2013

Learning and Technology Policy Framework

Alberta Government

The Building Alberta Plan

Special thanks to:

School Technology Advisory Committee (STAC) 2013

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Executive Summary

"Ultimately, the power of technology should be harnessed to support innovation and discovery, not simply to aid teaching. We need to engage learners to use these new technologies as designers and creators of knowledge."

- Inspiring Education: A Dialogue with Albertans

Inspiring Education: A Dialogue with Albertans (Inspiring Education) envisions a learner-centred, responsive education system with shared responsibility and accountability—one that engages community and provides inclusive, equitable access, flexibility and opportunities for innovation that promote excellence. It anticipates shifts in policy directions in order to build the capacity of the system to focus on students and new competencies.

To enable the new vision of education presented in *Inspiring Education*, Alberta Education launched a process in fall 2012 to update Alberta's 2004 *Learning and Technology Policy Framework*. Between October 2012 and March 2013, the School Technology Advisory Committee (chaired by School Technology Branch, with membership representing the ministry and 17 external stakeholders) and 1500 consultation participants from across the province co-created the updated *Learning and Technology Policy Framework*. This document represents their voice.

This 2013 *Learning and Technology Policy Framework* provides leadership and strategic direction for government and school authorities throughout Alberta. The framework guides government and local school authorities in developing policies to help achieve the vision of *Inspiring Education* through the innovative and effective use of technology in K–12 schools. It provides actions for bringing *Inspiring Education* to life through the innovative use of technology in learning, teaching, leadership and administration. The framework is intended to ensure coherence and alignment across Alberta's education system, including classrooms, schools, school authorities, provincial government, education partners, teacher preparation programs and professional organizations.

Five Policy Directions form the core of the framework. They are grounded in the *Inspiring Education* vision.

Policy Direction 1: Student-Centred Learning
Technology is used to support student-centred, personalized, authentic learning for all students.

Policy Direction 2: Research and Innovation
Teachers, administrators and other education professionals read, review, participate in, share and apply research and evidence-based practices to sustain and advance innovation in education.

Policy Direction 3: Professional Learning
Teachers, administrators and other education professionals develop, maintain and apply the knowledge, skills and attributes that enable them to use technology effectively, efficiently and innovatively in support of learning and teaching.

Policy Direction 4: Leadership
Education leaders establish policy and governance structures, cultivate innovation and build capacity within the system to leverage technology in support of student-centred learning and system efficiencies.

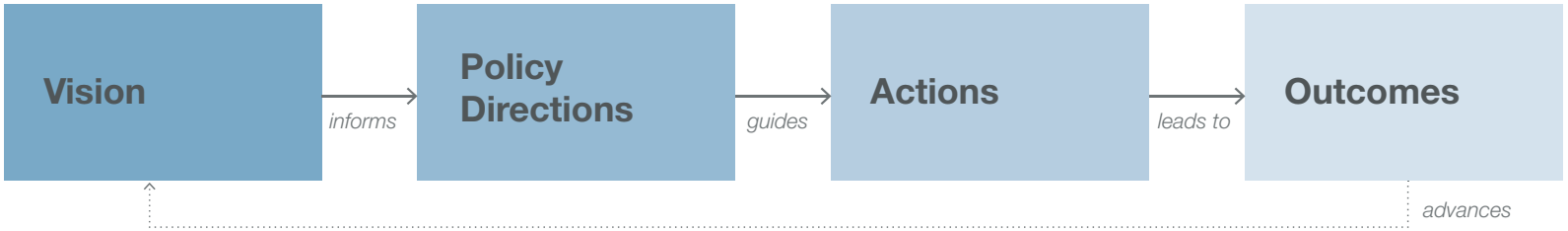
Policy Direction 5: Access, Infrastructure and Digital Learning Environments
All students, teachers, administrators and other education professionals have access to appropriate devices, reliable infrastructure, high-speed networks and digital learning environments.

