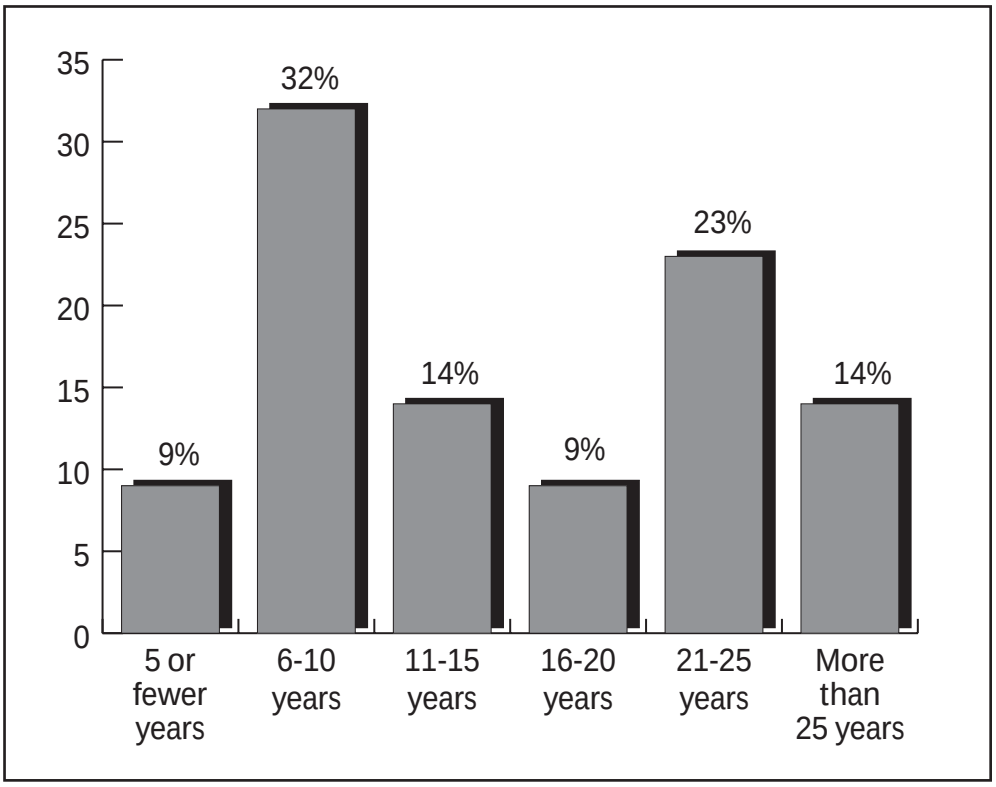
Fifty-three teachers participated in the Consortium's two eLearning initiatives for the 2003-04 school year. Twenty-one were online teachers and 27 were developers. Five individuals were involved in both initiatives. Fifty-nine percent of teachers who completed the surveys were working on eLearning initiatives for the first time. The remaining respondents had worked as online teachers and/or Web-based resource developers in previous years: 15% of those surveyed had been Web-based developers, 12% had been online teachers, and 15% had been involved in both initiatives in the past.

Thirty-four of the 53 teachers involved in the eLearning initiatives completed the *Nourishing Growth* pre-survey. Of those, 62% were female and 38% were male, which is similar to the composition of the province's teaching body. Respondents were asked to identify their main teaching assignment (the assignment to which more than 50% of their teaching time is dedicated). Sixty-eight percent of the pre-survey respondents identified themselves as regular full-time teachers, while 3% said they were part-time teachers. Twelve percent of those surveyed identified themselves as administrators, 9% identified themselves as Web-based learning resource developers, and the remaining 9% said their main assignment was something other than the listed options.

Twenty-six of the 53 teachers responded to the *Nourishing Growth* post-survey. Of the 26 respondents, 69% were female and 31% were male. The main teaching assignments of the 26 teachers were as follows: 12% identified themselves as administrators, 8% were online teachers, 4% were regular part-time teachers, 19% were developers, and the majority of respondents (54%) were regular full-time teachers. One person did not indicate his/her main teaching assignment.

Twenty-two participants completed both the pre-survey and the post-survey. Of these, 68% were female and 32% were male. Of the 22 respondents who completed both *Nourishing Growth* surveys, 1 had previous experience as a WBLRD developer, 3 had previously been online teachers, 5 had previously been both WBLRD developers and online teachers, and 13 were new to the eLearning initiatives in the 2003-04 school year. Years of teaching experience reported by these respondents varied from two with 5 or fewer years to three with more than 25 years (see Exhibit 1). The responses from these 22 common respondents were used to measure skill changes, reduction of barriers and computer use.

Exhibit 1:
Percentages of the 22 Common Respondents Reporting Their Years of Teaching Experience in the *Nourishing Growth* Post-Survey



Findings

TEACHER SKILL LEVELS

PROVINCIAL RESULTS REGARDING TEACHER SKILL LEVELS

The provincial responses indicated that teachers did not have knowledge in the majority of foundational skills, as mastery of only 6 of 14 basic skills was reported by over 50% of the teachers (see Exhibit 2). Additionally, the majority of teachers reported only 2 of 10 intermediate skills and none of the advanced skills (see Exhibit 2).

Exhibit 2:
Percentages of Teachers Who Reported Mastery of Skills in *Beyond the Mouse and Modem*

Level of Skill	Skills 50% or More of Teachers Have	Skills Less Than 50% of Teachers Have
Basic	80% - display contents of a disk 79% - use search engines to find information 70% - send and receive e-mail including attachments 63% - copy files 60% - use the WWW for recreational purposes 54% - put pictures in a word processing document	49% - name the critical components of my school's acceptable computer use policy 49% - use the Evergreen Curriculum 41% - use a drawing program 36% - use a spreadsheet 35% - prepare a slide show (PowerPoint) 35% - scan a picture 29% - use streamed video and audio applications 18% - compress or extract files
Intermediate	55% - install a program 53% - install virus software	38% - can download and install programs off of the Internet 30% - crop a digital image 25% - do an advanced search on the Internet 21% - understand what cookies do 19% - use instant messaging or real time chats 16% - make a Web page 11% - put a Web page on to the Web 10% - edit a digital video
Advanced	None	9% - am part of a ListServ or on-line discussion group 7% - write a computer program or macro

Pre-Survey and Post-Survey Results Regarding Teacher Skill Levels

Both *Nourishing Growth* surveys asked WBLRD developers and online teachers to self-assess their skill levels. The surveys asked about the skills listed in the provincial survey (see Exhibit 3) as well as some additional skills (see Exhibit 4).

Exhibit 3:
A Comparison of the Percentages of Teachers Who Reported Mastery of Skills in *Beyond the Mouse and Modem* and *Nourishing Growth*

		22 Common Respondents	
	Beyond the Mouse and Modem	*Nourishing Growth* Pre-Survey	*Nourishing Growth* Post-Survey
BASIC SKILLS			
Display contents of a disk	80%	91%	96%
Use search engines to find information	78%	95%	95%*
Send and receive e-mail including attachments	70%	100%	95%*
Copy files	63%	91%	96%
Use the WWW for recreational purposes	60%	91%	95%*
Put pictures in a word processing document	54%	77%	91%*
Name the critical components of my school's acceptable computer use policy	49%	77%	86%*
Use the Evergreen Curriculum	49%	91%	95%
Use a drawing program	41%	63%	73%
Use a spreadsheet	36%	63%	73%
Prepare a slide show (PowerPoint)	35%	82%	86%
Scan a picture	35%	78%	87%
Use streamed video and audio applications	29%	62%*	68%
Compress or extract files	18%	45%	68%
INTERMEDIATE SKILLS			
Install a program	55%	73%	82%
Install virus software	53%	95%	90%*
Can download and install programs off of the Internet	38%	77%	86%
Crop a digital image	30%	82%	91%
Do an advanced search on the Internet	25%	68%	86%*
Understand what cookies do	21%	45%	62%*
Use instant messaging or real time chats	19%	36%	36%
Make a Web page	16%	See Exhibit 4	See Exhibit 4
Put a Web page on to the Web	11%	73%	83%
Edit a digital video	10%	42%	45%
ADVANCED SKILLS			
Am part of a ListServ or online discussion group	9%	57%*	76%*
Write a computer program or macro	7%	14%	14%

* Default responses have been excluded

The initial level of skill of those 22 respondents who completed the *Nourishing Growth* pre-survey was dramatically higher than the level of those in the province in general. In *Beyond the Mouse and Modem*, more than half of the teaching population surveyed reported mastery of 6 of 14 basic skills, 2 of 10 intermediate skills, and 0 of 2 advanced skills. In contrast, the majority of 22 common respondents who completed the *Nourishing Growth* pre-survey reported mastery of 13 of 14 basic skills, 6 of 9 intermediate skills, and 1 of 2 advanced skills (The intermediate skill "make a Web page" in the provincial survey was broken into two separate skills, "create a functional Web page using 'hand coding' (html)" and "create a functional Web page using an html editor" in the *Nourishing Growth* surveys. These skills are reported as part of the "other" skills surveyed in *Nourishing Growth*.). Teachers also reported a command of 10 of 16 other skills in the *Nourishing Growth* pre-survey that were not assessed in *Beyond the Mouse and Modem*.

In the post-survey, the majority of the common respondents reported mastery of all 14 basic skills, 7 of 9 intermediate skills, 1 of 2 advanced skills, and 14 of 16 other skills (see Exhibits 3 and 4).

Exhibit 4:
A Comparison of the Percentages of Teachers Who Reported Mastery of Skills in *Nourishing Growth*

		22 Common Respondents	
	Beyond the Mouse and Modem	*Nourishing Growth* Pre-Survey	*Nourishing Growth* Post-Survey
OTHER SKILLS			
Select an appropriate printer for printing	N/A	87%	87%
Customize my desktop	N/A	73%	78%
Change the display settings of my computer	N/A	82%	87%
Set up a password on my computer	N/A	69%	69%
Locate my files in my computer file hierarchy	N/A	86%	100%
Create graphics in a graphics program	N/A	50%	81%
Optimize a graphic in a graphs program	N/A	68%	86%
I have firewall software installed and update it regularly	N/A	50%	57%*
Understand when I am saving files where I am saving them	N/A	82%	100%
Edit a digital video	N/A	42%	45%
Create a functional Web page using "hand coding" (html)	N/A	32%	29%*
Create a functional Web page using an html editor	N/A	77%	95%
Create interactive questions in a Web page	N/A	32%	68%
Embed audio in a Web page	N/A	45%	59%
Embed video in a Web page	N/A	41%	59%
Create animations for the Web	N/A	36%	50%

* Default responses have been excluded

It is important to note that in both *Nourishing Growth* and *Beyond the Mouse and Modem*, the surveys were specifically designed to have respondents self-assess a general set of skills, not those acquired in a specific professional development experience. While the participants in the *Nourishing Growth* post-survey had specific training relating to Web development applications or learning management systems, many of the skills for which survey data was generated were not taught

to the participants. The majority of skills listed in Exhibits 3 and 4 (33 of 42 skills) are not part of direct instruction provided to the developers or online teachers. Likewise, *Beyond the Mouse and Modem* checked some skills for which participants would likely have had inservice, and other skills for which they would likely have had none.

A comparison between the pre-survey and post-survey results of the 22 common respondents reveals that the educators saw gains in learning, even though the majority of them had much stronger skills than teachers in the province had in general. Post-survey respondents reported improvement in 33 of 41 skills. In the remaining 8 skills, 5 areas showed identical results. The only 3 skills that showed a decrease were sending and receiving e-mail including attachments (-5%), installing virus software (-5%), and creating a functional Web page using "hand coding" (html) (-3%). In each of these cases, the respondent who did not respond "yes" when asked if he or she could complete a task on the computer or Internet responded with "somewhat". Since it is unlikely those skills were actually lost in the months between the surveys, it is likely that the post-survey response of "somewhat" indicates a more accurate understanding of personal skills than did the pre-survey response.

