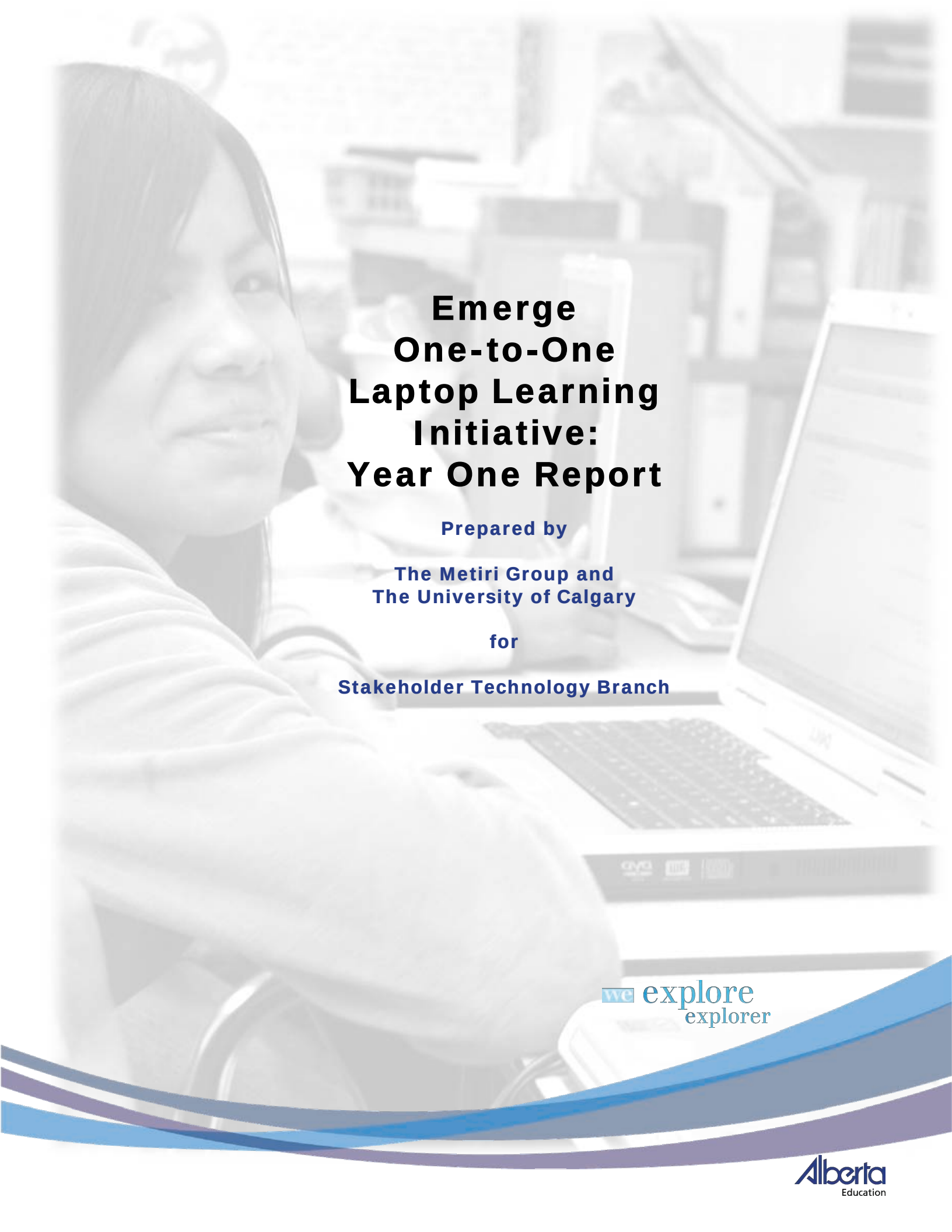

Emerge One-to-One Laptop Learning Initiative: Year One Report

Prepared by

The Metiri Group and
The University of Calgary

for

Stakeholder Technology Branch

explore explorer

Alberta Education

Emerge One-to-One Laptop Learning Initiative: Year One Report

This document is available on the internet at:
http://education.alberta.ca/admin/technology/emerge-one-to-one.aspx

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Executive Summary

The Emerge One-to-One Laptop Learning Project (Emerge) was established in 2006 by Alberta Education to investigate the efficacy of wireless computing for learning and teaching. In 2007, the Alberta provincial government awarded 3-year grants to 20 Alberta jurisdictions. Based on the projections in the awardees' applications, the project anticipated impacting 2,502 students, 173 teachers, and 47 administrators within 50 schools in the 20 Alberta jurisdictions.

This Year 1 Interim report represents initial baseline data from the 2007-08 school year, plus some limited spring 2008 follow-ups. The baseline data included educator surveys, student surveys, point-of-contact surveys, site visitations, and observations from the provincial community of practice and summer events. The spring follow-ups included point-of-contact surveys, student engagement surveys with only those students not continuing into year 2, and site visitations in all 20 jurisdictions.

The Emerge evaluation is intended to answer the following research questions:

1. What are the potential educational benefits of one-to-one laptop learning?
2. What are the technical merits and innovative practices in one-to-one wireless learning?
3. What expertise, experience and lessons learned have come from the Emerge One-to-One Laptop Learning Project in Alberta?
4. What is the level of jurisdictional and provincial readiness for systemically advancing 21st Century Learning and effective uses of technology in learning?
5. What are the trends and/or variances across indicators over time?

While it is too early in the project to answer completely the 5 research questions, findings have emerged from the baseline data. This initial report is focused on question 4, the jurisdictional and provincial readiness for systemically advancing 21st Century Learning and effective uses of technology in learning. Readiness is defined as the alignment of 7 interdependent dimensions within the education system related to 21st Century Learning and educational technology:

1. **Forward Looking, Shared Vision.** Does the jurisdiction have a forward-thinking shared vision with strong commitment on the part of students, educators, and community?
2. **Systems Thinking.** Has the jurisdiction aligned policies, procedures, and funding in support of achieving the vision?
3. **21st Century Skills and Instructional Approaches.** Has the jurisdiction redesigned learning to focus on 21st Century Skills, in the context of the academics?
4. **21st Century Learning Environment.** Has the jurisdiction established learning environments and learning cultures that integrate 21st Century Skills, academics, high tech tools, and emergent research from the learning sciences?

5. **Educator Proficiency with 21C Learning.** Are educators in the jurisdiction proficient in designing, implementing, and evaluating 21st Century Learning in practice?
6. **Access and Infrastructure.** Do students and educators have high-quality access to the Internet and other communication networks sufficient to achieve their learning and teaching goals?
7. **Accountability/Results.** Has the jurisdiction established and implemented metrics for evaluating 21st Century Learning? Is the jurisdiction using the results to ensure continuous improvement by students through more effective school projects?

The following chart provides data from the educator surveys as to the baseline level of readiness across the 20 jurisdictional Emerge projects.

Figure 1: Baseline Readiness Scores

n = 108 Teachers and 46 Administrators

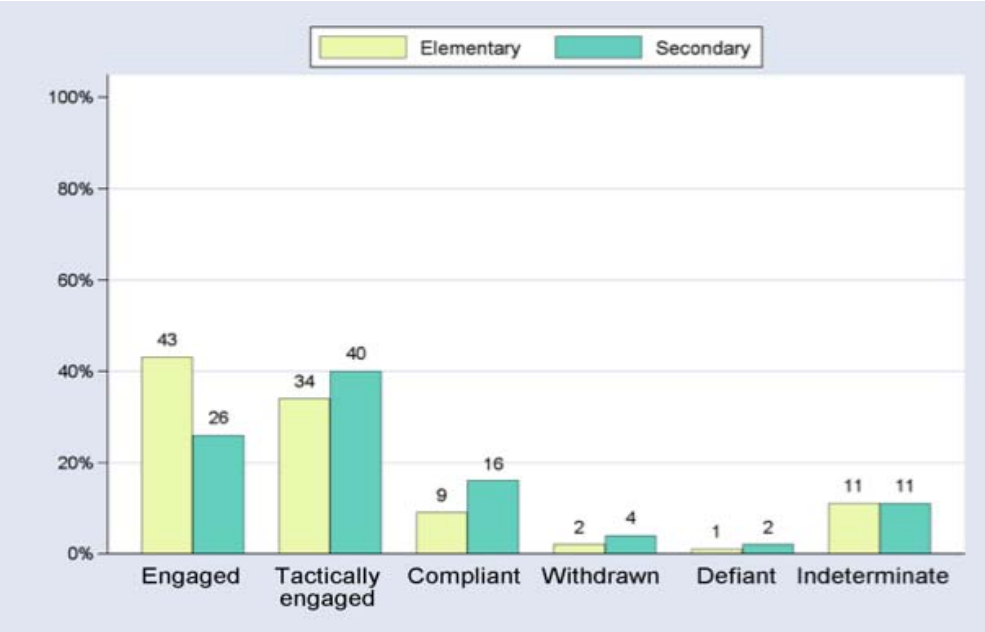
Awareness		Exploration		Scaling Up		Systemic	
1	2	3	4	5	6	7	8

All jurisdictions and the provincial government were provided individualized reports on the baseline data from 2007-2008 on these 7 interdependent factors of readiness as well as data from their student engagement surveys, student self-directed learning surveys, and data from site visitations.

It has been the researchers' experience that school systems that engage in high tech, 21st Century Learning do not show growth equally in all the Dimensions. Typically, Dimension 4 (Learning Environment) and Dimension 7 (Accountability) do not increase until the scores in all other Dimensions are fairly high. The relatively high baseline scores across the 20 jurisdictions in Dimensions 1, 2, and 6 suggest that this project has a fairly high probability of early success. Alberta Education has improved the potential for growth by establishing and supporting a Community of Practice (CoP) structure to advance professional learning among Emerge participants. Through that CoP structure Emerge educators learn, share successes and lessons learned, jointly tackle issues, and celebrate successes.

The evaluators have established baseline data for Emerge students related to their levels of self-directed learning, their engagement in learning, and their perceptions of the efficacy of the classrooms they attend to engage them and their fellow classmates in 21st Century Learning. Baseline engagement data are represented in Figure 2.