1: Student-Centred Learning	2: Research and Innovation	3: Professional Learning	4: Leadership	5: Access, Infrastructure and Digital Learning Environments
Students use technology, online learning and digital learning to: a. access, share and create knowledge b. discover, develop and apply competencies, as described in the *Ministerial Order on Student Learning*, to enable students to: • know how to learn • think critically • identify and solve complex problems • manage information • innovate • create opportunities • apply multiple literacies • demonstrate good communication and cooperation skills • demonstrate global and cultural understanding • identify and apply career and life skills c. develop and apply digital citizenship and technological skills d. demonstrate what they know and are able to do through effectively using a range of resources and media e. monitor their learning progress and inform decisions through the use of data and evidence-based reasoning	Teachers, administrators and other education professionals: a. stay current with educational technology research b. participate in and apply research to learning and teaching c. use data systems and evidence-based reasoning to monitor and support personalized, student-centred learning In Alberta's education system: d. educational technology research is supported e. decision-making related to technology is informed by data and research f. technology investments are targeted to areas of greatest effectiveness and need	Digitally confident teachers, administrators and other education professionals: a. are well prepared to use technology and digital resources innovatively and effectively for learning, teaching, leadership and administration b. use technology and research to design personalized, authentic and student-centred learning opportunities to meet the diverse needs and interests of all students c. engage in professional growth opportunities that are broadened and diversified through technology, social media and communities of practice	Education leaders at all levels champion effective and innovative uses of technology for all schools. As a result: a. government and school authorities have clarity and coherence in the policies and procedures that govern educational and administrative uses of technology in all schools b. teachers, administrators and other education professionals use technology innovatively, effectively and efficiently c. economies of scale that achieve cost effectiveness and efficiencies in educational technology are realized d. up-to-date guidelines and standards on uses of technology inform school authority education plans	Students, teachers, administrators and other education professionals have support for and equitable access to: a. devices and peripherals b. digital learning environments c. facilities designed to maximize learning with technology In Alberta's education system: d. reliable infrastructures exist that support safe, secure, efficient, interoperable and sustainable networks e. technology and network governance, policy and procedures ensure access essential to achieving the vision of *Inspiring Education* f. appropriate technology is available and supported

The context for each policy direction includes a rationale/research base, associated outcomes and a set of actions for the provincial government and school authorities. The outcomes serve as targets to guide Alberta's journey towards achieving the vision of *Inspiring Education*. The outcomes will be accomplished by implementing the recommended actions, which reflect the principles guiding Alberta's education system (see figure below).

This updated policy framework is intended to serve as a policy development guide to help government and Alberta school authorities achieve the vision of *Inspiring Education* through the innovative and effective use of technology in K–12 schools. The first decade of the 21st century saw a convergence of affordable and innovative technologies, sophisticated web applications and sound research on how people best learn. The inspiration and rationale for this framework comes from that convergence—in the context of the pioneering work that has come before it. The province is well-positioned for innovation in K–12 education, with a focus on empowering students to thrive in the 21st century.

The full *Learning and Technology Policy Framework* can be downloaded at **http://education.alberta.ca/media/7645220/learning-and-technology-policy-framework.pdf**



Model for a Policy Framework

Introduction

Today's generation has seen the rise of knowledge as a key resource of the world's economy. In the future, Alberta's economy will be even more knowledge-based, diverse and grounded in value-added industries. As never before, the next generation will need to be innovative, creative and skilled in managing knowledge as a resource. It will experience a world increasingly interdependent and competitive … To truly transform education, the education system must empower innovation throughout the province.

- *Inspiring Education*

Captured in *Inspiring Education*[1] is a vision for education that represents the voice of thousands of Albertans about how to ensure success for students. *Inspiring Education* calls for more student-centred, personalized, authentic learning experiences that will result in youth becoming engaged thinkers and ethical citizens, with an entrepreneurial spirit. This vision calls for an education system that is significantly different from that of yesterday and today. One of the critical differences will be the innovative use of technology to bring this vision to life in schools across Alberta. Such transformation will require bold, innovative leadership guided by a shared vision for learning.

Policy Shifts of Inspiring Education

Technology plays a role in realizing this vision. First and foremost, technology has fueled many innovations that have had a tremendous influence on societies and economies across the globe. It has significantly changed the way people live, work and communicate. Technology also provides the opportunity to personalize learning and to engage students in deep, authentic learning that enables them to learn about what matters to them—at their own pace and regardless of place or time.

As a result of the need to shift from the use of technology to support teaching toward the use of technology by students to create and share knowledge, Alberta Education began the work of updating the 2004 *Learning and Technology Policy Framework*.

1 Alberta Education. (2010). *Inspiring Education: A Dialogue with Albertans.* Edmonton, AB: Alberta Education.

The Opportunity

Educators now have more access to technologies and emergent research on how people best learn. The opportunity for optimizing technology resides in three key imperatives—the economic, the cognitive and the social.

The economic imperative

Technology, in combination with human ingenuity, has fueled tremendous societal and economic shifts across the globe. Technologies are woven into the fabric of today's society and, as such, must be integrated into the fabric of Alberta's education system.