Of the 26 skills self-assessed in *Beyond the Mouse and Modem*, a majority of respondents reported mastery of only 8 skills. In the *Nourishing Growth* pre-survey, more than half of the respondents reported a command of 21 of the 26 skills. A majority of post-survey respondents reported mastery of all but 3 skills (see Exhibits 3 and 4).

Of the 12 skills for which 90% or more of the common post-survey respondents indicated mastery, 8 were skills that were used in tasks required of WBLRD developers and/or online teachers. These 8 skills included cropping a digital image, locating files in a computer file hierarchy, understanding where on a computer a file is being saved, creating a functional Web page using an html editor, displaying contents of a disk, using search engines to find information, sending and receiving e-mail, and using the Evergreen Curriculum. The first 4 of these 8 skills were part of the hands-on workshop sessions given to the developers and/or online teachers. One must conclude that the process of Web resource development or online teaching did aide in the acquisition of skills and that those skills that were required were developed by more of the participants. However, further research into differences in skill development between WBLRD developers and online teachers is warranted.

The Teacher Stated Value of Technology Integration in the Classroom

Provincial Results Regarding the Value of Technology Integration in the Classroom

Eight-nine percent of provincial teachers felt their "current use of technology actually improves student learning". However, of these, 30% felt that it improved student learning only "somewhat". Given the activities that the provincial teachers as a group reported doing frequently, namely word processing, searching the Internet, and using drills, games, and tutorials, their assessment was accurate.

Interest in technology implementation remained consistently high throughout the provincial data and both groups of *Nourishing Growth* respondents.

Pre-Survey and Post-Survey Results Regarding the Value of Technology Integration in the Classroom

A *Nourishing Growth* respondent articulated teacher views by stating that "it is important to use the digital world of our students to foster learning." Seventy-four percent of the 34 pre-survey respondents stated that technology integration was important. Substantially more of the 26 teachers in the post-survey, 88%, responded that technology was important. Following their time to learn about technology and apply that learning, teachers stated the value of technology enhanced learning more strongly.

Eighty-nine percent of respondents in the pre-survey and post-survey reported interest in classroom implementation, and none identified "lack of interest" as a significant barrier. Both of these results were consistent with provincial results. Teachers were interested in implementing technology and believed that it was important.

Provincial and pre-survey respondents both felt that the use of computers in the classroom improved learning. Provincial respondents in *Beyond the Mouse and Modem* believed teaching with technology improved student learning, but they had less conviction than the pre-survey teachers. Of the pre-survey teachers who responded, 97% felt that "current use of technology actually improves student learning", 38% felt that technology improved student learning "a great deal", 41% felt that it improved student learning "generally" and 18% felt that it improved student learning only "somewhat". It is clear that teachers with more advanced skill levels and knowledge of a larger variety of programs believe that they are providing learning that is more meaningful for students. Results for post-survey respondents were very similar to those of the pre-survey.

Teachers' Stated Level of Confidence and Implementing Technology in the Classroom

Teacher confidence was a problem for teachers throughout the province, but not for the people who participated in the Consortium initiatives. Provincially, 59% of teachers stated that lack of personal confidence was a barrier to the development and implementation of technology knowledge, skills and abilities (see Exhibit 9). In the first *Nourishing Growth* study, 32% of the common respondents stated that lack of confidence was a barrier, and those who did state it was a barrier identified it less strongly than did provincial respondents. None of the pre-survey teachers who had already been developers or online teachers identified lack of confidence as a significant barrier, and only 2 identified it as a problem at all. In the post-survey, only 18% of the common respondents declared lack of confidence a barrier, with only 1 respondent identifying the barrier as significant (see Exhibit 10). These results indicate that as skill level and familiarity with technology grew, so did confidence. Post-survey respondents articulated this sentiment exactly, as summarized through one respondent's comment when he said, "I have more confidence when I am using the computer."

Despite the personal confidence of the pre-survey teachers, they were unsure how to implement technology. Fifty percent of common respondents in the pre-survey identified this as a barrier to use with 9% citing the barrier as significant. However, in the post-survey after seven months of focus on development or online teaching, teachers felt more confident about their ability to implement technology. Only 28% of common post-survey respondents felt that being unsure how to implement technology was a barrier. None reported the barrier significant. While involved in comprehensive professional development provided by eLearning initiatives, teachers gained confidence and a belief in their own abilities to integrate technology effectively in the classroom.

Teacher Reported Professional Use of Computers

The diversity of computer use grew directly with teacher confidence throughout all three surveys. Teachers with strong skill sets and high confidence also used computers more in the classroom in each survey. In addition to higher classroom use, these individuals reported higher professional use, as well as greater diversity of use in both areas.

Provincial Results Regarding Professional Use of Computers

In *Beyond the Mouse and Modem*, teachers were asked a number of questions that monitored professional use. Sixty-two percent of teachers recorded using a computer to record or calculate student grades, 84% used the Internet to find information they used in teaching, and 92% used computers to prepare resources for students. A majority, 77%, also used computers to prepare lessons. In comparison, only 42% of respondents used e-mail for professional communication and half of those recorded the lowest levels of use possible. A small minority of teachers put lessons online (8%) or posted materials to the Internet (15%). In the provincial survey, teachers reported doing activities that require a rudimentary skill set, and the group as a whole did not record doing any professional computer activity more frequently than once a week.

Pre-Survey and Post-Survey Results Regarding Professional Use of Computers

Nourishing Growth survey respondents were also asked to report how often, if at all, they used computers to perform certain professional tasks. The number of professional tasks listed was greater in the *Nourishing Growth* surveys than in the provincial survey. As a group, both sets of respondents to *Nourishing Growth* reported a larger diversity of use and more frequent use than educators who responded to *Beyond the Mouse and Modem*. However, the most interesting results are found within an in-depth comparison of the pre-survey and post-survey results as reported by the 22 common respondents (see Exhibit 5).

In general, more of the 22 common post-survey respondents reported computer use, at least occasionally, for professional tasks, than did pre-survey respondents (see Exhibit 5). Overall, there was increased computer use for 11 of 13 tasks; the other 2 tasks remained at 100% use (see Exhibit 5). The number of tasks for which at least some respondents reported no computer use at all decreased from 11 in the pre-survey to 8 in the post-survey: some degree of use was reported by all respondents for the tasks communicate and collaborate with peers, parents, and students; manage and communicate information; and find information and/or images for instructional purposes in the post-survey. When asked "During the 2002-03 school year, how often did you use a computer" to do the 13 tasks listed in Exhibit 5, a total of 56 responses of "not at all" were given by the common pre-survey respondents. When asked the same question in regard to the year in which they were involved in an eLearning initiative, a total of 22 "not at all" responses were reported by the common post-survey respondents. In 4 of the tasks,

a considerable increase in use, more than once a week, was reported by the common respondents in the post-survey: put lessons online (+32%), create/update a Web site (+28%), locate and engage in technology-based opportunities for professional development and lifelong learning (+18%), and manage and communicate information (+13%).

Exhibit 5:
A Comparison of Percentage of Teachers Reporting
Professional Computer Use Among 22 Common *Nourishing Growth* Respondents

Type of Professional Computer Use	Percentage of 22 Common Respondents Identifying Type of Use at Least Occasionally	
	Pre-Survey	Post-Survey
Locate and engage in technology-based opportunities for Professional Development and lifelong learning	82%	95%
Locate and evaluate information from a variety of sources about teaching and learning with technology	86%	91%
Maintain an awareness and understanding of current and emergent technologies	82%	91%
Collect and analyze data	73%	86%
Communicate and collaborate with peers, parents, and students	86%	100%
Analyze and interpret student performance	82%	86%
Manage and communicate information	91%	100%
Find information and/or images for instructional purposes	95%	100%*
Prepare lessons and activities for students	100%	100%*
Put lessons online	55%	95%
Create/update a Web site	64%	95%*
Post student work on the World Wide Web	50%	59%
Recreational purposes	100%	100%

* Default response has been excluded

These findings reveal that more teachers used computers for a wider variety of tasks after completing eight months of development or online teaching, and they used computers with greater frequency in a number of different ways.

The fact that 95% of post-survey respondents recorded using computers to do Web authoring activities is very exciting, because of implications for student computer use. Becker (2001) reported that "multimedia-authoring-capable teachers have students use computers more and with a greater variety of software than do other teachers teaching the same subject" (6). He cited a similar result for teachers who know how to prepare a slide show (6). The implications of the respondents' use are even more dramatic when frequency is considered. Fifty-five percent of teachers in the post-survey stated that they made Web pages multiple times a week, while only 16% of teachers in the province in general could make Web pages at all.

TEACHER REPORTED INSTRUCTIONAL USE OF COMPUTERS

PROVINCIAL RESULTS REGARDING CLASSROOM USE OF COMPUTERS

Provincially, educators were asked to identify the frequency of use in the classroom for 20 types of Internet and software resources. More than 30% of surveyed teachers reported that they used computers in10 or more lessons per year in the following areas in all their classes: word processing software (44%), Internet searching (41%), and instructional drills, games, and tutorials (32%). Fewer than 20% of teachers surveyed used any other computer-based instructional activities more than 9 times per year in all of their classes.

PRE-SURVEY AND POST-SURVEY RESULTS REGARDING CLASSROOM USE OF COMPUTERS

In *Nourishing Growth*, teachers were asked to identify the frequency of use for 30 types of Internet, hardware and software resources. However, the questions in *Beyond the Mouse and Modem* and *Nourishing Growth* were asked differently enough that direct comparison would not be valid, although *Nourishing Growth* respondents appear to have higher use in general. Comparison between pre-survey and post-survey respondents, however, is valid and yields interesting results.

Teachers were asked, "During the 2003-04 school year, in any of the classes that you teach, indicate the number of lessons in which you have had your students do the following." When considering the data collected from the common respondents, it is evident that the post-survey teachers, in general, had their students use technology in a greater number of lessons, when all levels of use were considered (see Exhibit 6). There was a decrease in use in 10 of the types of Internet, hardware, and software resources by the post-survey respondents. Of the activities where a decrease was noted, 8 out of 10 showed less than a 10% decrease in use. There was increased use in 19 of the 30 types of resources by post-survey respondents. In 7 of these, the percentage of teachers having their students use the resource was at least 10% higher in the post-survey teachers. The activities were as follows: participate in online threaded discussion forums (+43%), use online demonstrations and simulations (+24%), use instant messaging/real time chat applications (+19%), use multimedia resources (+14%), scan a picture (+14%), create documents using desktop publishing software (+10%), and use a statistics program to analyze data (+10%) (see Exhibit 6).