Figure 2: Baseline Engagement Levels of Emerge Students (2007-2008)



Definitions:

Engaged: Intrinsically motivated to learn

Engaged: Extrinsically motivated to learn

Compliant: Low Commitment to learning

Withdrawn: No Commitment to learning

Defiant: Diverted Attention from learning

n=948 elementary students (Grades 3-6) and 773 secondary students (Grades 7-12)

The key findings listed below represent a summary of the Year 1 baseline and spring data analyses from the educator and student surveys and the 2 site visits to each of the 20 jurisdictions.

Table 1: Year One Findings and Recommendations

Dimensions	Year 1 Baseline Findings
Forward Looking, Shared Vision	**Finding 1a**. The vision for laptop learning within the Emerge project is evolving as participating administrators, teachers, and students explore more high tech, authentic approaches to 21st Century teaching and learning. Generally, support for the laptop for learning projects is strong among students, educators, and parents.
Systems Thinking	**Finding 2a.**The Emerge jurisdictions recognize the need to shift policies and practices that fully leverage the use of the laptops for 21st Century learning and deeper learning. Supportive policies, programs, and support structures are emerging, but will require innovative leadership at all levels.
21st Century Skills and Instructional Approaches	**Finding 3a**. While the specific skills included in each Emerge project are locally determined, three key 21st Century Skills are emerging priorities in many Emerge projects: critical thinking, teaming and collaboration, and self-directed learning.
21st Century Learning	**Finding 4a**. In this first year, most Emerge jurisdictions are in the exploratory stages with 21st Century Learning. Thus, jurisdictions' uses of 21st Century Skills and technology are not yet

Dimensions	Year 1 Baseline Findings
Environment	fully systemic. **Finding 4b**. Digital content and digital learning spaces represent uncharted territory for many Emerge projects. **Finding 4c**. Parents are generally aware and supportive of laptop learning, but few Emerge jurisdictions are using the technology to increase direct parental involvement in student learning.
Educator Proficiency with 21C Learning	**Finding 5a**. While teachers generally understand how to use technology, many are still learning how to most effectively advance academic and 21st Century learning through these digital tools. **Finding 5b**. While the Emerge Community of Practice programs and local professional development programs are advancing educator proficiency, continuations and expansions of such programs will be needed if the vision for the project is to be achieved.
Access and Infrastructure	**Finding 6a**. Deployment of the laptops and associated network infrastructure was accomplished fairly quickly by all Emerge jurisdictions **Finding 6b**. Technical support systems vary across the 20 jurisdictions.
Accountability/ Results	**Finding 7a**. The assessment of students' 21st Century Learning has been identified as a critical component of laptop sustainability, yet remains an unmet challenge for Emerge jurisdictions. **Finding 7b**. Student engagement in learning has increased slightly from pretest to posttest for those students whose Emerge experience was limited to Year 1. (Note: only those students who were not continuing with the project were assessed at the end of Year 1. Others will be assessed in the spring of 2009, after their second year of participation.).

Overall, the baseline data demonstrate that the 20 Emerge jurisdictions are generally well staged to succeed with one-to-one laptop learning. They have established sound technology systems to support such learning. They are establishing policies and practices that leverage new approaches to learning made possible through these digital tools and the Internet access.

The remaining challenge lies in redefining the learning environments, the role of the student and the teacher, and the assessment systems in ways that optimize that potential.

"Students are very motivated, they are attending school, they are definitely engaged learners, and they are learning countless 21st Century Skills. The project has had a huge impact on our school division as a whole. Administrators and teachers have been closely watching the project develop and see the impact on student learning. They want to get involved. They want to collaborate. You cannot adequately express in words how this project has impacted students. Please come and visit. Every day gets better."

- Emerge Teacher

Year 1 Emerge Evaluation Results (2007-2008)

The Emerge One-to-One Laptop Learning Project is a 3-year Alberta Education Project. It was designed by the provincial government, in collaboration with publicly funded school jurisdictions and post-secondary institutions in Alberta, as a systematic research study of laptops in the classroom. In the fall of 2006, Alberta Education issued a Call for Proposals for jurisdictional, one-to-one mobile computing, as a formal announcement of the project. Originally, Alberta Education intended to award 16 jurisdictional projects that were focused on one-to-one laptop learning. The Call required that applicants focus on one of two themes: a) Enhancing teaching and learning for specific student populations, or b) Improving student learning in targeted areas.

In an effort to advance the capacity of the school jurisdictions to conceptualize such projects, Alberta Education hosted a laptop learning symposium on October 30, 2006 in Edmonton, Alberta, for interested jurisdictions. Titled *Laptop Learning: Essential Conditions for Success*, the symposium featured international speakers, discussion forums, and a research document on one-to-one laptop learning (compiled by Alberta Education).

Before the competitive process was completed, the provincial government was able to increase the overall funding, and, in the spring of 2007, Alberta Education awarded 20 jurisdictional Emerge projects. Currently identified as the Emerge One-to-One Laptop Learning Project, it includes jurisdictions from across the province.

Number	School/District
1	Battle River Regional Division
2	Black Gold Regional Division
3	Calgary Roman Catholic Separate School District
4	Calgary School District
5	Chinook's Edge School Division
6	Edmonton Catholic Separate School District
7	Edmonton School District
8	Elk Island Public Schools Regional Division
9	Greater Southern Separate Catholic Francophone Education Region
10	Greater St. Albert Catholic Regional Division
11	Lakeland Roman Catholic Separate School District
12	Medicine Hat School District
13	Northern Gateway Regional Division
14	Palliser Regional Division
15	Peace River School Division
16	Prairie Land Regional Division
17	Rocky View School Division
18	St. Paul Education Regional Division
19	Westwind School Division
20	Wolf Creek School Division

0riginal numbers from the proposals submitted to Alberta Education for Emerge indicated that the awardees would impact 2,502 students, 173 teachers, and 47 administrators involving 50 schools within 20 jurisdictions from across the province. While those numbers have remained relatively stable, the number of educators and students participating in the evaluation varies considerably across jurisdictions.

The objectives of the three-year study of Emerge, as identified by Alberta Education were/are to:

- Establish and support a research-based, one-to-one laptop learning community of practice.
- Further investigate the potential educational benefits of one-to-one laptop learning.
- Identify technical merits and innovative practices in one-to-one laptop learning.
- Share expertise, experience and lessons learned related to one-to-one wireless learning.
- Inform and support one-to-one laptop learning implementations within Alberta's learning system.

With those intents in mind for the Emerge project, Alberta Education issued a Request for Proposals on January 11, 2007, this time for an evaluator/researcher for the project. Through a competitive process, that contract was awarded to a partnership between the Metiri Group, a U.S. based company, and the University of Calgary, Alberta.

The Metiri/University of Calgary proposal included a mixed methods evaluation and a quasi-experimental design research study. Metiri Group and the University of Calgary, hereafter referred to as the researchers, introduced interim evaluation questions to add to those posed by Alberta Education. The Emerge evaluation is intended to answer the following research questions:

1. What are the potential educational benefits of one-to-one laptop learning?
2. What are the technical merits and innovative practices in one-to-one wireless learning?
3. What expertise, experience and lessons learned have come from the Emerge One-to-One Laptop Learning Project in Alberta?
4. What is the level of jurisdictional and provincial readiness for systemically advancing 21st Century Learning and effective uses of technology in learning?
5. What are the trends and/or variances across indicators over time?

The combination of the two sets of questions frame the evaluation work. As of the date of this report, the researchers have completed a first year evaluation and provided customized baseline data reports to the 20 jurisdictions along with an aggregated provincial report to Alberta Education. In addition, they have participated in capacity building events and finalized the quasi-experimental design (QED) for a small research study, and have begun conducting the QED in one of the 20 Emerge jurisdictions.

This report represents the triangulation of the following data sets:

- Administration of educators surveys; baseline 2007-08 only
- Administration of student engagement and self-direction surveys; baseline 2007-08 for all students, spring administration of engagement surveys for those students not continuing into year 2 of the project

- Site visitation data; baseline 2007-08 and spring 2008 visits
- Administration of Point-of-Contact surveys; baseline 2007-08 and spring 2008
- Feedback and observational data from events and seminars

A separate Technical Manual has also been submitted to Alberta Education to accompany this report. It includes a complete methodology, a year 1 provincial report reporting results across the 7 dimensions of readiness, student surveys, and reports on the two rounds of site visitations.

This initial report is focused on research question 4, the jurisdictional and provincial readiness for systemically advancing 21st Century Learning and effective uses of technology in learning. Readiness is defined as the alignment of 7 interdependent dimensions within the education system related to 21st Century Learning and educational technology:

1. **Forward Looking, Shared Vision.** Does the jurisdiction have a forward-thinking shared vision with strong commitment on the part of students, educators, and community?
2. **Systems Thinking.** Has the jurisdiction aligned policies, procedures, and funding in support of achieving the vision?
3. **21st Century Skills and Instructional Approaches.** Has the jurisdiction redesigned learning to focus on 21st Century Skills, in the context of the academics?
4. **21st Century Learning Environment.** Has the jurisdiction established learning environments and learning cultures that integrate 21st Century Skills, academics, high tech tools, and emergent research from the learning sciences?
5. **Educator Proficiency with 21C Learning.** Are educators in the jurisdiction proficient in designing, implementing, and evaluating 21st Century Learning in practice?
6. **Access and Infrastructure.** Do students and educators have high-quality access to the Internet and other communication networks sufficient to achieve their learning and teaching goals?
7. **Accountability/Results.** Has the jurisdiction established and implemented metrics for evaluating 21st Century Learning? Is the jurisdiction using the results to ensure continuous improvement by students through more effective school projects?

The following commentary from Emerge participants provides insights into the initial response of the 20 jurisdictions to Emerge:

> *"In one of our project classes we have a deaf student. His teacher found him text messaging with another student using their laptops. This particular student could never have communicated with his classmate at this level without the technology."*

> *"The one student who hated technology the most became the class expert in Compendium brainstorming software showing peers [how] to access all facets of the program."*

The overall provincial scores across the 7 Metiri Dimensions (see Figure 3) provide early indicators upon which these findings and recommendations were based.