Alberta has led the nation in average annual economic growth for two decades. It is staged to continue that trend in 2013.[2] While the energy sector is Alberta's driving economic force, the province is becoming increasingly economically diversified through advances in fields such as petrochemicals, agriculture, forest products, industrial machinery, tourism and information and communications technologies. Alberta Innovates, a branch of the Alberta Research and Innovation Authority (ARIA), is focused on solving the world's biggest problems with the best in research and innovation. This will require graduates from Alberta's schools who are ready to engage in critical and creative thinking, innovation and entrepreneurship.

The cognitive imperative

Research from the learning sciences, psychology and neuroscience provides a sound basis for shifting the focus of schools to the student through personalization and authentic learning experiences. The research is clear—students learn best when they:

- learn in the context of the real world, where their academic studies help them make sense of the real world
- are self-directed in their learning
- learn collaboratively
- exercise some choice in their learning
- exercise some control in the pace of their learning
- receive immediate feedback targeted to scaffold their learning
- build on their prior knowledge base
- learn with instructional multimedia that is interactive and expertly designed
- are taught by teachers who personalize their learning to address personal interests, meet personal needs and offer novelty and variety in learning

Most of these research findings are difficult to scale to all students without technology, and most are not possible to accomplish routinely without technology. The technology enables student-centred learning focused on new competencies. In turn, studies show a connection between the teaching of higher order thinking in classrooms with a region's economic viability.[3]

2 Alberta Enterprise and Advanced Education. (2013). Highlights of the Alberta Economy 2013. Accessed 02/25/13 from http://albertacanada.com/files/albertacanada/SP-EH_highlightsABEconomyPresentation.pdf.

3 Hanushek, E. A., & Woessmann, L. (2008). The role of cognitive skills in economic development. Journal of Economic Literature, 46(3), 607-668.

The community imperative

Thousands of Albertans' voices are represented in *Inspiring Education's* vision for 21st century learning. One of the tenets of that vision is the engagement of the larger community as a true partner in learning. As noted in *Inspiring Education*, "The community can be a source of leadership, teaching, and support through the participation of experts, mentors, and elders." The community extends the learning environment to a variety of entities, including cultural groups, the business community, post-secondary institutions and not-for-profit organizations.

As one Alberta educator so eloquently stated, "Technology serves as an enabler and accelerator of the type of learning that research says works best."

What is the *Learning and Technology Policy Framework*?

The framework is a roadmap—a set of principles, policy directions, outcomes and actions that are intended to guide government and school authorities in visioning, planning and decision-making related to technology. The 2013 framework serves as a policy development guide to help government and Alberta school authorities achieve the vision of *Inspiring Education* through the innovative and effective use of technology in an inclusive K–12 education system.

Alberta's updated *Learning and Technology Policy Framework* was co-created by over 1,500 Albertans between October 2012, and March 2013. The consultations were participatory and collaborative, intended to engage participants in dialogue and discussion that informed the process. The School Technology Advisory Committee (STAC) served as the primary authors and advisors for the development of the framework. STAC convened for five all-day sessions during which they contributed, reviewed and commented on drafts and provided recommendations on issues related to the *Learning and Technology Policy Framework*. This framework builds on the 2004 version, on the pioneering work of Alberta school authorities over the last decade and on Albertan's vision of the way forward.

The key elements of the updated *Learning and Technology Policy Framework* include:

- the vision of *Inspiring Education*, which serves as the long-term outcome for the framework
- the learning principles that guide our work
- the five policy directions and associated descriptions, research, outcomes and actions

The updated *Learning and Technology Policy Framework* supports student-centred, personalized, authentic learning. The framework positions technology as an enabler, bringing the vision of *Inspiring Education* to life in schools across the province.

A Vision for Learning in Alberta

The vision of *Inspiring Education* is represented by three long-term outcomes, known as "the three E's" of education (**engaged** thinker, **ethical** citizen with an **entrepreneurial** spirit) in the context of a set of new competencies. The competencies are:

- Know how to learn—to gain knowledge, understanding or skills through experiences, study and interaction with others
- Think critically—conceptualize, apply, analyze, synthesize and evaluate to construct knowledge
- Identify and solve complex problems
- Manage information—access, interpret, evaluate and use information effectively, efficiently and ethically
- Innovate—create and generate new ideas or concepts
- Create opportunities—through play, imagination, reflection, negotiation and competition—with an entrepreneurial spirit
- Apply multiple literacies—reading, writing, mathematics, technology, languages, media and personal finance
- Demonstrate good communication skills and the ability to work cooperatively with others
- Demonstrate global and cultural understanding
- Identify and apply career and life skills

The following is an excerpt from *Inspiring Education*. It presents the vision from the perspective of educated Alberta students and adults.