Exhibit 6:
A Comparison of the Percentage of Teachers Who Reported
Instructional Use of Computers Between the Common Pre-Survey and Post-Survey Respondents

Type of Internet, Hardware or Software Resource	Percentage of the Common Respondents Indicating Some Level of Use with Students (21 Respondents**)	
	Pre-Survey	Post-Survey
Use word processing software	90%	95%
Use online demonstrations and simulations	67%	91%
Use search engines to find information	90%*	85%*
Create documents using desktop publishing software	71%	81%
Use presentation software (e.g. PowerPoint)	76%	81%
Scan a picture	67%	81%
Edit/crop a digital image	67%	76%
Use a drawing/paint program	67%	76%
Use multimedia resources	62%	76%
Search the Web using advanced search methods	76%	65%*
Use computer-based information sources	71%	65%*
Participate in online threaded discussion forums	19%	62%
Use instructional drills, games, and tutorials	71%	62%
Use e-mail	62%	60%*
Optimize a digital image	48%	57%
Film digital video	48%	57%
Use WebQuests/Treasure hunts	52%	57%
Create a Web page using an html editor	67%	55%*
Create/edit audio files	43%	52%
Make the Web page/site available on the WWW (via FTP, etc.)	43%	45%*
Create/add to an electronic portfolio of original technology-based products	38%	43%*
Edit digital video	52%	38%
Collaborate with students in other schools electronically	38%	38%
Use instant messaging/real time chat applications	14%	33%
Use database or spreadsheet software	38%	30%*
Create a Web page using hand coding	29%	25%*
Use a graphic calculator	24%	15%*
Use a statistics program to analyze data	5%*	15%
Write a computer program or macro	14%	15%*
Use a data collection probe	10%	14%

* Default response has been excluded
** 21 of the 22 common respondents completed this question in the pre-survey and post-survey

Clearly, the post-survey teachers have indicated that their use of computers with their students was altered during their involvement in the eLearning initiatives. One of the teachers explained how his teaching changed:

> *I have stepped out of my comfort zone and have attempted many more online activities (wequests [sic], Webpage design and development, html language) as well as in class use of Power Point [sic] presentations. I have also begun maintaining a teacher Website in which the students/parents can access their homework and additional information such tests, field trips and due dates for assignments in all my classes. I have also had students emailing their homework when they have left town for holidays and ask questions when I have been on the road and away from school. The students have found this to be extremely beneficial and are quick to let me know when I have not ftp'ed the daily assignments to my Website (as well as any mistakes they have come across).*

Frequency and Variety of Use of Computers in Instruction

Frequency and variety of computer use in instruction are two of the main ways some indicators effective integration in the classroom. While frequency can show how often computers are used, frequency alone does not indicate how effective that use is. Variety remains the more important element when assessing actual effectiveness, as it is more variety of use in the classroom that is more commonly associated with strong educational outcomes. Additional information about this can be found by looking at the stages teachers go through when implementing computers effectively in instruction. The ACOT study of 1995 identified a number of key stages in effective integration of computers in the classroom. The first two stages are titled Entry and Adoption, and they represent the use of a few activities, such as word processing, for targeted areas. These activities are a good start, but do not result in strong outcomes for students. By contrast, the final two stages, Appropriation and Innovation, are characterized by diverse objectives, a wide variety of use, original use and a focus on higher level thinking skills. These stages result in a wide variety of excellent outcomes for students.

Provincial Results Regarding Frequency and Variety of Instructional Use of Computers

In *Beyond the Mouse and Modem*, teachers were asked: "In the class in which you (or your students) use computers the most, how often does a typical student use a computer?" Twenty-nine percent of educators responded they used computers less than once a week, 16% responded their use was weekly and 32% responded they used computers two to four times per week in the class they used computers most. Twenty-three percent reported they used computers daily. However, teachers as a group reported that the use in 10 or more lessons per year was limited to primarily 3 of 20 areas: word processing (44%), Internet searching (41%) and instructional tutorials, drills and games (32%). So while teachers reflected some frequency of use in the class where they used computers the most, they did not reflect appropriate diversity for true technology integration. On the provincial level, the average teacher was only in the Adoption or Entry stage of technology integration.

Pre-Survey and Post-Survey Results Regarding Frequency and Variety of Instructional Use of Computers

Respondents in the *Nourishing Growth* surveys were asked to respond to a similar question: "Over the course of the 2002-03 (or 2003-04) school year, how many hours of class time would the class in which you use computers the most have utilized computers?" Among the 22 common pre-survey respondents, 5% of respondents did not use computers at all, 9% of respondents reported only 1-10 hours of computer use, 14% indicated 11-25 hours of use, 18% logged 26-50 hours of class computer use and 55% said they had their classes use computers more than 50 hours through the course of the year. Of the common pre-survey respondents, over 30% reported use in 6 of 30 Internet, hardware and software resources in 10 or more lessons per year: use word processing software (76%), use

search engines to find information (48%), create documents using desktop publishing software (43%), use a drawing/paint program (43%), use multimedia resources (33%), and edit/crop a digital image (33%).

The results from the post-survey pertaining to the number of hours of class time in which computers were utilized were similar. Of the 19 teachers who responded to the question (3 of the 22 common respondents defaulted), none reported zero hours of use of computers, 11% percent used computers with their classes for 1-10 hours, 16% reported 11-25 hours of computer use, 16% had their classes use computers 26-50 hours, and 58% reported class use of computers exceeding 50 hours. Of the common post-survey respondents, over 30% reported use of 2 of 30 Internet, hardware and software resources in 10 or more lessons per year: word processing software (71%) and use search engines to find information (40%). It is important to note that while use of the various resources in 10 or more classes per year was less common in the post-survey teachers, their total use overall was greater (see Exhibit 6), despite the fact that any teachers who were developers had reduced instructional time during the development year, due to release time. As the teachers became more skilled and more confident, their computer use with their students was both greater and more varied. A teacher's response in the post-survey supports this conclusion:

> *Since my involvement with the LTU as both a WBLRD developer and Online Teacher, I have constantly been engaging my students in activities that use technology specifically digital cameras digital video and editing software and the use of Macintosh computers. My students are creating new media projects as well as traditional arts expressions. The number of students who use this technology in their projects is greater that 75% of my senior classes.*

Written responses by teachers and the wider variety of uses placed teachers involved in the eLearning projects much farther along the technology integration continuum than teachers in the province in general. As a result, their use of technology can be assessed as much more effective.

Teacher Objectives for the Use of Computers in Instruction

Provincial Results Regarding Objectives for Student Computer Use

Another method of examining teacher use is to look at objectives for students. In *Beyond the Mouse and Modem*, of the 10 objectives for student computer use available for selection in the survey, the majority of the province's teachers identified the following 6 objectives: finding ideas and information, learning to work independently, improving computer skills, expressing themselves in writing, mastering skills just taught, and remediation of skills not learned well (see Exhibit 7).

Exhibit 7:
Percentage of Teachers Identifying Objectives for Student Computer Use in *Beyond the Mouse and Modem*

Objective for Students	Percentage of Teachers Identifying the Objective
Finding ideas and information	78%
Learning to work independently	77%
Improving computer skills	67%
Expressing themselves in writing	64%
Mastering skills just taught	56%
Remediation of skills not learned well	53%

The remaining four objectives in the survey that were not identified by a majority of teachers as ones they have for student computer use were: analyzing information (49%), presenting information to an audience (48%), learning to work collaboratively (44%), and communicating electronically with other people (24%).

Pre-Survey and Post-Survey Results Regarding Objectives for Student Computer Use

In comparison, in both of the *Nourishing Growth* surveys, of the 18 objectives for student computer use available for selection, 50% or more of the educators in the common respondents group identified all 18 objectives (see Exhibit 8).

It is clear that as educators become more familiar and comfortable with technology, their diversity of implementation (see Exhibit 6) and reasons for implementation increase (see Exhibit 8). The comments of a teacher in the post-survey highlighted thoughtful and professional use of technology rather than indiscriminant or ineffective use:

> *I don't believe that computer technology is always a better tool than other tools available to teachers, but it has been significant to have*

this option available to me as a teacher. I enjoy using a variety of teaching strategies, and try to select the strategy that best suits the lesson objectives. Working with the WBLRD has expanded these options available to me.

There were few statistical differences in the objectives which teachers in the pre-survey and post-survey had for students when using technology. However, post-survey teachers indicated a greater tendency to expect their students to use technology to communicate, and more post-survey teachers expected their students to present information to an audience (+5%), disseminate information (+18%) and communicate electronically with other people (+10%) (see Exhibit 8).

Exhibit 8:
A Comparison of Percentages of Pre-Survey and Post-Survey Teachers Reporting Objectives for Student Computer Use**

Objectives for Students	Percentage of the Common Respondents Identifying the Objective (21 Respondents**)	
	Pre-Survey	Post-Survey
Promoting creativity	100%*	100%*
Presenting information to an audience	95%*	100%
Learning to work independently	100%	100%
Learning to work collaboratively	95%*	95%*
Finding ideas and information	83%*	95%*
Enrichment	95%*	95%
Practicing responsible use of technology	94%*	94%*
Aiding the development of a positive attitude toward technology	89%*	94%*
Disseminating information	72%*	90%*
Expressing themselves using graphics	89%*	80%*
Improving computer skills	84%*	79%*
Expressing themselves in writing	78%*	79%
Mastering skills just taught	78%*	78%
Processing data and reporting results	68%*	74%
Remediation of skills not learned well	74%*	61%
Evaluating information for validity, accuracy, relevance, comprehensiveness, or bias	67%*	61%
Communicating electronically with other people	50%*	60%*
Analyzing information	78%*	55%*

* Default responses have been excluded
** 20 of the 22 common respondents completed this question in the pre-survey and post-survey

Teachers with a broad base of skills, including advanced skills, are often the people who are interested in expanding their abilities through professional development opportunities such as the eLearning initiatives. It is clear from the pre-survey respondents that the group who completed the *Nourishing Growth* surveys had a large skill set and was more likely to identify objectives regarding the use of technology in the classroom than the provincial respondents. In addition, educators surveyed in *Nourishing Growth* believed overwhelmingly that their current use of computers improved student learning. Only one of the respondents in each of the surveys believed that computer use did not improve student learning. Strong belief in the value of computers in learning created another incentive for use that was revealed in the results of the study.

Barriers Impeding Teacher Technology Use in Classroom

As much as participants in *Nourishing Growth* and *Beyond the Mouse and Modem* believed in the integration of technology in the classroom, there were a number of barriers each group identified that impeded use. In *Beyond the Mouse and Modem*, teachers were asked to classify a total of 11 barriers to developing and implementing their technology knowledge, skills and abilities. In *Nourishing Growth*, respondents were asked about the same 11 barriers, in addition to a number of others. All respondents were asked to rate these barriers by degree (see Exhibit 9).

Provincial Results Regarding Barriers to Developing and Implementing Technology Knowledge, Skills, and Abilities

Provincial teachers identified as barriers lack of time at school, confidence, quality professional development, software, and being unsure of how to implement technology in the classroom. Of these, the most significant barrier was lack of time at school (see Exhibit 9.)

Exhibit 9:
Percentage of Teachers Reporting Barriers to Developing and Implementing Their Technology Knowledge, Skills, and Abilities in *Beyond the Mouse and Modem*

Barriers to developing and implementing technology knowledge, skills and abilities	A Significant Barrier	A Barrier	A Minor Barrier	Not a Barrier
Insufficient time at school	51%	28%	11%	10%
Lack of software	13%	20%	24%	42%
Lack of personal confidence	12%	21%	26%	41%
Lack of quality professional development	11%	23%	27%	38%
Lack of hardware	10%	16%	19%	55%
Unsure of how to effectively implement technology in my courses	10%	22%	26%	42%
Lack of technical support	8%	17%	23%	51%
Lack of vision in your school or division	4%	9%	13%	74%
Not viewing such development as important or necessary	4%	7%	15%	74%
Lack of administrative support	3%	6%	13%	77%
Lack of interest	0%	12%	21%	67%

* Due to rounding, not all totals equal 100%

Pre-Survey and Post-Survey Results Regarding Barriers to Developing and Implementing Technology Knowledge, Skills, and Abilities

In the *Nourishing Growth* surveys, teachers were asked to rate the same 11 barriers, in addition to a few others. As a group, the common pre-survey respondents were less likely than the provincial respondents to report lack of confidence (-27%), interest (-19%), software (-8%), hardware (-4%), quality professional development (-3%), and being unsure of how to effectively implement technology (-8%) as barriers (see Exhibit 10). They were more likely than the teachers surveyed provincially to report lack of vision in the school or division (+24%), technical support (+19%), and administrative support (+8%), as well as not viewing such development as important or necessary (+6%) and insufficient time at school (+1%) as barriers to the implementation of technology knowledge, skills, and abilities (see Exhibit 10).