Figure 3: Alberta MTIPS/D21 Scores: Baseline 2007-08

n = 108 Teachers and 46 Administrators

Awareness		Exploration		Scaling Up		Systemic	
1	2	3	4	5	6	7	8

MTIPS/Dimensions21 scores provide schools with insights into the elements required to translate 21st Century Learning into action. The 7 Dimensions represent the divergent and innovative thinking it takes to ground schools in emergent cognitive, social, and neuroscience as it deploys one-to-one laptop technologies.

Metiri Group developed metrics that gauge a school or district's progress in establishing 21st Century systems of learning. Each dimension is analyzed on an 8-point scale to calibrate with a 4-stage rubric of jurisdictional readiness to advancing 21st Century Learning: Awareness, Exploration, Scaling Up, and Systemic.

Each of the findings of this report is discussed in more detail on the following pages, organized around the 7 Dimensions. Each section includes recommendations for consideration by Alberta Education and the Emerge jurisdictions.

Dimension 1: Vision

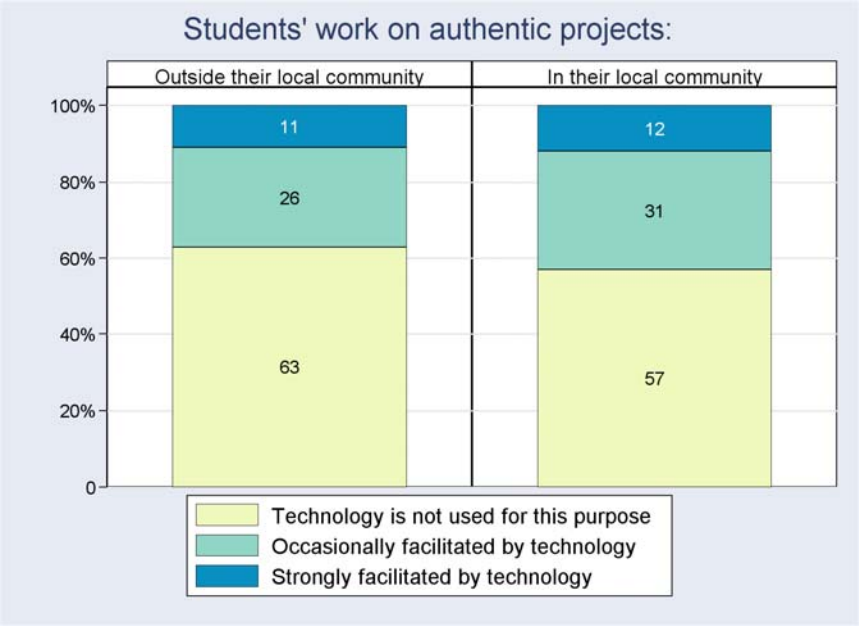
Does the jurisdiction have a forward-thinking shared vision with strong commitment on the part of students, educators, and community?

> **Finding 1:** The vision for laptop learning within the Emerge project is evolving as participating administrators, teachers, and students explore more high tech, authentic approaches to 21st Century teaching and learning. Generally, support for the laptop for learning projects is strong among students, educators, and parents.

Discussion: The original request for proposal released by Alberta Education on the Emerge One-to-One Laptop Learning project required that applicants establish goals related to the academics, 21st Century learning, and special populations. Thus, the 20 jurisdictions have established individual goals for their Emerge projects and will be reporting on their achievement of those goals to Alberta Education.

The site visits revealed that, while all Emerge projects established visions, goals, and objectives related to academic and 21st Century Skills, in the first year not all teachers, or administrators, were fully aware of, or committed to, their jurisdiction's Emerge visions. When asked about their level of support for their jurisdiction's vision for 21st Century Learning, 54% said they were extremely supportive, 35% reported being somewhat supportive, and 12% indicated they were undecided or didn't know. (These data are from the baseline 2007-2008.) Discussions during the site visitations to the jurisdictions indicated that, while the Emerge goals were written into the proposals, the vision and goals for the projects are continuing to evolve as Emerge participants become more familiar with laptop learning, digital resources, and associated learning approaches with student populations.

Figure 4: Teacher perceptions of the impact technology has on community involvement



n = 108 teachers. Source: Baseline 2007-08 Surveys.

Most Emerge projects have ongoing communications with parents of students in the project. While parents are very supportive of the Emerge project, the parents seem enamored more with the development of their students' technology literacy, and less aware of technology as an effective learning tool.

The following recommendations are offered to the Emerge project based on the aforementioned findings:

Recommendation 1a: The Emerge jurisdictions should continue their outreach communications with all educators, students, parents, and the community on all aspects of the project. Such communications should increase the awareness of these groups as to the educational value of the technology.

Recommendation 1b: The Emerge jurisdictions should serve as a bridge to their communities, encouraging and facilitating increased parental and community involvement in authentic learning units, service learning, and performance assessments of their students.

Dimension 2: Systems Thinking

Has the jurisdiction aligned policies, procedures, and funding in support of achieving the vision?

> **Finding 2**: The Emerge jurisdictions recognize the need to shift to policies and practices that fully leverage the use of the laptops for 21st Century learning and deeper learning. Supportive policies, projects, and support structures are emerging, but will require innovative leadership at all levels. Implementation is idiosyncratic to individual teachers.

Discussion: The readiness of the jurisdictions to implement laptop learning effectively is dependent on the jurisdictions capacity to attend to each of the 7 dimensions (i.e., Metiri's 7 Dimensions: Vision, Systems Thinking, 21C Skills, 21C Learning Environments, Educator Proficiency with 21C, Access and Infrastructure, and Accountability and Results). Because each of these Dimensions is interdependent, a systemic approach often results in a multiplier effect.

Typically, Dimension 4, the Learning Environment, is the last to shift, since it is so dependent on the other dimensions being in place. The dimension scores reported above indicate that all but Dimension 4 and Dimension 7 (Accountability) are in the scaling up category (i.e., the jurisdiction understands the issue related to that dimension, has some promising models in place, and is now working on expanding or scaling those models across grade levels, subject areas, and for all student populations).

The researchers looked across the projects and found that the implementation of Emerge varied greatly across jurisdictions, across schools within jurisdictions, and across classrooms within the schools. The idiosyncratic nature of the current implementation is confirmed in noting the percentage of teachers who answered the question about systematic implementation (see Table 2). Only 22% of teachers indicated that there was a systemic approach that would ensure that all students would be assured of a consistent approach to 21st Century Learning and technology, regardless of classroom assignments and students' schedules.

Table 2: Systemic aspects of implementation of classroom practices:

Teachers were asked: In my school teachers in the same grade or subject areas:	Percent
Share little or no common understanding about evidence-based practices. Teachers decide individually whether and how they will make instructional decisions.	13%
Share some common understanding about evidence-based practices; however, some teachers implement these uses and others do not.	61%
Share a common understanding about evidence-based practices; there are clear expectations that such practices will be used.	22%

Note: The practices indicated in this question provide insights into whether schools are systematically adopting evidence-based practices or are leaving such adoption to individual teacher choice.

n = 108 teachers. Source: Baseline 2007-08 Surveys.

This idiosyncratic approach was also evident in the discussion among jurisdictions related to the two key 21st Century Skills, as identified on the evaluation webinars in Year 1. Those skills, critical thinking and teaming/collaboration, are of high interest to the jurisdictions. However, few teachers and administrators report a systematic adoption of curricula and instructional practices related to critical thinking, creative thinking, and/or systems thinking. Again, this is not surprising in the first year of a 3-year project.

The following recommendations are offered to the Emerge project based on the aforementioned findings:

Recommendation 2a: Alberta Education should provide provincial leadership in 21st Century Learning (e.g., a provincial summit on 21st Century Learning to create definition and urgency for action among community, business, governmental, non-profit, and education leaders; changes in policies; and strategic communication of Emerge results)

Recommendation 2b: Alberta Education should consider administrative leadership seminars focused on 21st Century Learning, facilitating deep, interactive knowledge building among administrative leaders as to the definition of, vision for, and road to 21st Century Learning. These seminars might include hosted site visits for leaders to convene, consider, analyze, and discuss leadership practices for 21st Century Learning.

Recommendation 2c: Emerge jurisdictions should consider systemic approaches to ensuring all teachers are advancing their students' propensity for self-directed learning and other targeted 21st Century Skills.

Recommendation 2d: Alberta Education should consider developing performance assessments for 21st Century Skills.

Dimension 3: 21st Century Skills

Has the jurisdiction redesigned learning to focus on 21st Century Skills, in the context of the academics?

> **Finding 3**: While the specific skills included in each Emerge project are locally determined, three key 21st Century Skills are emerging as priorities in many Emerge projects: critical thinking, teaming and collaboration, and self-directed learning.

Discussion: All 20 jurisdictions identified at least one 21st Century Skill as a focus for their Emerge project in their grant proposals. Each project's individual focus on specific 21st Century Skills evolved as teachers and administrators began implementing the project. The key 21st Century Skills now emphasized by most of the Emerge projects are: critical thinking, teaming and collaboration, Information, Communication, and Technology (ICT) literacy, and self-direction. The table below outlines administrators' perceptions as to the degree to which formal initiatives are underway for the various 21st Century skills, and teachers' reports as to their comfort level in teaching the skill and their perception of its relevance for their content area. The scores are quite high overall given that not all jurisdictional projects are focusing on all skills.

Table 3: Administrator and teacher perceptions related to 21st Century Skills. (Average on scale of 1 – 8.)