The 22 common post-survey respondents differed by at least 10% from the pre-survey respondents in their perceptions of barriers in seven areas: unsure of how to effectively implement technology in my course (-27%), not viewing such developments as important or necessary (-18%), lack of vision in school or division (-14%), computers and/or computer labs are not available when needed (-13%), lack of confidence (-13%), other academic requirements preventing the teacher from spending time on technology (+14%), and distrust of the Internet (+18%) (see Exhibit 10).

Exhibit 10:
A Comparison of Percentages of Respondents Who Reported Barriers to Developing and Implementing Their Technology Knowledge, Skills, and Abilities

Barriers to developing and implementing *technology knowledge, skills and abilities*	*Beyond the Mouse and Modem*	22 Common Respondents *in Nourishing Growth*	
		Pre-Survey	Post-Survey
Insufficient time at school	90%	91%	86%
Other academic requirements prevent me from spending time on technology	—	68%	82%
Lack of technical support	49%	68%	59%
Computers and/or computer labs are not available when I need them	—	68%	55%
Lack of quality professional development	62%	59%	50%
Lack of software	58%	50%	50%
Lack of knowledge	—	77%	50%
Lack of hardware	45%	41%	41%
Technical limitations imposed by the school or school division technology policy	—	45%	38%*
Lack of administrative support	33%	41%	36%
Lack of vision in school or division	26%	50%	36%
Limitations imposed by school and/or school division security policies	—	—	36%
Student behavior	—	41%	32%
Distrust of the Internet	—	14%	32%
Community expectations	—	32%	24%*
Unsure of how to effectively implement technology in my course	58%	50%	23%
Lack of confidence	59%	32%	19%
Lack of interest	33%	14%	14%
Not viewing such development as important or necessary	26%	32%	14%

* Default response has been excluded
Question not included in *Beyond the Mouse and Modem* and/or the *Nourishing Growth* pre-survey

A. Lack of Time at School as a Barrier in All Three Surveys

In the provincial results, insufficient time at school was the strongest barrier identified. Ninety percent of teachers in the province cited lack of time as some degree of barrier, with 51% reporting it was a significant barrier, the strongest rating allowed by the survey.

In the *Nourishing Growth* pre-survey there were almost identical findings. Of the 22 common respondents, 91% cited lack of time at school as some degree of barrier, with 50% reporting it was a significant barrier, the strongest rating allowed by the survey.

Post-survey data revealed that educators also felt frustrated by lack of time to implement technology, but there was change is the level of barrier respondents perceived. Eighty-six percent of the common post-survey respondents noted that

lack of time was a barrier. However, while 50% of pre-survey respondents reported the barrier was significant, only 32% of the common post-survey respondents rated the barrier as significant. While lack of time at school remained both the greatest and the most strongly identified barrier, it was reduced as a significant barrier for teachers involved in the eLearning initiatives.

This reduced perception of lack of time being a barrier may be related to the release time provided for eLearning initiative participants. For the 22 common respondents, pre-survey data revealed that 36% had no release time at all in the school year prior to the year in which they were developers or online teachers. Thirty-two percent had less than 5% release time. Only 10% reported 50% or more release time (see Exhibit 11).

Exhibit 11:
Percentage of the Common Respondents Reporting Their Levels of Release Time

Percentage of Release Time	Percentage of the 22 Common Respondents Reporting Level of Release Time	
	Pre-Survey	Post-Survey
No release or preparation time	36%	0%
Less than 5%	32%	9%
Between 5% and 9%	9%	18%
Between 10% and 14%	14%	5%
Between 15% and 19%	0%	5%
Between 20% and 24%	0%	5%
Between 25% and 29%	0%	18%
Between 30% and 39%	0%	14%
Between 40% and 49%	0%	9%
Between 50% and 59%	5%	9%
Between 60% and 69%	5%	0%
Between 70% and 79%	0%	9%
Between 80% and 89%	0%	0%
Between 90% and 99%	0%	0%
100%	0%	0%

*Due to rounding, totals do not equal 100%

Among the WBLRD developers, release time varied according to the funding of the project and the number of teachers on the development team. Among the online teachers, release time varied according to how much release time the individual teacher requested (see eLearning Initiatives in the Survey Background section). Common post-survey respondents reported receiving widely varied release time but no participants reported having no release time. Twenty-seven percent received less than 10% release time and 18% received more than 50% release time (see Exhibit 11).

Seven of the 22 common post-survey respondents identified lack of time as a significant barrier. For these teachers, release time varied from less than 5% to

between 30% and 39%. Six of the 22 common post-survey respondents identified a lack of time as a minor barrier. Release time for these respondents varied from a low of between 5% and 9% to a high of between 70% and 79%. There was no clear relationship between level of release time and perception of lack of time as a barrier. Further research into the relationship between the perception of time as a barrier and a number of other factors including amount of release time, skill levels and personal confidence may be warranted with a larger population of eLearning initiative participants. More consistency of release time among participants would also facilitate meaningful findings.

Despite the fact that some people received little release time, there were repeated comments about the amount of learning accomplished with the time that was received. One educator said, "I have appreciated having had release time to explore and learn more about a variety of technologies, and identifying resources that would be useful to myself and my staff." In addition, the new ideas encountered during the release time appeared to allow educators to see areas where they wished to devote their own time:

> *Now that I am more familiar with teaching online, I feel I will be able to devote more time to developing my Web design skills. I also expanded my use and knowledge of digital photography and the related skills of altering the photos to make them small enough to put in presentations and send over the Internet. I think I need to focus my next learning on video and audio skills! They are my weakness, that is for sure.*

B. The Role of Support in All Three Surveys

Provincial teachers needed technical support. Sixty-four percent of teachers surveyed reported needing technical support at least once a month. The 22 common pre-survey respondents reported a similar need, with 59% reporting needing support that often. Planning and instructional support were also needed by both the provincial group and those who answered the pre-survey. Forty-three percent of provincial respondents reported needing planning support at least once a month and 38% noted they needed instructional support at least that often. Of the 22 common pre-survey respondents, 32% needed planning support and 28% needed instructional support at least once a month. The need for support was lesser for each type for the 22 common post-survey respondents: 50% reported needing technical support, 5% planning support and 9% instructional support at least once a month. Clearly, there was a reduced need for support among individuals who have been involved in the eLearning initiatives.

Interestingly, despite having greater skill levels and confidence, as well as indicating that they needed support less often, the 22 common pre-survey and post-survey respondents were more likely (+19% and +10% respectively) to identify lack of technical support as a barrier to development and implementation of technology knowledge, skills and abilities than the provincial teachers (see Exhibit 10). However, the degree of the perceived barrier was less among the *Nourishing Growth* respondents. While 8% of the provincial respondents reported that the lack of technical support was a significant barrier, none of the 22 common *Nourishing Growth* pre-survey and post-survey respondents reported that the lack of support was a barrier to that extent.

With their superior skills and confidence, the pre-survey teachers used computers to a greater degree than did their provincial counterparts (see Sections 1, 3 and 5). Data collected suggests that as teachers integrate technology in their classrooms to a greater extent, their need for technical support may increase, especially if their skills are newly developed. Nine percent fewer of the post-survey respondents reported lack of technical support as a barrier to development and implementation (see Exhibit 10) despite greater and more varied implementation than seen in the pre-survey respondents (see Section 5). With more experience, greater confidence, and a stronger skill set (see Sections 1 and 3), fewer of the post-survey respondents found the lack of technical support a barrier than did the pre-survey teachers.

It is likely that the additional professional development and technical support offered to those involved in the eLearning initiatives had a role in reducing the perception that lack of support was a barrier. In the post-survey, teachers expressed a feeling of intangible support provided by the province-wide initiatives: "Involvement with WBLRD has increased my knowledge, comfort and skills with technology. I have also felt more connected to provincial-level support; not just my own school division."

One of the key things that also characterized the *Nourishing Growth* respondents was their role in providing support. There were three types of support studied by the report: technical, planning and instructional. Participants played a role in providing all three in their home school divisions. Eighty-five percent of those who completed the pre-survey *Nourishing Growth* reported providing technical support for others (12% of survey respondents stated it was a part of their jobs). Eighty-five percent also reported providing planning support and 80% stated they provided instructional support. In both cases, 21% of respondents stated that providing support was a part of their job descriptions. In the post-survey, it was also clear that the respondents performed the role of providing technical, planning, and instructional support in levels similar to those of the pre-survey respondents.

In the post-survey, a teacher described providing support: "By the time my project is completed, I intend to work with another teacher as a result of work done with WBLRD. As well, other teachers are aware of involvement and feel comfortable in approaching me for assistance and support." A respondent gave a concrete example of growth as a support for other teachers: "Throughout the year I have learned how to use Blackboard. I was then able to teach this to two teachers in the school. As a result, they have each set up accounts and are now trying to use Blackboard with Grades 7-9 students."

C. Pre-Survey and Post-Survey Respondents See Pressure from Other Academic Requirements

Teachers in the pre-survey agreed that "other academic requirements prevent me from spending time on technology" was a barrier to developing and implementing technology knowledge, skills and abilities. Sixty-eight percent of the pre-survey teachers believed that this was some degree of barrier. In the post-survey, 77% of respondents believed that other academic requirements were a barrier:

> *I guess because I have had the opportunity to work through various software programs and learn how to use the technology myself, I*

would be more comfortable to use it in my classroom. But as a Senior Teacher, I feel the pressures of completing the course load, so I don't integrate it as much as I know I should or I would like. The continual fight for the labs is a pain and students not having access to the various technology at home means no work can be done on their own time which sucks up classroom time!

It may be argued that as teachers became more able and willing to integrate technology widely and more intent upon doing so, they became more cognizant of the challenges of integration.

PROFESSIONAL DEVELOPMENT

PROVINCIAL RESULTS REGARDING PROFESSIONAL DEVELOPMENT

Provincial teacher responses regarding what professional development they were receiving were very mixed. None of the technology-related professional development topics listed in *Beyond the Mouse and Modem* was identified by a majority of those surveyed as a topic that had been a main focus of professional development. Teachers who recalled particular topics were most likely to mention "use of the Web", "the mechanics of using computer technology and software", and "integrating computers into instructional activities in your subject area". The other five topics listed received little attention.

Despite the focus on technology professional development by many school divisions, the Saskatchewan Teachers' Federation and Saskatchewan Learning, the majority of teachers surveyed provincially still believed that lack of quality professional development remained a barrier to implementation. Sixty-two percent of teachers identified this as a barrier to developing skills and implementing technology in the classroom. Of those, 11% noted it was "a significant barrier".

PRE-SURVEY AND POST-SURVEY RESULTS REGARDING PROFESSIONAL DEVELOPMENT

A majority of the *Nourishing Growth* common pre-survey respondents identified 4 of the 8 topics as major focuses in their professional development experiences in their school divisions. The majority of teachers stated the topics including "technology related content to teach your students", "integrating computers into instructional activities in your subject area", the "how to use the Web", and "how to enable students to create multimedia presentations" had been a focus. Results were similar for the common post-survey respondents. Fifty-nine percent of the common pre-survey respondents still believed that lack of quality professional development was a barrier. However, none identified the barrier as significant. Of the common post-survey respondents, 50% perceived lack of quality professional development impeded the development of their technology skills and subsequent implementation. One person indicated this was a significant barrier.

The *Nourishing Growth* surveys had two questions pertaining to the types of professional development the teachers had experienced and the extent to which they applied each form. During the 2003-04 school year, the two most common types of professional development reported by the 22 common post-survey respondents were "learning regarding technology on my own time", which 82% of respondents reported and "professional development sessions to support online teaching or Web-based learning resource development", reported by 77% of respondents. A third type of professional development was also reported by a majority of respondents: "a one-time learning session on a software package or on hardware." Fifty-five percent of respondents reported having this type of professional development.

When asked to what extent they had applied what they had learned during the different types of professional development that they had had, the respondents were able to choose "a lot", "some", "a little", or "not at all". None of the respondents selected "not at all" for any of the types of professional development listed.

Reports of "a lot" of application of learning varied according to type of professional development (see Exhibit 12).

Exhibit 12:
Percentages of Post-Survey Respondents Reporting
"A Lot" Application of Different Types of Professional Development

Type of Professional Development	Percentages of Post-Survey Respondents Reporting "A Lot" of Application
Learning regarding technology on my own time	83%*
Professional development sessions to support online teaching or Web-based learning resource development	82%*
A learning session with one or more follow up sessions	73%*
A learning session with follow up technical or instructional support (n=11)	55%*
A one-time learning session on a software package or on hardware (n=12)	42%*

* Default responses have been excluded

Eighty-three percent reported "a lot" of application of learning done on their own time (see Exhibit 12). In addition, 82% of post-survey respondents indicated that they applied what they were learning at the WBLRD and/or online teachers' professional development sessions "a lot". Clearly, these two types of learning were resulting in the greatest application by participants in the eLearning initiatives. It is important to consider the reasons for these results.

Rodriguez and Knuth (2000) suggest that effective professional development "cannot take the traditional forms of individual workshops or one-time training sessions. Instead, it must be viewed as an ongoing and integral part of teachers' professional lives." The comprehensive approach to professional development in the eLearning initiatives, including the number of days devoted to professional development, the release time, the ongoing support and the productivity required, make the use of technology a fundamental part of the participants' lives for the duration of their involvement.

Rodriguez and Knuth (2000) also state that research indicates there are a number of components essential to effective technology professional development:

> *A connection to student learning, hands-on technology use, variety of learning experiences, curriculum-specific applications, new roles for teachers, collegial learning, active participation of teachers, ongoing process, sufficient time, technical assistance and support, administrative support, adequate resources, continuous funding, and built-in evaluation.*

The design and implementation of the eLearning initiatives has included each of these components. Teacher experiences in the initiatives varied according to their role and the arrangements within their school divisions.

There are a number of indicators that the comprehensive approach to professional development within the eLearning initiatives was effective: skill levels of participants improved, as did levels of confidence and the ability to integrate technology effectively. Perceptions of barriers decreased overall, professional and classroom

use of computers increased and was more diverse, and teachers' reasons for using computers with students were more wide-ranging and broadly subscribed. Ongoing research into the impact of these or similar initiatives on teacher growth is the key to improving the way we use technology to enhance student learning.

Conclusions

Nourishing Growth was designed to explore the efficacy of involvement in extended technology-related projects. It looked specifically at effects on teacher skill level and classroom practice. While it determined that a noticeable impact on teacher skill level and meaningful implementation was made, lack of support and insufficient time in school continued to be issues.

There were a number of factors limiting potential conclusions. Fewer than 50% of those involved in the eLearning initiatives voluntarily completed both surveys, and those who chose to volunteer were not necessarily representative of the group as a whole in this year or other years. The number of teachers who completed both surveys was small. Additionally, these findings cannot necessarily be generalized to other teachers, especially because the teachers involved did not represent the "typical" Saskatchewan teacher, as evidenced by much higher initial skill levels. Continued research is necessary.

Despite the greater initial abilities of those surveyed, it is clear that the impacts of the eLearning initiatives were positive. More teachers used computers for a wider variety of tasks after completing eight months of development or online teaching, and they used computers with greater frequency in a number of different ways. In addition, as the teachers became more skilled and more confident, their computer use with their students was both greater and more varied. Following their time to learn about technology and apply that learning, teachers stated the value of technology-enhanced learning more strongly. Teacher confidence also improved. One of the teachers articulated the effect of the combined growth in skill level, frequency of use and confidence: "I have experienced such growth in my own abilities and understandings; I've been able to pass this on to my students and open more doors for them."

Growth in confidence and a willingness to pass on learning does not necessarily dictate that there was no need for support, however. This research suggested that as teachers implement technology use in their classrooms to a greater extent, their need for technical support increased, especially if their skills were newly developed. Hence, school divisions need to continue to provide technical support even for the more technically savvy. A positive element, highlighted by the research, was the fact that these same teachers provided substantial amounts of support to other teachers, even when doing so was not a part of a job description.

The survey responses revealed interesting results in terms of effective types of professional development. Of the five types listed in the survey, three forms of professional development, time for independent learning, professional development directly related to the task and a learning session with one or more follow sessions, were applied "a lot" by over two-thirds of the respondents. All three of these types are an integral part of involvement in the eLearning initiatives. The comprehensive design of the professional development integral to the eLearning initiatives involved all of the components essential to effective technology professional development.

The strengths of professional development gains were not equally matched by a reduction in the problem of time. Lack of time at school remained a barrier for teachers involved in the eLearning initiatives. The survey respondents had a wide variety of release time allocations. Given this fact and the small number of

respondents, the effects of release time could not be reliably assessed. While lack of time remained both the greatest and the most strongly identified barrier, it was still reduced as a "significant barrier" for teachers involved in the eLearning initiatives.

The findings did establish a need for additional research in a number of areas:

1. Further research is needed into the relationship between release time and perception of time as a barrier with a larger population who has had consistent, substantial release time.

2. A further investigation of this data or similar data is needed to explore whether there is a difference in the extent of skill mastery between developers and online teachers.

3. Personally directed independent learning and task-targeted learning were found to be the most effective forms of professional development. A larger sample size should be utilized to further study and quantify these findings. Further research might also address the role of learning style in the effectiveness of professional development.

Educators surveyed in *Nourishing Growth* believed overwhelmingly that their current use of computers improved student learning. This principle can be applied to teachers and their learning about technology as easily as it can to students. A study of the eLearning initiatives reveals that effective skill building and application methods transcend age. One must conclude that the process of Web resource development or online teaching aided in the acquisition of skills, and that the skills that were essential were developed by more of the participants. In addition, these skills transferred into the classroom in the form of more varied and complex integration of technology. However, teachers continued to struggle with two of the main issues that teachers throughout the province express. The use of technology remained hampered by lack of time in school to implement and the need for a variety of additional supports. Written comments from a participant summarized both the strengths of the experience and the areas of continued concern:

> *I come from a very weak technological background and so any learning over the past couple of years has been remarkable. I have had changes in my course load in the classroom, and I teach online and so I have had to learn the basics. I am very willing to learn new technologies but I find that I am not a fast learner and I need more follow up. I feel I do not really have the support in my school I need and feel that I struggle away on my own. I have made small strides and marvel in them. I see the need for me to incorporate more and more technology into my classes but am hindered mostly by my marking load and so time to practice new skills is not there. I guess what I am saying is that I am making progress. I am proud of the progress I have made, but I have a long way to go.*

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APPENDIX A:

Beyond the Mouse and Modem Online Survey

This is a summary of the original survey without the text boxes and buttons (the original survey may be viewed at http://www.saskschools.ca/~techsurvey/). In this version, questions are stated in bold to distinguish them from potential responses.

HARDWARE

1. **How many computers are available for your students in each of these locations?** a. My own classroom, b. School library, c. Computer lab

2. **What kinds of technology resources has the school provided for your use?** a. Digital still camera, b. Data projector, c. Scanner, d. Video camera, e. A desktop computer for your own use while at school, f. A laptop computer for using both at work and at home, g. A computer printer in your room or nearby, h. Access to electronic mail from your classroom, lounge, or office, i. Modem access to the Internet from your classroom, j. High speed access to the Internet from your classroom, k. Other (text entry option)

3. **How valuable do you think the following equipment might be for your teaching, whether or not you are currently have access to it? (Essential, valuable, some value, not needed)** a. Digital still camera, b. Data projector, c. Scanner, d. Video camera, e. A desktop computer for your own use while at school, f. A laptop computer for using both at work and at home, g. A computer printer in your room or nearby, h. Access to electronic mail from your classroom, lounge, or office, i. Modem access to the Internet from your classroom, j. High speed access to the Internet from your classroom, k. Other (text entry option)

4. **For how many years, if at all, have you had a computer at your home? An Internet connection? If you don't have a computer or an Internet connection at home, please enter "0".** a. Computer at home, b. Internet at home

SOFTWARE

5. **How adequate is the supply of useful software at your school? (Excellent, very good, good, fair, poor, don't need or don't know)** a. Instructional drills, games, and tutorials, b. Computer-based information sources (e.g., CD-ROM encyclopedia and databases), c. Word processing software, d. Presentation software, e. Database and spreadsheet software, f. Drawing and paint software, g. Desktop publishing software, h. Image editing software, i. Web page authoring software, j. Audio/video editing software, k. Programming software

TECHNICAL SUPPORT

6. **How often do you need each type of support? (Weekly or more often, 1-3 times a month, seldom, not at all)** a. Technical support (e.g., hardware and software fixes), b. Planning support (e.g., incorporating technology into your lessons), c. Instructional support (e.g. technical support during the lesson and activity)

7. **How available is each type of support when you need it? (More than 75% of the time, between 51-75% of the time, between 26-50% of the time, up to 25% of the time, not available)** a. Technical support (e.g., hardware and software fixes), b. Planning support (e.g., incorporating technology into your lessons), c. Instructional support (e.g. technical support during the lesson and activity)

8. **What is the quality of support you receive? (Excellent, very good, good, fair, poor, no support received)** a. Technical support, b. Planning support, c. Instructional support

9. **How much more would you use computers in your teaching if you always received adequate support in these areas when you needed it? (Much more, more, somewhat more, no more)** a. Technical support, b. Planning support, c. Instructional support

10. **Which of the following have been a main focus for professional development for your staff in the past two years?** a. Technology related content to teach your students, b. Using technology to improve how well students work in groups or how well they conduct peer discussions, c. The mechanics of using computer technology and software, d. Integrating computers into instructional activities in your subject area, e. How to use the Web or other online activities, f. How to enable students to create multimedia presentations, g. Connecting technology skills instruction with real-world applications, h. Other, please specify (text entry option)

11. **Think about the professional development opportunities you selected in Question 10. To what degree have you been able to apply the knowledge and skills you acquired in your current teaching? If you did not select any opportunities in Question 10, please go on to Question 12. (A great deal, somewhat, not at all, not applicable)** a. Technology related content to teach your students, b. Using technology to improve how well students work in groups or how well they conduct peer discussions, c. The mechanics of using computer technology and software, d. Integrating computers into instructional activities in your subject area, e. How to use the Web or other online activities, f. How to enable students to create multimedia presentations, g. Connecting technology skills instruction with real-world applications, h. Other, as specified in question 10.

12. **Which of the following are barriers to your developing and implementing your technology knowledge, skills and abilities? (A significant barrier, a barrier, a minor barrier, not a barrier)** a. Insufficient time at school, b. Lack of personal confidence, c. Lack of quality professional development, d. Lack of interest, e. Lack of hardware, f. Lack of software, g. Lack of technical support, h. Lack of administrative support, i. Lack of vision in your school or division, j. Not viewing such development as important or necessary, k. Unsure of how to effectively implement technology in my courses

13. **I would like more information about the following online teaching strategies:** a. Direct Instruction (e.g. Mastery Lecture, Drill and Practice, Demonstrations), b. Indirect Instruction (e.g. Problem Solving, Case Studies,

Concept Mapping), c. Experiential Learning (e.g. Field Trips, Focused Imaging, Role Playing), d. Independent Study (e.g. Computer Assisted Instruction, Research Projects, Learning Contracts), e. Interactive Instruction (e.g. Debates, Brainstorming, Interviewing)

14. **Assess your current computer skills. I know how to: (Yes, somewhat, no)** a. Display the contents of the disk, b. Copy files from one disk to another, c. Install a new program on a computer, d. Put pictures into a word-processing document, f. Make a Web page, g. Put a Web page on the World Wide Web, h. Use a spreadsheet to create a chart, i. Write a computer program or macro, j. Crop a digital image, k. Scan a picture for use on a Web page or document, l. Edit a digital video, m. Use a drawing program (e.g. Paint)

15. **Assess your current Internet knowledge, skills and abilities. (Yes, somewhat, no)** a. I can list some of the critical components of a good Acceptable Use Policy and I am familiar with my school's policy; b. I can send and receive email including attachments; c. I have virus software installed on my computer and update it regularly; d. I use a ListServ, and/or am part of an online discussion group; e. I use the WWW for recreational purposes; f. I use search engines to find information; g. I search the Web using Boolean Logic search terms (e.g. +, " "); h. I understand what cookies do; i. I can download and install programs off the Internet; j. I can compress and extract files (e.g. WinZip, StuffIt); k. I can use streaming audio and video applications (e.g. RealPlayer); l. I use instant messaging/real time chat applications (e.g. ICQ, AIM, MSN Messenger); m. I use Saskatchewan Education's Evergreen Curriculum.