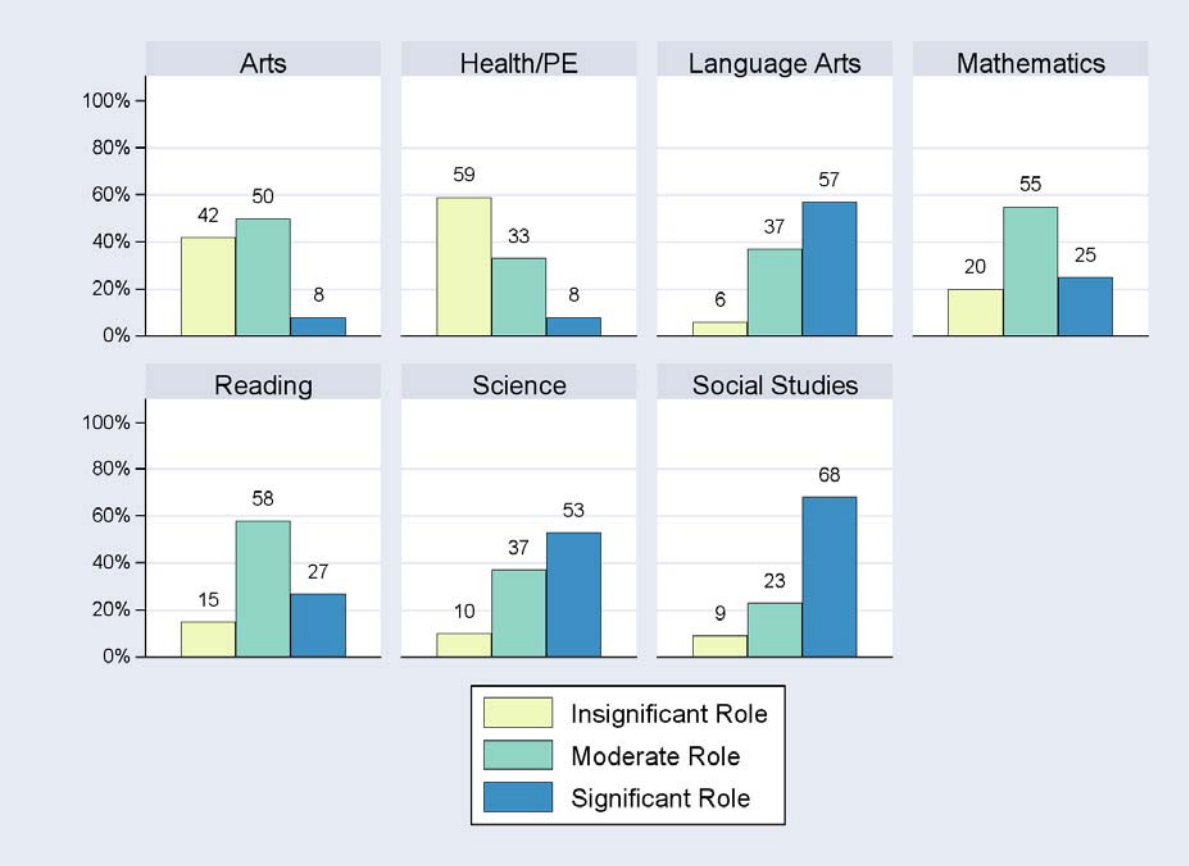
	Administrators: Degree to which formal initiative is underway	Teachers*: Comfort Level	Teachers: Relevance to content
Global awareness	4.6	4.9	4.6
Information literacy	5.7	5.5	5.1
Creativity	5.3	5.3	5.2
Critical thinking	6,0	5.3	5.4
Self-direction**	5.5	5.3	5.1
Teaming and collaboration	5.7	5.5	6.5
Effective use of real-world tools	4.2	4.7	6.2
Productivity	5.0	5.0	6.3

n = 108 teachers and 46 administrators
** Only those teachers who indicated relevance to their content areas were asked about comfort level.*
**Note: Alberta Education, in recognition that self-directed behavior correlates more highly with student achievement than virtually any other learner characteristic, is assessing all Emerge students on that skill. The baseline data from 2007-08 student surveys indicate that Emerge students are generally in the mid-range for self-direction.

Because Emerge is a one-to-one laptop learning project, the evaluators also asked survey questions specifically about the role technology plays in the teaching and learning of academic

content. Figure 6 below, displays the perceptions of teachers with responsibilities in the content areas as to the role technology plays in building students' skills or proficiencies. A majority said that technology plays a significant role in Language Arts, Science, and Social Studies. However, less than half of teachers reported a significant role for Mathematics, Reading, Arts, and Health/PE.

Figure 5: Teachers' perspectives on the role technology plays by content area



n = 108 teachers. Source: Baseline 2007-08 Surveys. Note: The data in each chart above reflect responses from teachers who indicated the subject was applicable to their teaching.

The following recommendation is offered to the Emerge project based on the aforementioned finding:

Recommendation 3: Each Emerge project should articulate a Year 2 plan for advancing the specific 21st Century Skills outlined in their proposal. This should include jurisdictional growth targets determined by baseline data along with a plan for closing the gaps between current status and the vision.

Dimension 4: 21st Century Learning Environment

Has the jurisdiction established learning environments and learning cultures that integrate 21st Century Skills, academics, high tech tools, and emergent research from the learning sciences?

Finding 4a: In this first year, most Emerge jurisdictions are in the exploratory stages with 21st Century Learning and associated cultures. Thus, jurisdictions' uses of 21st Century Skills and technology are not yet fully systemic nor are the cultures fully developed.

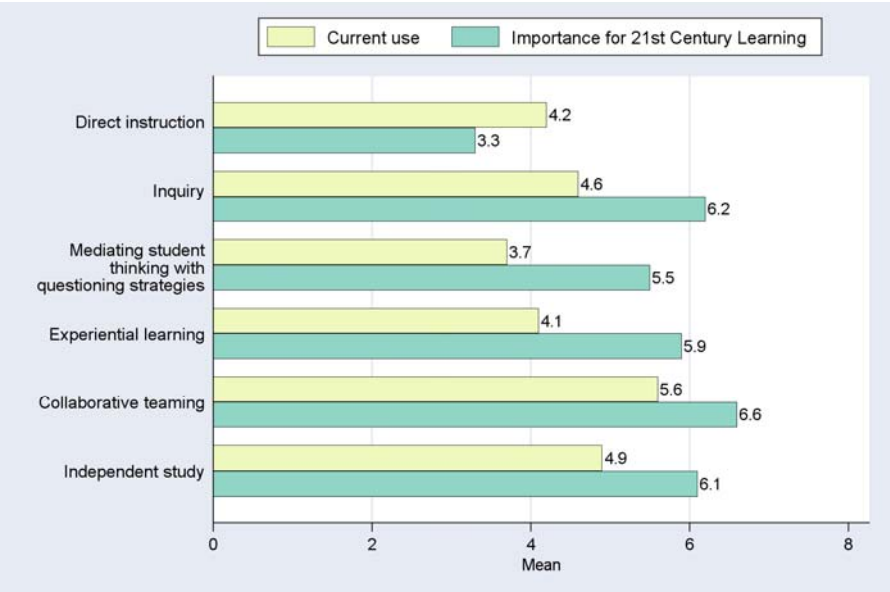
Finding 4b: Digital content and digital learning spaces represent uncharted territory for many Emerge projects.

Finding 4c: Parents are generally aware and supportive of laptop learning, but few Emerge jurisdictions are using the technology to increase direct parental involvement in student learning.

Discussion: Most Emerge jurisdictions have cleared the technological hurdle and have recently moved on to the challenge of teaching and learning effectively with technology. That implies that most Emerge jurisdictions are only now beginning to explore and implement 21st Century Learning. The data indicate that few jurisdictions have yet to identify clearly, or implement fully, the significant changes in teaching and learning that are required to achieve those visions. This is evident from the relatively low scores on the Learning Environment indicator at the baseline (i.e., a score of 4.1 out of 8 points).

Another indicator of readiness is the type of instructional strategies used in the classroom in conjunction with the laptops to advance 21st Century Learning (see Figure 7).

Figure 6: From the Baseline 2007-08 Surveys: Teachers' rating related to various instructional strategies used in their classrooms.

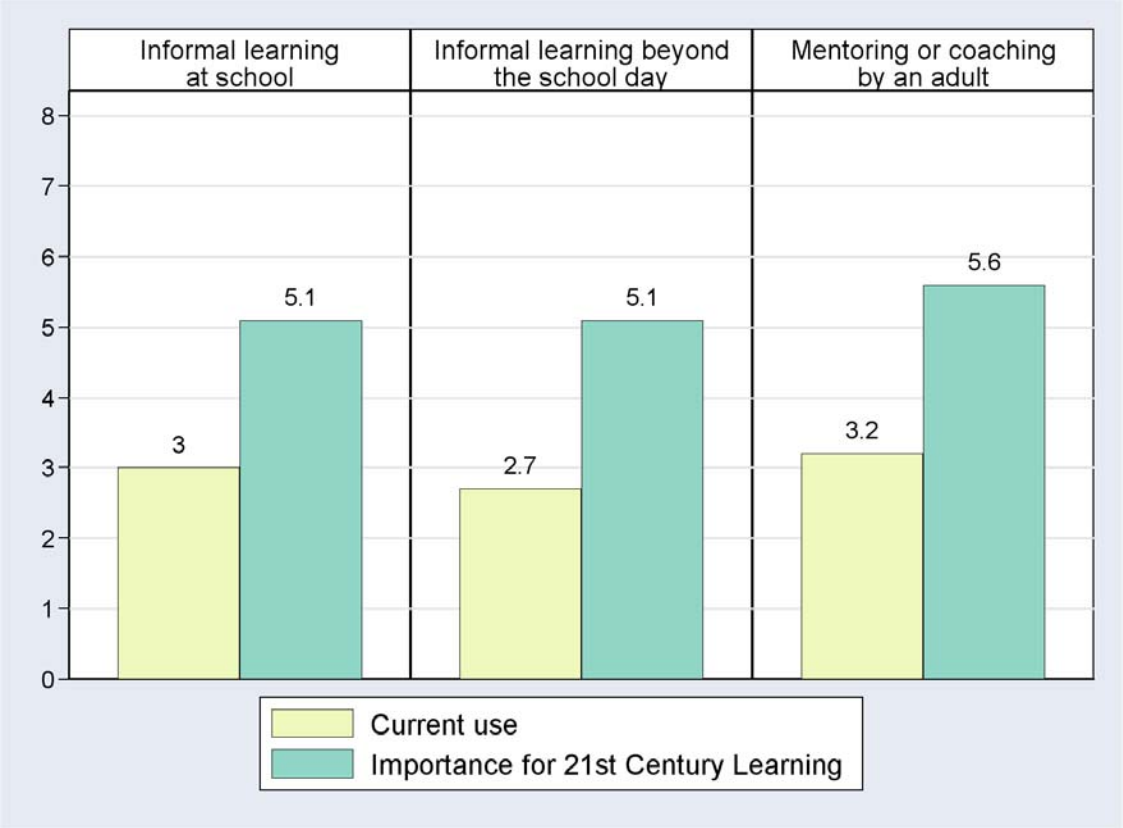


n = 108 teachers. Source: Baseline 2007-08 Surveys.