16. **In the class in which you (or your students) use computers the least, how often does a typical student use a computer?** 1. Less than once a week, 2. once a week, 3. 2-4 times a week, 4. daily

17. **In the class in which you (or your students) use computers the most, how often does a typical student use a computer?** 1. Less than once a week, 2. once a week, 3. 2-4 times a week, 4. daily

Think of the class in which you most often accomplish your teaching goals.

Refer to this class as you answer question 18.

18. **What objectives do you have for student computer use?** a. Mastering skills just taught, b. Remediation of skills not learned well, c. Expressing themselves in writing, d. Communicating electronically with other people, e. Finding ideas and information, f. Analyzing information, g. Presenting information to an audience, h. Improving computer skills, i. Learning to work collaboratively, j. Learning to work independently, k. Other (text entry option)

Please indicate the letters of the three objectives from above which are most important to you. (ranked 1-3, or choose not applicable)

The remaining questions refer to any of the classes that you teach.

19. **Indicate the number of lessons in this school year in which you have used the following types of software. (10+lessons, 3-9, 1-2, 0)** a. Instructional drills, games, and tutorials, b. Computer-based information sources (e.g., CD-ROM encyclopaedias and databases), c. Word processing software, d. Presentation software, e. Database and spreadsheet software, f. Drawing and paint software, g. Desktop publishing software, h. Image editing software, h. Image editing software, i. Web page authoring software, j. Audio/video editing software, k. Programming software

20. **Indicate the number of lessons in this school year in which your students have used the following Internet services. (10+lessons, 3-9, 1-2, 0)** a. Web search engine, b. E-mail, c. Audio or video, d. Online demonstrations and simulations, g. WebQuests/Treasure hunts, h. Collaborating with students in other schools, i. Publishing a Web page/Web site

21. **How do you use computers to prepare for teaching your classes or in other professional activities? I use computers to: (More often, weekly, occasionally, don not use)** a. Record or calculate student grades, b. Make handouts for students, c. E-mail parents or teachers, d. Write lesson plans or related notes, e. Get information or pictures from the Internet for use in lessons, f. Use camcorders, digital cameras, or scanners to prepare for class, g. Exchange computer files with other teachers, h. Post student work, suggestions for resources, or ideas and opinions on the Internet, i. Put lessons online

22. **How many years ago, if at all, did you first use computers in the following way? (10+ years, 6-9, 3-5, in the last 2 years, never)** a. For assigning tasks to students in your classes, b. For your own work (e.g. grading, handouts, etc), c. For other activities (e.g. personal e-mail, word processing, games)

23. **Compared to five years ago, are you using computers more frequently or less frequently in these ways? (Much more frequently now, More frequently now, stayed the same, less frequently now)** a. Trying out new software programs, b. Using computers for class preparation (e.g. handouts, overheads), c. Using computers for non-work activities, d. Professional development, e. Requiring the use of computers in student projects

24. **Evaluate the following statements about student use of computers. (True, not true, no opinion)** a. Students create better-looking products than they could do with just writing and other traditional media; b. Computers provide a welcome break for students from more routine learning activities; c. Students help one another more while doing computer work; d. Students take more initiative outside of class time; doing extra research or polishing their work; e. Students' writing quality is better when they use word processing; f. Students work harder at their assignments when they use computers; g. Having my students use computers enables me to offer more creative, student-centre assignments.

25. **Do you believe your current use of technology actually improves student learning?** A great deal, generally, not at all, not applicable

26. **In general, what is your opinion of each of the following statements? (True, not true, no opinion)** a. Computers are too unpredictable—they "crash", or the software doesn't work correctly; b. Computers are hard to figure out how to use; c. Many students use computers in order to avoid doing more important schoolwork; d. Many students are not careful enough with this expensive equipment; e. It is difficult to integrate computer activities into most of my regular lesson plans; f. Often too many students need my help at the same time; g. Students often get so wound up, I can't get them to settle down afterwards; h. A teacher has to give up too much instructional responsibility to the computer software—I feel I'm not really "teaching"; i. Students can cheat more easily; copying work and turning it in as their own.

GENERAL INFORMATION

27. **Please indicate all of the grade levels that you currently teach:** K-2, 3-5,6-7, 8-9, 10-12, other (Administration, Guidance, etc.)

28. **Please select all of the subjects that you currently teach:** All subjects in a grade, mathematics, sciences, social sciences, language arts, fine arts, languages, physical education, vocational education, computers, special education, other (text entry option)

29. **Your main assignment at the school would be considered:** Regular full-time teacher, regular part-time teacher, itinerant, long-term substitute, administration, other (text entry option)

30. **As of the completion of the 2001-2002 school year, how many years of teaching experience will you have?** 1, 2, 3, 4, 5, 6-10, 11-15, 16-20, 21-25, more than 25

31. **What is the total number of individual students you teach?** Numerical options

32. **What is your average class size?** Numerical options

33. **In which of these settings do you teach?** Urban, rural, reserve

34. **Who funds the school in which you teach?** Public system, separate system, federal system, private school

35. **Do you teach in a northern community?** Yes, no

36. **Your age** Numerical options

37. **Gender** F. M

38. **School Division** Select from a list of divisions

APPENDIX B:

Nourishing Growth Online Pre-Survey

This is a summary of the original survey without the text boxes and buttons (the original survey may be viewed at http://www.saskschools.ca/~techpd/). In this version, questions are stated in bold to distinguish them from potential responses.

TECHNOLOGY TOOL ACCESS

1. **In the classroom in which you most often teach, do you have a computer that functions adequately for your needs?** a. yes; b. no
2. **In the classroom in which you most often teach, how many computers that function adequately are available for your students?** a. 0; b. 1; c. 2; d. 3; e. 4; f. 5; g. 6-10; h. 11-15; i. 16-20; j. 21+
3. **How often, if ever, does the inaccessibility of computers affect your use of computers with your students?** a. always; b. most of the time; c. often; d. sometimes; e. rarely; f. never; g. I never use computers

TECHNICAL SUPPORT

4. **How often do you need each type of support? (Weekly or more often, 1-3 times a month, seldom, not at all)** a. Technical support (e.g., hardware and software fixes), b. Planning support (e.g., incorporating technology into your lessons), c. Instructional support (e.g. technical support during the lesson and activity)
5. **How available is each type of support when you need it? (More than 75% of the time, between 51-75% of the time, between 26-50% of the time, up to 25% of the time, not available)** a. Technical support (e.g., hardware and software fixes), b. Planning support (e.g., incorporating technology into your lessons), c. Instructional support (e.g. technical support during the lesson and activity)
6. **What is the quality of support you receive? (Excellent, very good, good, fair, poor, no support received)** a. Technical support, b. Planning support, c. Instructional support
7. **How much more would you use computers in your teaching if you always received adequate support in these areas when you needed it? (Much more, more, somewhat more, no more, I always receive adequate support)** a. Technical support, b. Planning support, c. Instructional support
8. **Do you provide technical support to your colleagues?** a. yes; it is part of my job description; b. yes; but it is not part of my job description; c. no
9. **Do you provide planning support to your colleagues?** a. yes; it is part of my job description; b. yes; but it is not part of my job description; c. no

10. **Do you provide instructional support to your colleagues?** a. yes; it is part of my job description; b. yes; but it is not part of my job description; c. no

Professional Development

11. **Which of the following have been a main focus for professional development for your staff in the past two years?** a. Technology related content to teach your students, b. Using technology to improve how well students work in groups or how well they conduct peer discussions, c. The mechanics of using computer technology and software, d. Integrating computers into instructional activities in your subject area, e. How to use the Web or other online activities, f. How to enable students to create multimedia presentations, g. Connecting technology skills instruction with real-world applications, h. Other, please specify (text entry option)

12. **Select all of the forms of professional development regarding technology you have had during the 2002-2003 school year. (I have had this form of PD)** a. A one-time learning session on a software package or on hardware; b. A learning session with one or more follow up sessions; c. A learning session with follow up technical or instructional support; d. Learning regarding technology on my own time; e. Professional developments sessions to support online teaching or Web-based learning resource development; f. None; g. Other, please specify (text entry option)

13. **Using the types of professional development discussed in question 12, rate how much you have applied each type (a lot, some, a little, not at all, I did not have this form of PD).** a. A one-time learning session on a software package or on hardware; b. A learning session with one or more follow up sessions; c. A learning session with follow up technical or instructional support; d. Learning regarding technology on my own time; e. Professional developments sessions to support online teaching or Web-based learning resource development; f. None; g. Other, as indicated in Question #12.

14. **How much release time or preparation time were you given during the 2002-2003 school year to apply specifically to your technology learning?** a. does not apply; b. No release time or preparation; c. less than 5%; d. between 5% and 9%; e. between 10% and 14%; f. between 15% and 19%; g. between 20% and 24%; h. between 25% and 29%; i. between 30% and 39%; j. between 40% and 49%; k. between 50% and 59%; l. between 60% and 69%; m. between 70% and 79%; n. between 80% and 89%; o. between 90% and 99%; p. 100%

Personal Technology Knowledge, Skills, Abilities, and Use

15. **Assess your current computer skills. I know how to: (Yes, and I could teach others to do this, Yes, somewhat, no, I cannot do this at all)** a. Display the contents of the disk, b. Copy files from one disk to another, c. Install a new program on a computer, d. Select the appropriate printer for printing; e. Customize my desktop; f. Change the display settings of my computer (eg. change from 800 x 600 to 1024 x 768); g. Set up a password on my computer; h. Locate my files in my computer file hierarchy; i. Understand when I am saving files where on my computer I am saving

them; j. Scan a picture for use on a Web page or document; k. Crop a digital image; l. Put pictures into a word-processing document, m. Prepare a slide show using presentation software, n. Use a spreadsheet to create a chart, o. Use a drawing program (e.g. Paint), p. Edit a digital video, q. Create graphics in a graphics program, r. Optimize a graphic (reduce file size) in a graphics program, s. Create a functional Web page using "hand coding" (html), t. Create a functional Web page using an html editor (e.g. Dreamweaver, FrontPage, Netscape Composer, etc.), u. Create interactive questions in a Web page (e.g. using CourseBuilder or FLASH, etc.), v. Embed audio in a Web page, w. Embed video in a Web page, x. Create animations for the Web, y. Put a Web page on the World Wide Web (FTP), z. Write a computer program or macro.

16. **Assess your current Internet knowledge, skills and abilities. (Yes, somewhat, no)** a. I can list some of the critical components of a good Acceptable Use Policy and I am familiar with my school's policy; b. I can send and receive email including attachments; c. I have virus software installed on my computer and update it regularly; d. I use a ListServ, and/or am part of an online discussion group; e. I use the WWW for recreational purposes; f. I use search engines to find information; g. I search the Web using Boolean Logic search terms (e.g. +, " "); h. I understand what cookies do; i. I can download and install programs off the Internet; j. I can compress and extract files (e.g. WinZip, StuffIt); k. I can use streaming audio and video applications (e.g. RealPlayer); l. I use instant messaging/real time chat applications (e.g. ICQ, AIM, MSN Messenger); m. I use Saskatchewan Education's Evergreen Curriculum, n. I have firewall software installed on my computer and update it regularly.