As the chart indicates, teachers do recognize that direct instruction is currently used more than is warranted in 21st Century learning (i.e., respective ratings of 4.2 for current use and 3.3 points for importance to 21st Century learning, on a scale of 1-8). It is also important to note the gaps between teachers' perceptions of the importance of more inquiry-based, experiential, and collaborative learning approaches and the current uses of such approaches in Emerge classrooms. As indicated by the chart, those gaps are significant.

Teachers in general also recognize that informal learning, including mentoring and coaching by an adult plays a significant role in 21st Century Learning, but current leveraging of such activity is reported by teachers to be low (i.e., a score of 3.2 on an 8-point scale in Figure 8).

Figure 7: Teachers' ratings (scale 1-8) related to informal learning strategies.



n = 108 teachers. Source: Baseline 2007-08 Surveys.
Note: "At school" includes after school activities, peer-interactions, etc., while "beyond the school day" includes text messaging, student web browsing/searching, etc.

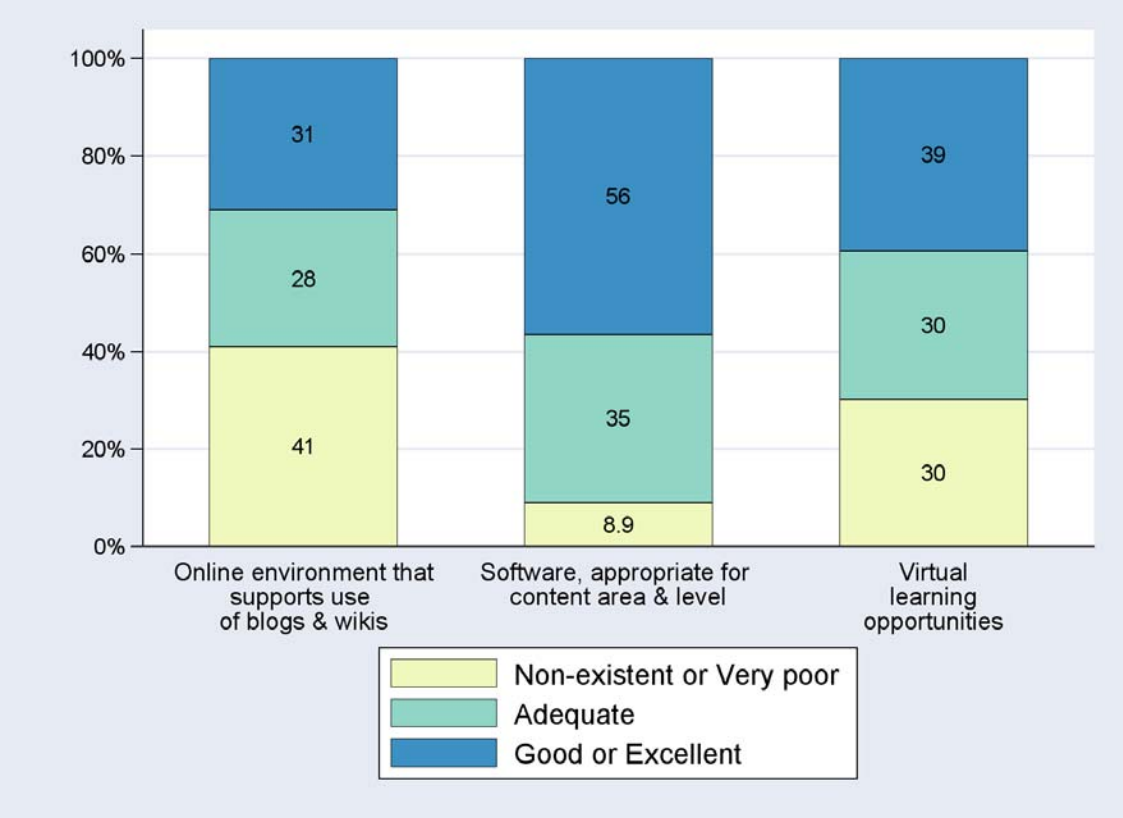
In addition to questioning educators, the researchers also polled students about the learning environment. Students were asked questions related to the existence and quality of classroom structures that would typically lead to higher student engagement (i.e., options for choice, intellectual safety, variety, content staged to interest them, etc.). Those data were consistent with teachers' perceptions. Both teachers and students indicate that most classrooms are at mid-ranges of readiness for 21st Century Learning.

A third source of data related to learning environments is from site visitations. The researchers visited each of the 20 jurisdictions twice during Year 1. A key element of a 21st Century Learning

environment is access to digital content. The site reviewers reported only moderate levels of access to appropriate software, digital content, virtual learning opportunities, and online environments that support learning and teaching. The exception is the *Learn Alberta* online digital content and the software licensing provided by Alberta Education that are greatly appreciated by, and currently in high use within the Emerge projects.

Meanwhile, administrators report that, while teacher access to software appropriate to content and grade level is quite good (see chart below), the access to virtual learning opportunities, and Web 2.0 environments with tools such as blogs or wikis is less available.

Figure 8: Administrators' perceptions of digital content accessibility

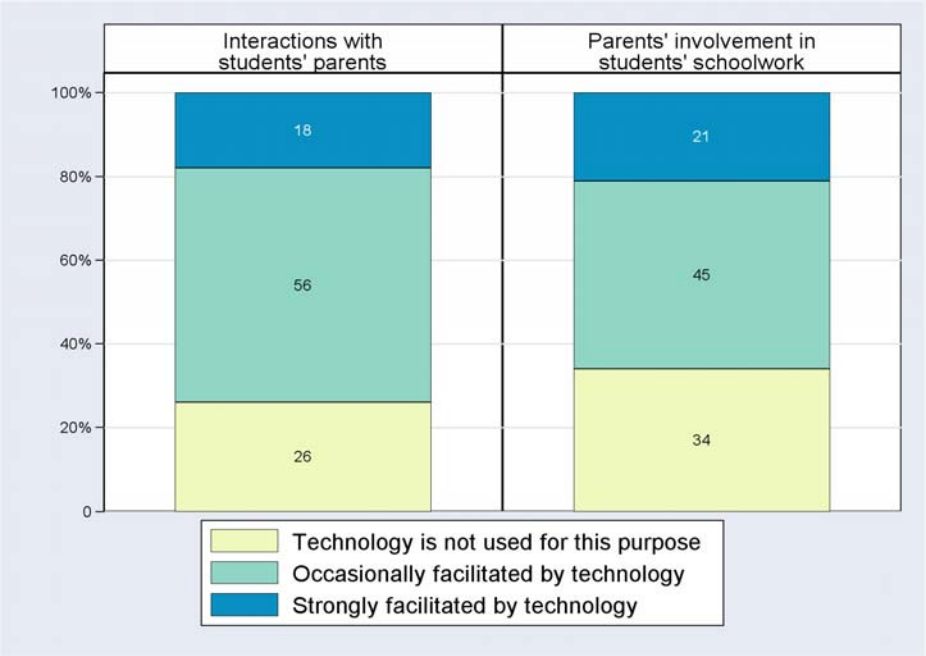


n = 46 administrators. Source: Baseline 2007-08 Surveys

Based on the site visitation data, most schools are using content software, many are using productivity tools, but few schools are currently using Web 2.0 tools such as wikis, blogs, and social networking to advance learning.

Another key element of a 21st Century learning environment is parental and community involvement. Year 1 findings indicate that the use of technology early in the Emerge project is beginning to have an impact on parental interactions and involvement with school.

Figure 9: Teacher perceptions of the impact technology has on parental involvement



n = 108 teachers. Source: Baseline 2007-08 Surveys.

The following recommendations are offered to the Emerge project based on the aforementioned findings:

Recommendation 4a: Alberta Education should consider convening key pioneering teachers from the Emerge classrooms to develop Emerge exemplars (e.g., curricula, lesson design, foundational instructional strategies, etc.) for 21st Century Learning, especially those for effective uses of Web 2.0 for learning.

Recommendation 4b: The Emerge project should consider convening/polling Emerge educators about digital content and digital environments for learning. Based on this information, the Emerge project should investigate how the Emerge jurisdictions might gain access to digital content generally considered as useful and necessary for Emerge classrooms.

Recommendation 4c: Jurisdictions should consider systemic adoption of technology-based practices based on research as well as experiences within the project. Note: Systemic adoption will ensure that all students are presented with such opportunities for learning.

Recommendation 4d: Emerge teachers should incorporate research-based strategies and designs for increasing student engagement (e.g., provide

more choice, incorporate more student-directed learning into their classrooms, increase authenticity, ensure intellectual safety, etc.)

Recommendation 4e: During the Community of Practice events, the Emerge project should convene technical and programmatic representatives to investigate the most effective and efficient ways to address digital content and digital learning spaces for teaching and learning (e.g., access to: wiki spaces, blogging, videoconferencing, virtual learning, etc.).

Dimension 5: Educator Proficiency

Are educators in the jurisdiction proficient in designing, implementing, and evaluating 21st Century Learning in practice?

Finding 5a: While teachers generally understand how to use technology, many are still learning how to most effectively advance academic and 21st Century learning through these digital tools.

Finding 5b: The Emerge Community of Practice programs and local professional development programs are advancing educator proficiency. Continuations and expansions of such programs will be needed if the vision for the project is to be achieved.

Discussion: When asked about teacher preparedness, over half (53%) of administrators replied that either all or most of Emerge teachers were prepared, while 45% said that few or none were prepared. Administrators also commented that 47% of Emerge teachers were "skilled in designing curriculum that integrates content, 21st Century Skills, and technology," and 63% of administrators indicated that Emerge teachers were prepared to assess student products created by using technology. These statistics are typical for a baseline year.

To increase teacher preparedness, Alberta Education has established Communities of Practice (CoPs) through which Emerge educators can take advantage of professional development opportunities, exchange information, discuss issues, and learn about emergent research. As a component of the CoP, Emerge is offering a series of professional develop opportunities. The narrative data from the Points-of-Contact (POCs) from the 20 jurisdictions indicate that the professional development series, the Community of Practice events, and the webinars are all valued by the 20 jurisdictions. The POCs generally find the series as contributory to advancing their knowledge and skills with 21st Century Learning and educational technology.

The area of educator proficiency with 21st Century Learning and educational technology is a growth area for most jurisdictional Emerge projects.

The following recommendations are offered to the Emerge project based on the aforementioned findings:

Recommendation 5a: The professional development provided for the teachers should include exemplars of 21st Century Learning, effective uses of technology, and facilitated development of curricular units and lessons that meet standards for 21st Century Learning (e.g., for critical thinking and teaming/collaboration, etc.).

Recommendation 5b: The professional development provided for Emerge educators should be embedded, hands-on, include visual examples of exemplars, include discussions of the research-basis for the work, should allow teachers to practice targeted skills, and should include preparation for associated teacher and student assessment.

Recommendation 5c: The Emerge project should continue facilitating online communities of practice and work to increase both the interactivity and collaboration among participants. Teachers need opportunities to share successes and lessons learned, critique new approaches to learning with laptops, and discuss/critique emergent research related to technology in order to increase the collective knowledge base.

Recommendation 5d: The Emerge project should continue to provide educators with professional development opportunities related to authenticity and student classroom engagement (e.g., research on what types of classrooms fully engage students; the means for interpreting jurisdictional engagement data, and tips and techniques for addressing gaps).

Dimension 6: Access and Infrastructure

Do students and educators have high-quality access to the Internet and other communication networks sufficient to achieve their learning and teaching goals?

Finding 6a: Deployment of the laptops and associated network infrastructure was accomplished fairly rapidly by all Emerge jurisdictions

Finding 6b: Technical support systems vary considerably across the 20 jurisdictions.

Discussion: During the first year of the Emerge project, the access and infrastructure deployment was rapidly accomplished throughout the province by the 20 jurisdictions. Some pioneering jurisdictions launched the laptop project at the opening of school; many others incrementally deployed the technology and infrastructure throughout the fall. By mid-year of the 2007-08 school year, laptops were in use by students and teachers in all jurisdictions. This was a critically important milestone for all 20 jurisdictions – a necessary, although not sufficient, condition for schools to achieve their Emerge learning goals.

While quickly accomplished, the nature of the technology deployment varied considerably across the jurisdictions. In some jurisdictions the laptops were checked out to students, so as to provide them with access 24 hours a day, 7 days a week (24/7); in others, student use of the laptops was restricted to within the school day; and still others only periodically checked out laptops for home use by students.

One of the other key decisions was whether to move the laptops from year to year with students as they move up in grade level, or to have the laptops remain at specific grade level(s), allowing students only one or two years of access. Table 2 outlines the decisions made by the jurisdictions for Year 2.

Table 4: Deployment of Laptops in Year 2 of the Emerge Project

Laptop Deployment	A. Laptops stay with the same group(s) of students for all 3 years.	B.* Laptops stay with students less than 3 years, but for as long as the students remain within a designated grade band.	C. Laptops stay at a particular grade level (or levels) and are assigned to new groups of students each year of the project	D.** Combination(s)
Number of Jurisdictions	5	11	7	2

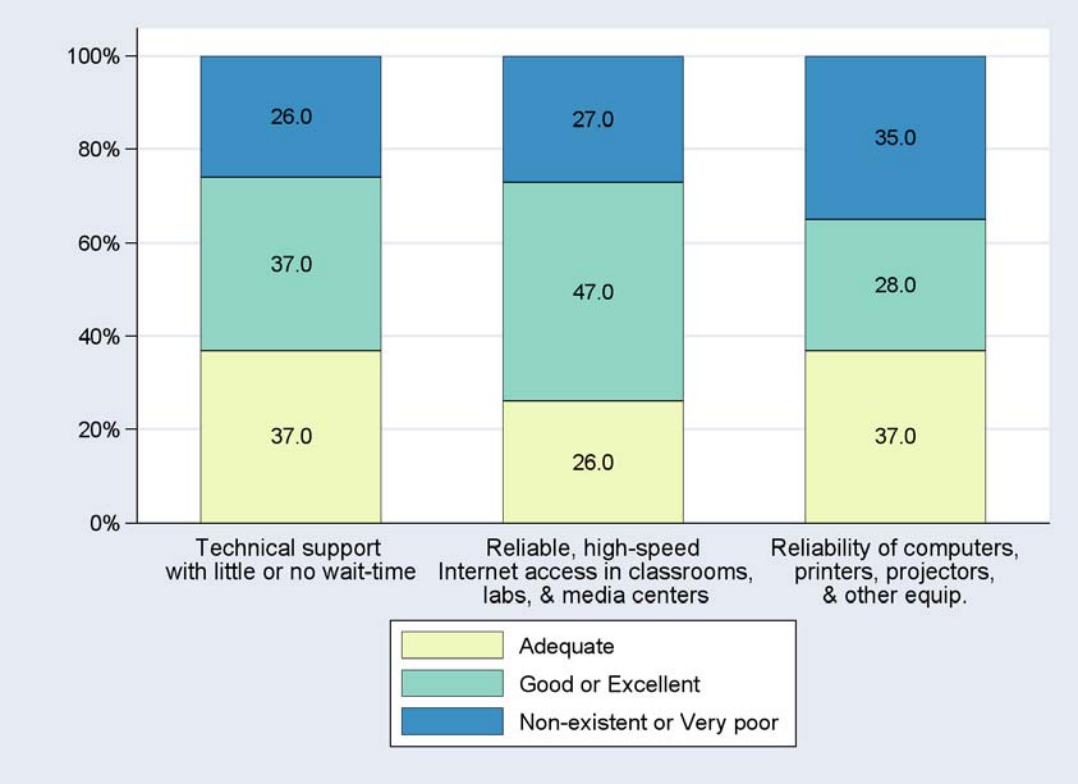
Source: Point-of-Contact Interview from Spring 2008 site visit
* Example B1. In one jurisdiction students in Grades 7, 8, and 9 had laptops in Year 1. In Year 2, the Grade 9s leave the project with only 1 year of laptop use; Grade 8s will continue to eventually have 2 years of laptop use; Grade 7s will continue to eventually have 3 years of laptop use; and Grade 6s will join the project for 2 years of laptop use.
* Example B2: In a second jurisdiction, students in Grades 11 and 12 had laptops in Year 1. In Year 2, Grade 12s will be graduating; the Grade 11s will have 2 years of laptop use;, and Grade 10s will be joining the project (2 years of laptop use).
** Example D1: One school jurisdiction will have 6 of 7 schools opting for Type A, new students with the laptops each year; while 1 of the 7 schools will have laptops following the students.
** Example D2: In the second jurisdiction, the laptops are used for distance learning. If the student continues with the project, he/she continues to use the laptop.

The Emerge project serves as a pilot for testing the waters with 21st Century Learning. The site reviewers have noted several instances where even in its first year it has sparked increased investment in one-to-one laptop learning. For example, one Emerge jurisdiction had planned to have the laptops remain at the 4th grade level in the 2nd year, with a new group of students. However, upon seeing the effective use by the Year 1 Grade 4s, they found the funds to purchase laptops for Grade 5 so the students could continue their use of technology a second year.

As schools consider the costs for one-to-one laptop learning, some are investigating the possibility of configuring school networks to accommodate the personal technologies the students might want to bring in for learning purposes. The rationale for doing so cited by Emerge participants is affordability and sustainability as the jurisdiction attempts to scale the laptop project to achieve ubiquity.

On another front, the ongoing technical support also varies greatly across jurisdictions. Some have technology specialists on site and available. In other schools, the response time for technical requests from teachers is less immediate. The baseline (2007-2008) survey of administrators found that 37% of respondents rated "technical support" as Good or Excellent, another 37% rated it as adequate, while the remaining 26% rated it as Very Poor or Non-Existent. See Figure 10.

Figure 10: Administrator perspectives on the quality of technical service for Emerge classrooms.



n = 46 administrators. Source: Baseline 2007-08 Surveys

The following recommendations are offered to the Emerge project based on the aforementioned findings:

Recommendation 6a: All jurisdictions should provide technical leadership throughout the term of the grant project and beyond.

Recommendation 6b: All jurisdictions should ensure that wireless access is available in schools 24 hours a day, 7 days a week (24/7) throughout the term of the grant project and beyond.

Recommendation 6c: All jurisdictions should enable students with 24/7 access to the laptops and, where possible, to 24/7 access to Internet and Intranet resources.

Recommendation 6d: All jurisdictions should facilitate regular discussions and ensure that technology decision making is done collaboratively among the technical and instructional program staff for Emerge.

Recommendation 6e: Through the Community of Practice, the Emerge project should facilitate discussions between the educational technology specialists and the information technology specialists in Emerge. The intent is to define "open" technological systems that are sufficiently flexible and adaptable for learning and teaching, yet still safe for students and manageable for technical staff.

Dimension 7: Accountability/Results

Has the jurisdiction established and implemented metrics for evaluating 21st Century Learning? Is the jurisdiction using the results to ensure continuous improvement by students through more effective school programs?