17. **Which of the following are barriers to your developing and implementing your technology knowledge, skills and abilities? (A significant barrier, a barrier, a minor barrier, not a barrier)** a. Insufficient time at school, b. Lack of personal confidence, c. Lack of knowledge d. Lack of quality professional development, e. Lack of interest, f. Lack of hardware, g. Lack of software, h. Lack of technical support, i. Lack of administrative support, j. Lack of vision in your school or division, k. Not viewing such development as important or necessary, l. Unsure of how to effectively implement technology in my courses, m. Technical limitations imposed by the school or school division technology policy, n. Computers and/or computer labs are not available when I need them, o. Distrust of the Internet, p. Other academic or job requirements prevent me from spending time on technology, q. Community expectations, r. Student behaviour.

18. **During the 2002-2003 school year, how often did you use a computer to (more often than weekly, weekly, occasionally, not at all)** a. To locate and engage in technology-based opportunities for Professional Development and lifelong learning, like distance education, b. To locate and evaluate information from a variety of sources about teaching and learning with technology, c. To maintain an awareness and understanding of current and emergent technologies, d. To collect and analyze data, interpret results, and communicate findings to improve your own teaching practice and enhance student learning, e. To communicate and collaborate with peers, parents, and students, f. To analyze, interpret, and communicate student performance, g. To manage and communicate information, h. To find information and/or images for instructional purposes, i. To prepare lessons, activites, and handouts for students, j. To put lessons online, k. To create/update a Web site(s), l. To post student work on the World Wide Web, m. For recreational purposes, including communication with family or friends.

19. **How often did you use each of the following technology tools in your teaching during the 2002-2003 school year? (Daily, Frequently, Sometimes, Never, This technology tool was not available for my use)** a. Graphing calculator, b. Data collection probe, c. Digital still camera, d. Digital video camera, e. Web cam, f. Recorder (handheld/digital), g. Scanner, h. VCR, i. Overhead projector, j. Data projector, k. Interactive white board (e.g. Smart Board), l. Computer, m. Portable computer keyboard (e.g. AlphaSmart), n. Graphic tablet, o. CD burner, p. Printer, q. Sound mixing board, r. Video editing suite, s. Theatre lighting board, t. E-mail, u. The World Wide Web, v. Personal digital assistant, w. Other; please specify (text entry option).

20. **During the 2002-2003 school year, to what degree have you (a lot, some, a little, not at all)** a. Used technology to meet the unique needs of students, b. Planned and implemented learning activities that integrated technology use to enhance student academic achievement and technology proficiency, c. Offered learner-centred activities that encouraged self-directed student learning., d. Offered learning activities in which students used technology resources to solve authentic problems, e. Planned, implemented, and assessed technology-based learning activities that promoted student engagement in higher order thinking skills and creation of original products, f. Acknowledged students' technology knowledge, skills, and abilities and provide them with opportunities to share their expertise, g. Modeled and taught legal and ethical technology use.

21. **How important were computers in your teaching in each of the past three school years?** (Very important, moderately important, minor importance, I did not use computers in my teaching) a. 2000-2001, b. 2001-2002, c. 2002-2003.

22. **During the 2002-2003 school year, what objectives have you had for student computer use? (yes, no)** a. Mastering skills just taught, b. Remediation of skills not learned well, c. Enrichment d. Expressing themselves in writing, e. Expressing themselves using graphics, f. Communicating electronically with other people, g. Finding ideas and information, h. Analyzing information, i. Evaluating information for validity, accuracy, relevance, comprehensiveness, or bias j. Processing data and reporting results, k. Disseminating information. l. Presenting information to an audience, m. Improving computer skills, n. Learning to work collaboratively, o. Learning to work independently, p. Aiding the development of a positive attitude toward technology, q. Practicing responsible use of technology, r. Promoting creativity, s. Other (text entry option)

Computer Use with Students

23. **Indicate the number of lessons in the 2002-2003 school year in which you had your students do the following. Combine all of your classes when identifying the number of lessons . (10+lessons, 3-9, 1-2, 0)** a. Use word processing software, b. Create documents using desktop publishing software, c. Use presentation software (e.g. PowerPoint), d. Edit/crop a digital image, e. Optimize a ditigal image, f. Scan a picture, g. Film digital video, h. Edit digital video, i. Create/edit audio files, j. Use a drawing/paint program, k. Use a data collection probe, l. Use a graphic calculator, m. Create a Web page using hand coding, n. Create a Web page using an html editor (FrontPage, Dreamweaver, Netscape Compose, etc.), o. Make the Web page/site available on the WWW (via FTP, etc.), p. Use database or spreadsheet software, q. Use a statistics program to analyze data, r. Write a computer program or macro, s. Use e-mail,

t. Use search engines to find information, u. Search the Web using advanced search methods/Boolean Logic search terms (e.g. +, " "), v. Use instant messaging/real time chat applications (e.g. ICQ, AIM, MSN, Messenger, software in a Course Management Tool), w. Participate in online threaded discussion forums, x. Use multimedia resources, y. Use WebQuests/Treasure hunts, z. Use online demonstrations and simulations, aa. Collaborate with students in other schools electronically, bb. Create/add to an electronic portfolio of original technology-based products, cc. Use instructional drills, games, and tutorials, dd. Use computer-based information sources (e.g., CD-ROM encyclopedias and databases.

24. **Over the course of the 2002-2003 school year, how many hours of class time would the class in which you used computers the most have utilized computers?** a. 0 hours, b. 1-10 hours, c. 11-25 hours, d. 26-50 hours, e. more than 50 hours.

25. **Evaluate the following statements about student use of computers (true, not true, no opinion)** a. Students create better-looking products than they could do with just writing and other traditional media; b. Computers provide a welcome break for students from more routine learning activities; c. Students help one another more while doing computer work; d. Students take more initiative outside of class time; doing extra research or polishing their work; e. Students' writing quality is better when they use word processing; f. Students work harder at their assignments when they use computers; g. Having my students use computers enables me to offer more creative, student-centre assignments.

26. **Do you believe your use of technology during the 2002-2003 school year actually improved student learning?** a. a great deal, b. generally, c. somewhat, d. not at all

27. **In general, what is your opinion of each of the following statements? (True, not true, no opinion)** a. Computers are too unpredictable—they "crash", or the software doesn't work correctly; b. Computers are hard to figure out how to use; c. Many students use computers in order to avoid doing more important schoolwork; d. Many students are not careful enough with this expensive equipment; e. It is difficult to integrate computer activities into most of my regular lesson plans; f. Often too many students need my help at the same time; g. Students often get so wound up, I can't get them to settle down afterwards; h. A teacher has to give up too much instructional responsibility to the computer software—I feel I'm not really "teaching"; i. Students can cheat more easily; copying work and turning it in as their own.

General Information

28. **I have been or am a WBLRD developer for which of the following? (Please select all that apply.)** 2000-2001, 2001-2002, 2002-2003, 2003-2004.

29. **I have been or am a Central iSchool online teacher for which of the following?** Please select all that apply. 2001-2002, 2002-2003, 2003-2004.

30. **In which of these settings was your school or office located for the 2002-2003 school year?** a. town with a population under 250, b. town with a population from 250-999, c. town with a population from 1000-4999, d. city with a population from 5000-49 999, e. city with a population from 50 000-99 999, f. city with population over 100 000, g. Reserve, h. Hutterite colony, i. other

31. **Your main assignment for the 2002-2003 school year would have been considered:** a. regular full-time teacher, b. regular part-time teacher, c. Itinerant teacher, d. Online teacher, e. Web-based resource developer, f. administration, g. technology co-ordinator/support, h. other.

32. **As of the completion of the 2002-2003 school year, how many years of teaching experience did you have?** a. 0 years, b. less than 1 year, c. 1 year, d. 2 years, e. 3 years, f. 4 years, g. 5 years, h. 6-10 years, i. 11-15 years, j. 16-20 years, k. 21-25 years, l. more than 25 years.

33. **Your gender is:** male, female

For purposes of matching initial and follow-up surveys to determine changes, please answer the following question:

34. **What is your mother's maiden name?**

APPENDIX C:

Nourishing Growth Online Post-Survey

This is a summary of the original survey without the text boxes and buttons (the original survey may be viewed at (http://www.saskschools.ca/~techsurvey/). In this version, questions are stated in bold to distinguish them from potential responses.

TECHNOLOGY TOOL ACCESS

1. **In the classroom in which you most often teach, do you have a computer that functions adequately for your needs?** a. yes; b. no
2. **In the classroom in which you most often teach, how many computers that function adequately are available for your students?** a. 0; b. 1; c. 2; d. 3; e. 4; f. 5; g. 6-10; h. 11-15; i. 16-20; j. 21+
3. **How often, if ever, does the inaccessibility of computers affect your use of computers with your students?** a. always; b. most of the time; c. often; d. sometimes; e. rarely; f. never; g. I never use computers

TECHNICAL SUPPORT

4. **How often do you need each type of support? (Weekly or more often, 1-3 times a month, seldom, not at all)** a. Technical support (e.g., hardware and software fixes), b. Planning support (e.g., incorporating technology into your lessons), c. Instructional support (e.g. technical support during the lesson and activity)
5. **How available is each type of support when you need it? (More than 75% of the time, between 51-75% of the time, between 26-50% of the time, up to 25% of the time, not available)** a. Technical support (e.g., hardware and software fixes), b. Planning support (e.g., incorporating technology into your lessons), c. Instructional support (e.g. technical support during the lesson and activity)
6. **What is the quality of support you receive? (Excellent, very good, good, fair, poor, no support received)** a. Technical support, b. Planning support, c. Instructional support
7. **How much, if any, more would you use computers in your teaching if you always received adequate support in these areas when you needed it? (Much more, more, somewhat more, no more, I always receive adequate support)** a. Technical support, b. Planning support, c. Instructional support
8. **Do you provide technical support to your colleagues?** a. yes; it is part of my job description; b. yes; but it is not part of my job description; c. no
9. **Do you provide planning support to your colleagues?** a. yes; it is part of my job description; b. yes; but it is not part of my job description; c. no

10. **Do you provide instructional support to your colleagues?** a. yes; it is part of my job description; b. yes; but it is not part of my job description; c. no

11. **How often have you needed technical support during the 2003-2004 school year?** weekly or more often, 1-3 times a month, seldom, not at all

12. **What is the quality of the support you have received?** Excellent, very good, good, fair, poor, no support received

PROFESSIONAL DEVELOPMENT

13. **Which of the following have been a main focus for professional development for your staff in the past two years?** a. Technology related content to teach your students, b. Using technology to improve how well students work in groups or how well they conduct peer discussions, c. The mechanics of using computer technology and software, d. Integrating computers into instructional activities in your subject area, e. How to use the Web or other online activities, f. How to enable students to create multimedia presentations, g. Connecting technology skills instruction with real-world applications, h. Other, please specify (text entry option)

14. **Select all of the forms of professional development regarding technology you have had during the 2002-2003 school year. (I have had this form of PD)** a. A one-time learning session on a software package or on hardware; b. A learning session with one or more follow up sessions; c. A learning session with follow up technical or instructional support; d. Learning regarding technology on my own time; e. Professional developments sessions to support online teaching or Web-based learning resource development; f. None; g. Other, please specify (text entry option)

15. **Using the types of professional development discussed in question 12, rate how much you have applied each type (a lot, some, a little, not at all, I did not have this form of PD).** a. A one-time learning session on a software package or on hardware; b. A learning session with one or more follow up sessions; c. A learning session with follow up technical or instructional support; d. Learning regarding technology on my own time; e. Professional developments sessions to support online teaching or Web-based learning resource development; f. None; g. Other, as indicated in Question #12.