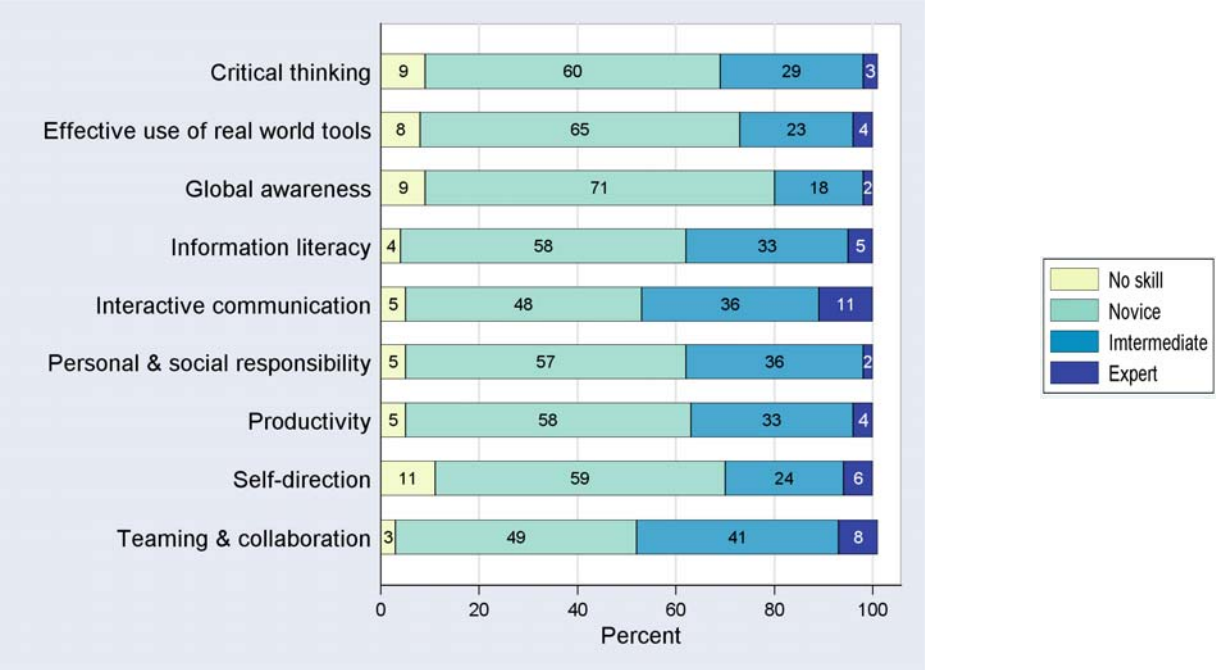
Finding 7a: The assessment of students' 21st Century Learning has been identified as a critical component of laptop sustainability, yet remains an unmet challenge for Emerge jurisdictions.

Finding 7b: Student engagement in learning has increased slightly from pretest to posttest for those students whose Emerge experience was limited to Year 1. Such increases were limited to movements from Tactical to Engaged, with little significant change in the Compliant, Withdrawn, or Defiant. (Note: only those students who were not continuing with the project were assessed at the end of Year 1. Others will be assessed in the spring of 2009, after their second year of participation.)

Finding 7c: Teachers perceive most students' current 21st Century Skill attainment to be Novice or lower.

Discussion: Emerge educators are using this piloting phase to explore 21st Century Skills and effective uses of technology for learning. Teachers were asked to rate the current level of students' 21st Century learning. In most cases, there remained considerable room for growth as teachers rated more than 50% of their students as Novice or less on all skills.

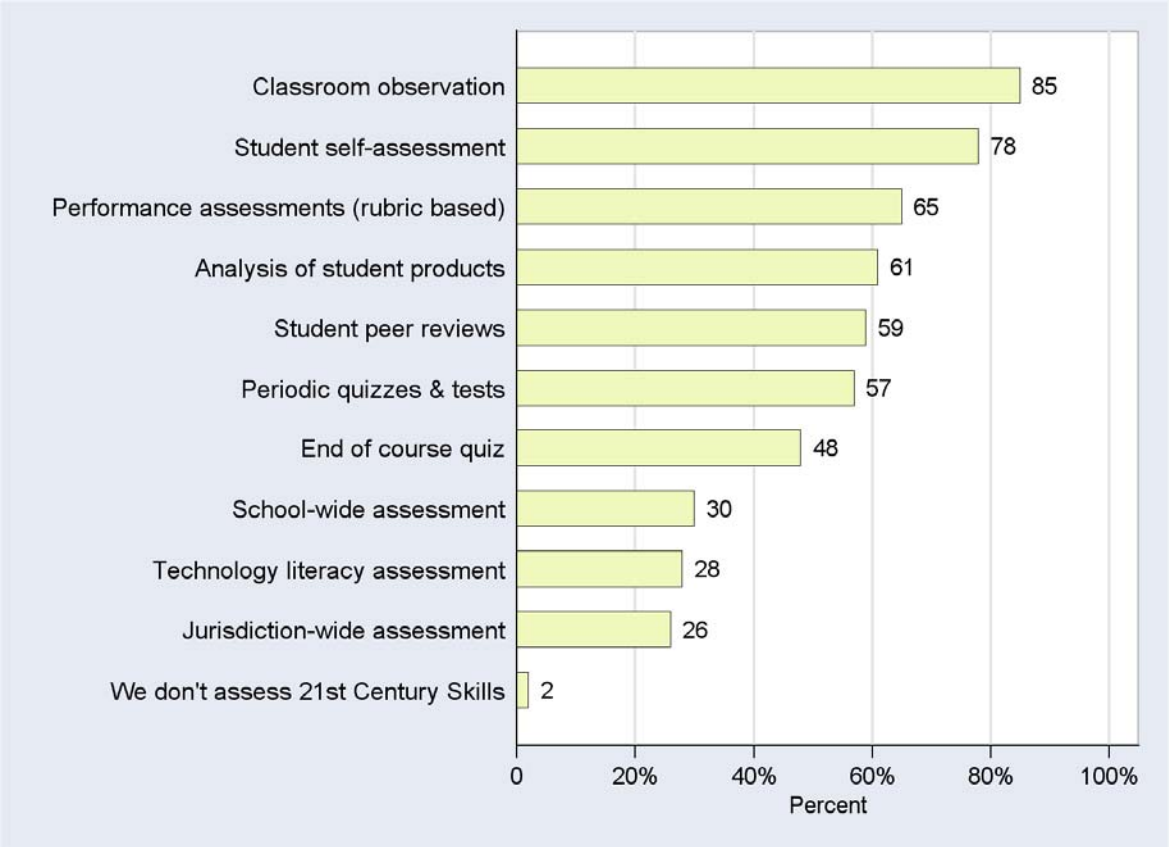
Figure 11: Teachers' ratings of student level of expertise in 21st Century Skills



n = 108 teachers. Source: Baseline 2007-08 Surveys

Administrators were asked how 21st Century skills were being assessed. The data indicated few patterns, with administrators identifying a wide variety of instruments and methods ranging from classroom observation, performance assessments with rubrics, to student self-assessment to the analysis of student products. Few indicated consistent assessments for 21st Century Skills that were used across the jurisdiction. Emerge webinar discussions further informed this finding in that most jurisdictions indicated a strong need for advice on how to assess the priority 21st Century Skills of critical thinking and teaming and collaboration.

Figure 12: Percentage of administrators who indicated routinely using the following methods to assess student attainment of 21st Century Skills



n = 46 administrators. Source: Baseline 2007-08 Surveys.

Less than 50% of teachers indicated agreement with the statement, "Students in their classrooms were clear about how they need to demonstrate their skill level with 21st Century Skills." Those data suggest there is not yet high clarity as to what students should know and be able to do with 21st Century Skills.

Engagement of Student in Learning

One of the other areas of interest in the Emerge project is student engagement in learning. Student engagement is defined as the degree to which students are actively pursuing deep learning related to established standards (e.g., cognitive/ intellectual engagement, socio-emotional engagement, and behavioral engagement). Each of these subscales is described

below:

- Cognitive engagement is the investment of effort and self-regulation by the individual student focused on deep, intellectual learning of the academics and intellectual development, as evidenced by motivation, attitude, commitment, and self-regulation.
- Socio-emotional engagement refers to students' affective reactions in and to schooling. It may be registered as interest, boredom, anxiety, happiness, etc., but is generally thought to be a measure of the identification or belonging the student associates with schooling.
- Behavioral engagement focuses on participation. The way in which students follow school rules, their level of in-class participation (e.g., academic and social), and extracurricular participation provide evidence for this category. That participation often involves such behaviors as effort, persistence, concentration, attention, asking questions, and contributing in class.

The researchers asked each of the jurisdictions to have their students take engagement surveys in Year 1. The levels of student engagement in Emerge classrooms -- as determined by the student survey results – were at moderate levels at the baseline (2007-08), with 43% of elementary (Grade 3-6) students and 26% of the secondary (Grade 7-12) students at the highest level of engagement. The engagement levels reported by the site visitors, which were based on select classroom observations from the first round of site visitations, were somewhat lower than that reported through student surveys (see Tables 5 and 6).

The student engagement surveys and the student engagement rubric used in the site visitation protocol both look at the three types of engagement: cognitive, behavioral, and socio-emotional. While the student survey does include questions on all three scales, the site visit data on engagement is limited to that which can be observed by the site reviewer, or revealed through questioning of students. Tables 5 and 6 provide data on the percentage of students at the highest levels of engagement as determined by student surveys and site reviewers' observations. The site visitors do not visit every Emerge classroom, but are trained to use an engagement rubric expertly. The researchers do not have a complete explanation for the differences in the baseline scores between students and observers, but suggest that the statistics which now matter are the direction and significance of the changes over time, not the raw baseline scores.

Table 5: Student Engagement at Baseline (2007-08) of Emerge students from all 20 jurisdictions

	Percent of Elementary Students Intrinsically Engaged		Percent of Secondary Students Intrinsically Engaged	
	According to Student Surveys*	According to Site Observers***	According to Student Surveys**	According to Site Observers***
Engaged	43%	17%	26%	12%

**n* = 948 elementary students. Source: Baseline 2007-08 Student Engagement Surveys
***n* = 773 secondary students. Source: Baseline 2007-08 Student Engagement Surveys
****n* = 20 jurisdictional site visits by researchers: Baseline Site Visitations 2007-08.

Table 6: Student Engagement in Spring 2008 of select Emerge students*

	Percent of Elementary Students Intrinsically Engaged		Percent of Secondary Students Intrinsically Engaged	
	According to Student Surveys**	According to Site Observers****	According to Student Surveys***	According to Site Observers****
Engaged	65%	21%	33%	19%

*Note: Student survey results are limited to those students not continuing into Year 2. This represented 18% of all students who completed year 1 surveys (13% of all elementary and 24% of all secondary).
***n* = 219 elementary students. Source: Spring 2008 Student Engagement Surveys
****n* = 183 secondary students. Source: Spring 2008 Student Engagement Surveys
*****n* = 20 jurisdictional site visits: Spring 2008 Site Visitations.

The Emerge project is assessing students' self-direction in learning (levels at baseline are moderate) and students' engagement in learning, but does not have consistent measures for other important 21st Century Skills such as critical thinking and teaming and collaboration. Emerge participants are seeking leadership and advice in this area.

The following recommendations are offered to the Emerge project based on the aforementioned findings:

Recommendation 7a: Alberta Education should provide provincial leadership in the assessment of 21st Century Learning. Such leadership might include: the convening of a summit on the assessment of 21st Century Skills, with invitations to key assessment experts and practitioners throughout the province; provision of rubrics for scoring technology products; provision of assessments and/or rubrics for the assessment of 21st Century skills; and standards for 21st Century Learning environments, etc.

Recommendation 7b: Alberta Education should convene Emerge participants in seminars on the assessment of critical thinking, teaming and collaboration, and other high interest 21st Century skills. Such seminars should include the use of sample assessments for 21st Century Skills (e.g., rubrics, performance assessments, portfolios, observations tools, etc.)

Recommendation 7c: Provide Emerge educators with online support and resources for fully defining, understanding, assessing, and increasing student engagement.

Summary Table: Year One Findings and Recommendations

Emerge One-to-One Laptop Learning Project

Dimension	Finding	Recommendation
Dimension 1: Vision	**Finding 1**. The vision for laptop learning within the Emerge project is evolving as participating administrators, teachers, and students explore more high tech, authentic approaches to 21st Century teaching and learning. Generally, support for the laptop for learning projects is strong among students, educators, and parents.	**Recommendation 1a.** The Emerge jurisdictions should continue their outreach communications with all educators, students, parents, and the community on all aspects of the project. Such communications should increase the awareness of these groups as to the educational value of the technology. **Recommendation 1b:** The Emerge jurisdictions should serve as a bridge to their communities, encouraging and facilitating increased parental and community involvement in authentic learning units, service learning, and performance assessments of their students.
Dimension 2: Systems Thinking	**Finding 2**.The Emerge jurisdictions recognize the need to shift to policies and practices that fully leverage the use of the laptops for 21st Century learning and deeper learning. Supportive policies, programs, and support structures are emerging, but will require innovative leadership at all levels.	**Recommendation 2a**. Alberta Education should provide provincial leadership in 21st Century Learning (e.g., a provincial summit on 21st Century Learning to create definition and urgency for action among community, business, governmental, non-profit, and education leaders; changes in policies; and strategic communication of Emerge results) **Recommendation 2b**. Alberta Education should consider administrative leadership seminars focused on 21st Century Learning, facilitating deep, interactive knowledge building among administrative leaders as to the definition of, vision for, and road to 21st Century Learning. These seminars might include hosted site visits for leaders to convene, consider, analyze, and discuss leadership practices for 21st Century Learning. **Recommendation 2c**. Emerge jurisdictions should consider systemic approaches to ensuring all teachers are advancing their students' propensity for self-directed learning and other targeted 21st Century Skills. **Recommendation 2d**. Alberta Education should consider developing performance assessments for 21st Century Skills.
Dimension 3: 21st Century Skills	**Finding 3**. While the specific skills included in each Emerge project are locally determined, three key 21st Century Skills are emerging as priorities in many Emerge projects: critical thinking, teaming and collaboration, and self-directed learning.	**Recommendation 3**. Each Emerge project should articulate a Year 2 plan for advancing the specific 21st Century Skills outlined in their proposal. This should include jurisdictional growth targets determined by baseline data along with a plan for closing the gaps between current status and the vision.
Dimension 4: 21st Century Learning Environment	**Finding 4**. In this first year, most Emerge jurisdictions are in the exploratory stages with 21st Century Learning and associated cultures. Thus, jurisdictions' uses of 21st	**Recommendation 4a.** Alberta Education should consider convening key pioneering teachers from the Emerge classrooms to develop Emerge exemplars (e.g., curricula, lesson design, foundational instructional strategies, etc.) for 21st Century Learning, especially those for effective uses of Web

Dimension	Finding	Recommendation
	Century Skills and technology are not yet fully systemic nor are the cultures fully developed. **Finding 4b**. Digital content and digital learning spaces represent uncharted territory for many Emerge projects. **Finding 4c**. Parents are generally aware and supportive of laptop learning, but few Emerge jurisdictions are using the technology to increase direct parental involvement in student learning.	2.0 for learning. **Recommendation 4b**. The Emerge project should consider convening/polling Emerge educators about digital content and digital environments for learning. Based on this information, the Emerge project should investigate how the Emerge jurisdictions might gain access to digital content generally considered as useful and necessary for Emerge classrooms. **Recommendation 4c**. Jurisdictions should consider systemic adoption of technology-based practices based on research as well as experiences within the project. Note: Systemic adoption will ensure that all students are presented with such opportunities for learning. **Recommendation 4d**. Emerge teachers should incorporate research-based strategies and designs for increasing student engagement (e.g., provide more choice, incorporate more student-directed learning into their classrooms, increase authenticity, ensure intellectual safety, etc.) **Recommendation 4e**. During the Community of Practice events, the Emerge project should convene technical and programmatic representatives to investigate the most effective and efficient ways to address digital content and digital learning spaces for teaching and learning (e.g., access to: wiki spaces, blogging, videoconferencing, virtual learning, etc.).
Dimension 5: Educator Proficiency	**Finding 5a**. While teachers generally understand how to use technology, many are still learning how to most effectively advance academic and 21st Century learning through these digital tools. **Finding 5b**. While the Emerge Community of Practice programs and local professional development programs are advancing educator proficiency, continuations and expansions of such programs will be needed if the vision for the Emerge project is to be achieved.	**Recommendation 5a**. The professional development provided for the teachers should include exemplars of 21st Century Learning, effective uses of technology, and facilitated development of curricular units and lessons that meet standards for 21st Century Learning (e.g., for critical thinking and teaming/collaboration, etc.). **Recommendation 5b**. The professional development provided for Emerge educators should be embedded, hands-on, include visual examples of exemplars, include discussions of the research-basis for the work, should allow teachers to practice targeted skills, and should include preparation for associated teacher and student assessment. **Recommendation 5c**. The Emerge project should continue facilitating online communities of practice and work to increase both the interactivity and collaboration among participants. Teachers need opportunities to share successes and lessons learned, critique new approaches to learning with laptops, and discuss/critique emergent research related to technology in order to increase the collective knowledge base. **Recommendation 5d**. The Emerge project should continue to provide educators with professional development opportunities related to authenticity and student classroom engagement (e.g., research on what types of classrooms fully engage students; the means for interpreting jurisdictional engagement data,

Dimension	Finding	Recommendation
		and tips and techniques for addressing gaps).
Dimension 6: Access and Infrastructure	**Finding 6a**. Deployment of the laptops and associated network infrastructure was accomplished fairly rapidly by all Emerge jurisdictions **Finding 6b**. Technical support systems vary considerably across the 20 jurisdictions.	**Recommendation 6a**. All jurisdictions should provide technical leadership throughout the term of the grant project and beyond. **Recommendation 6b**. All jurisdictions should ensure that wireless access is available in schools 24 hours a day, 7 days a week (24/7) throughout the term of the grant project and beyond. **Recommendation 6c**. All jurisdictions should enable students with 24/7 access to the laptops and, where possible, to 24/7 access to Internet and Intranet resources. **Recommendation 6d**. All jurisdictions should facilitate regular discussions and ensure that technology decision making is done collaboratively among the technical and instructional program staff for Emerge. **Recommendation 6e.** Through the Community of Practice, the Emerge project should facilitate discussions between the educational technology specialists and the information technology specialists in Emerge. The intent is to define "open" technological systems that are sufficiently flexible and adaptable for learning and teaching, yet still safe for students and manageable for technical staff.
Dimension 7: Accountability/ Results	**Finding 7a**. The assessment of students' 21st Century Learning has been identified as a critical component of laptop sustainability, yet remains an unmet challenge for Emerge jurisdictions. **Finding 7b**. Student engagement in learning has increased slightly from pretest to posttest for those students whose Emerge experience was limited to Year 1. (Note: only those students who were not continuing with the project were assessed at the end of Year 1. Others will be assessed in the spring of 2009, after their second year of participation.). **Finding 7c**: Teachers perceive most students' current 21st Century Skill attainment to be Novice or lower.	**Recommendation 7a**. Alberta Education should provide provincial leadership in the assessment of 21st Century Learning. Such leadership might include: the convening of a summit on the assessment of 21st Century Skills, with invitations to key assessment experts and practitioners throughout the province; provision of rubrics for scoring technology products; provision of assessments and/or rubrics for the assessment of 21st Century skills; and standards for 21st Century Learning environments, etc. **Recommendation 7b**. Alberta Education should convene Emerge participants in seminars on the assessment of critical thinking, teaming and collaboration, and other high interest 21st Century skills. Such seminars should include the use of sample assessments for 21st Century Skills (e.g., rubrics, performance assessments, portfolios, observations tools, etc.) **Recommendation 7c**. Provide Emerge educators with online support and resources for fully defining, understanding, assessing, and increasing student engagement.

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