16. **How much release time or preparation time were you given during the 2002-2003 school year to apply specifically to your technology learning? (This includes any and all release/preparation time for WBLRD development and/or online teaching.)** a. does not apply; b. No release time or preparation; c. less than 5%; d. between 5% and 9%; e. between 10% and 14%; f. between 15% and 19%; g. between 20% and 24%; h. between 25% and 29%; i. between 30% and 39%; j. between 40% and 49%; k. between 50% and 59%; l. between 60% and 69%; m. between 70% and 79%; n. between 80% and 89%; o. between 90% and 99%; p. 100%

Personal Technology Knowledge, Skills, Abilities, and Use

17. **Assess your current computer skills. I know how to: (Yes, and I could teach others to do this, Yes, somewhat, no, I cannot do this at all)** a. Display the contents of the disk, b. Copy files from one disk to another, c. Install a new program on a computer, d. Select the appropriate printer for printing; e. Customize my desktop; f. Change the display settings of my computer (eg. change from 800 x 600 to 1024 x 768); g. Set up a password on my computer; h. Locate my files in my computer file hierarchy; i. Understand when I am saving files where on my computer I am saving them; j. Scan a picture for use on a Web page or document; k. Crop a digital image; l. Put pictures into a word-processing document, m. Prepare a slide show using presentation software, n. Use a spreadsheet to create a chart, o. Use a drawing program (e.g. Paint), p. Edit a digital video, q. Create graphics in a graphics program, r. Optimize a graphic (reduce file size) in a graphics program, s. Create a functional Web page using "hand coding" (html), t. Create a functional Web page using an html editor (e.g. Dreamweaver, FrontPage, Netscape Composer, etc.), u. Create interactive questions in a Web page (e.g. using CourseBuilder or FLASH, etc.), v. Embed audio in a Web page, w. Embed video in a Web page, x. Create animations for the Web, y. Put a Web page on the World Wide Web (FTP), z. Write a computer program or macro.

18. **Assess your current Internet knowledge, skills and abilities. (Yes, somewhat, no)** a. I can list some of the critical components of a good Acceptable Use Policy and I am familiar with my school's policy; b. I can send and receive email including attachments; c. I have virus software installed on my computer and update it regularly; d. I use a ListServ, and/or am part of an online discussion group; e. I use the WWW for recreational purposes; f. I use search engines to find information; g. I search the Web using Boolean Logic search terms (e.g. +, " "); h. I understand what cookies do; i. I can download and install programs off the Internet; j. I can compress and extract files (e.g. WinZip, StuffIt); k. I can use streaming audio and video applications (e.g. RealPlayer); l. I use instant messaging/real time chat applications (e.g. ICQ, AIM, MSN Messenger); m. I use Saskatchewan Education's Evergreen Curriculum, n. I have firewall software installed on my computer and update it regularly.

19. **Which of the following are barriers to your developing and implementing your technology knowledge, skills and abilities? (A significant barrier, a barrier, a minor barrier, not a barrier)** a. Insufficient time at school, b. Lack of personal confidence, c. Lack of knowledge d. Lack of quality professional development, e. Lack of interest, f. Lack of hardware, g. Lack of software, h. Lack of technical support, i. Lack of administrative support, j. Lack of vision in your school or division, k. Not viewing such development as important or necessary, l. Unsure of how to effectively implement technology in my courses, m. Technical limitations imposed by the school or school division technology policy, n. Computers and/or computer labs are not available when I need them, o. Distrust of the Internet, p. Other academic or job requirements prevent me from spending time on technology, q. Community expectations, r. Student behaviour, s. Limitations imposed by school and/or school division security policies

20. **During the 2002-2003 school year, how often did you use a computer to (more often than weekly, weekly, occasionally, not at all)** a. To locate and engage in technology-based opportunities for Professional Development and

lifelong learning, like distance education, b. To locate and evaluate information from a variety of sources about teaching and learning with technology, c. To maintain an awareness and understanding of current and emergent technologies, d. To collect and analyze data, interpret results, and communicate findings to improve your own teaching practice and enhance student learning, e. To communicate and collaborate with peers, parents, and students, f. To analyze, interpret, and communicate student performance, g. To manage and communicate information, h. To find information and/or images for instructional purposes, i. To prepare lessons, activites, and handouts for students, j. To put lessons online, k. To create/update a Web site(s), l. To post student work on the World Wide Web, m. For recreational purposes, including communication with family or friends.

21. **How often did you use each of the following technology tools in your teaching during the 2002-2003 school year? (Daily, Frequently, Sometimes, Never, This technology tool was not available for my use)** a. Graphing calculator, b. Data collection probe, c. Digital still camera, d. Digital video camera, e. Web cam, f. Recorder (handheld/digital), g. Scanner, h. VCR, i. Overhead projector, j. Data projector, k. Interactive white board (e.g. Smart Board), l. Computer, m. Portable computer keyboard (e.g. AlphaSmart), n. Graphic tablet, o. CD burner, p. Printer, q. Sound mixing board, r. Video editing suite, s. Theatre lighting board, t. E-mail, u. The World Wide Web, v. Personal digital assistant, w. Other; please specify (text entry option).

22. **During the 2002-2003 school year, to what degree have you (a lot, some, a little, not at all)** a. Used technology to meet the unique needs of students, b. Planned and implemented learning activities that integrated technology use to enhance student academic achievement and technology proficiency, c. Offered learner-centred activities that encouraged self-directed student learning., d. Offered learning activities in which students used technology resources to solve authentic problems, e. Planned, implemented, and assessed technology-based learning activities that promoted student engagement in higher order thinking skills and creation of original products, f. Acknowledged students' technology knowledge, skills, and abilities and provide them with opportunities to share their expertise, g. Modeled and taught legal and ethical technology use.

23. **How important were computers in your teaching in each of the past three school years?** (Very important, moderately important, minor importance, I did not use computers in my teaching) a. 2000-2001, b. 2001-2002, c. 2002-2003.

24. **During the 2002-2003 school year, what objectives have you had for student computer use?** (yes, no) a. Mastering skills just taught, b. Remediation of skills not learned well, c. Enrichment d. Expressing themselves in writing, e. Expressing themselves using graphics, f. Communicating electronically with other people, g. Finding ideas and information, h. Analyzing information, i. Evaluating information for validity, accuracy, relevance, comprehensiveness, or bias j. Processing data and reporting results, k. Disseminating information. l. Presenting information to an audience, m. Improving computer skills, n. Learning to work collaboratively, o. Learning to work independently, p. Aiding the development of a positive attitude toward technology, q. Practicing responsible use of technology, r. Promoting creativity, s. Other (text entry option)

COMPUTER USE WITH STUDENTS

25. **Indicate the number of lessons in the 2002-2003 school year in which you had your students do the following. Combine all of your classes when identifying the number of lessons . (10+lessons, 3-9, 1-2, 0)** a. Use word processing software, b. Create documents using desktop publishing software, c. Use presentation software (e.g. PowerPoint), d. Edit/crop a digital image, e. Optimize a ditigal image, f. Scan a picture, g. Film digital video, h. Edit digital video, i. Create/edit audio files, j. Use a drawing/paint program, k. Use a data collection probe, l. Use a graphic calculator, m. Create a Web page using hand coding, n. Create a Web page using an html editor (FrontPage, Dreamweaver, Netscape Compose, etc.), o. Make the Web page/site available on the WWW (via FTP, etc.), p. Use database or spreadsheet software, q. Use a statistics program to analyze data, r. Write a computer program or macro, s. Use e-mail, t. Use search engines to find information, u. Search the Web using advanced search methods/Boolean Logic search terms (e.g. +, " "), v. Use instant messaging/real time chat applications (e.g. ICQ, AIM, MSN, Messenger, software in a Course Management Tool), w. Participate in online threaded discussion forums, x. Use multimedia resources, y. Use WebQuests/Treasure hunts, z. Use online demonstrations and simulations, aa. Collaborate with students in other schools electronically, bb. Create/add to an electronic portfolio of original technology-based products, cc. Use instructional drills, games, and tutorials, dd. Use computer-based information sources (e.g., CD-ROM encyclopedias and databases.

26. **Over the course of the 2002-2003 school year, how many hours of class time would the class in which you used computers the most have utilized computers?** a. 0 hours, b. 1-10 hours, c. 11-25 hours, d. 26-50 hours, e. more than 50 hours.

27. **Evaluate the following statements about student use of computers (true, not true, no opinion)** a. Students create better-looking products than they could do with just writing and other traditional media; b. Computers provide a welcome break for students from more routine learning activities; c. Students help one another more while doing computer work; d. Students take more initiative outside of class time; doing extra research or polishing their work; e. Students' writing quality is better when they use word processing; f. Students work harder at their assignments when they use computers; g. Having my students use computers enables me to offer more creative, student-centre assignments.

28. **Do you believe your use of technology during the 2002-2003 school year actually improved student learning?** a. a great deal, b. generally, c. somewhat, d. not at all

29. **In general, what is your opinion of each of the following statements? (True, not true, no opinion)** a. Computers are too unpredictable—they "crash", or the software doesn't work correctly; b. Computers are hard to figure out how to use; c. Many students use computers in order to avoid doing more important schoolwork; d. Many students are not careful enough with this expensive equipment; e. It is difficult to integrate computer activities into most of my regular lesson plans; f. Often too many students need my help at the same time; g. Students often get so wound up, I can't get them to settle down afterwards; h. A teacher has to give up too much instructional responsibility to the computer software—I feel I'm not really "teaching"; i. Students can cheat more easily; copying work and turning it in as their own.

30. **How much, if any, has your current involvement with WBLRD and/or online teaching affected the degree of technology integration in your teaching?** Not at all, Somewhat, A good deal, A great deal

Please use the text box to provide more information about how your involvement has affected your technology integration. Be specific and provide examples, if possible.

General Information

31. **I have been or am a WBLRD developer for which of the following?** (Please select all that apply.) 2000-2001, 2001-2002, 2002-2003, 2003-2004.

32. **If you have been a WBLRD developer, to what extent were you responsible for the actual Web page development in the project in each of the following years (2000-2001, 2001-2002, 2002-2003, 2003-2004)** a. I was not a WBLRD developer in this year, b. complete responsibility, c. shared responsibility, d. minimal responsibility, e. I supplied ideas while my partner(s) created the Web pages.

33. **I have been or am a Central iSchool online teacher for which of the following?** Please select all that apply. 2001-2002, 2002-2003, 2003-2004.

34. **In which of these settings was your school or office located for the 2002-2003** school year? a. town with a population under 250, b. town with a population from 250-999, c. town with a population from 1000-4999, d. city with a population from 5000-49 999, e. city with a population from 50 000-99 999, f. city with population over 100 000, g. Reserve, h. Hutterite colony, i. other

35. **Your main assignment for the 2002-2003 school year would have been considered:** a. regular full-time teacher, b. regular part-time teacher, c. Itinerant teacher, d. Online teacher, e. Web-based resource developer, f. administration, g. technology co-ordinator/support, h. other.

36. **As of the completion of the 2002-2003 school year, how many years of teaching experience did you have?** a. 0 years, b. less than 1 year, c. 1 year, d. 2 years, e. 3 years, f. 4 years, g. 5 years, h. 6-10 years, i. 11-15 years, j. 16-20 years, k. 21-25 years, l. more than 25 years.

37. **Your gender is:** male, female

For purposes of matching initial and follow-up surveys to determine changes, please answer the following question:

38. **What is your mother's maiden name?**

2317 Arlington Avenue
Saskatoon SK Canada S7J 2H8
Phone: 306-373-1660
Toll Free: 1-800-667-7762
Fax: 306-374-1122
E-mail: mcdowell@stf.sk.ca

www.mcdowellfoundation.ca