Engaged Thinker:

"I collaborate to create new knowledge."

I am competent in the **arts and sciences**, including **languages**. I know how to **think critically and creatively** and how to make discoveries—through inquiry, reflection, exploration, experimentation and trial and error. I use technology to learn, innovate, collaborate, communicate and discover. I have developed a **wide range of competencies** in many areas including the gathering, analysis and evaluation of information.

Because I am familiar with multiple perspectives and disciplines, I can first identify problems and then find the best solutions. As a team member, I integrate ideas from a variety of sources into a coherent whole and communicate these ideas to others.

As I have grown up, I have seen many changes in society and the economy. **I adapt to change** with an attitude of optimism and hope for the future. As a **life-long learner**, I believe there is no limit to what knowledge may be gleaned, what skills may be accumulated and what may be achieved in cooperation with others. And always, I keep growing and learning.

Ethical Citizen:

"I do the right thing because it is the right thing to do."

It's not all about me. I have learned about and appreciate the effort and sacrifice that built this province and country. My education has helped me see beyond my self-interests to the needs of the community. As a result, **I contribute** fully to the world around me—economically, culturally, socially and politically. As a **steward of the earth**, I minimize environmental impacts wherever I go.

I build relationships through humility; fairness and open mindedness; and with **teamwork** and communication. I engage with many cultures, religions and languages. This enables me to **value diversity** in all people and adapt to any situation. I demonstrate respect, **empathy** and compassion for all people.

I can **care for myself** physically, emotionally, intellectually, socially and spiritually, yet I am able to ask for help when needed from others and for others. I am well-prepared to **assume the responsibilities** of life – whether they be the duties of a parent, a neighbour, a mentor, or an employee or employer.

Entrepreneurial Spirit:

"I create new opportunities."

I am motivated, **resourceful** and **self-reliant**. Many people describe me as tenacious because I continuously set goals and work with perseverance and discipline to achieve them. Through hard work, **I earn my achievements** and the respect of others. I strive for **excellence** and personal success.

I am **competitive** and ready to challenge the status quo. I explore ideas and technologies by myself and as part of diverse teams. I am resilient and adaptable and have the ability and determination to transform my discoveries into products or services that benefit my community and by extension, the world.

I have the confidence to take risks and make bold decisions in the face of adversity, recognizing that to hold back is to be held back. I have the courage to dream.

Achieving this vision will require a significant shift in the policy, practices and procedures of Alberta's education system.

The Role of Technology in Achieving the Vision

"If we are to shape the future of education and not have it shaped for us, we must become more purposeful in our approach to technology. We need to understand what may be emerging, its implications, and how it can be used for education. Ultimately, the power of technology should be harnessed to support innovation and discovery, not simply to aid teaching. We need to engage learners to use these new technologies as designers and creators of knowledge."

- *Inspiring Education*

One of the key roles technology can serve in K–12 education is to shift the focus from the system, school and content toward learning and the learner, building competencies and enabling the learner to create and share knowledge. Technology is recognized as playing an integral role in creating student-centred, personalized, authentic learning environments.

Innovative and routine uses of technology:

- enable students to research information, construct and creatively express their knowledge and collaborate and communicate with peers and experts worldwide
- enable innovative approaches to teaching and learning that improve the quality of students' learning experiences while increasing student choice
- enhance professional learning opportunities and experiences
- increase the capacity of the education system to support improved student learning by realizing data, management and administrative efficiencies
- improve data analyses, information sharing and communication within and beyond the school community.

This updated *Learning and Technology Policy Framework* is based on the belief that digital technologies play an integral role in preparing students as future global citizens.

The Principles

The following principles, identified in *Inspiring Education*, are key to achieving Alberta's vision for learning. The chart below presents *Inspiring Education*'s description of the principle and identifies the role that technology plays in supporting that principle.

Principle	Description	Role of Technology
Learner-centred	Decision makers should consider the needs of children and youth first and foremost when making decisions.	Technologies enable students to learn at their own pace, anywhere, at any time. Digital content, assistive technologies, online learning and other tools provide platforms for personalizing learning for each student.
Shared Responsibility and Accountability	Acknowledging that parents are the primary guides and decision-makers for children, all partners in education should share responsibility and accountability for education outcomes.	Technology enables open lines of communication between all partners in education. This offers parents, students and teachers the ability to track progress, stay informed and work together to improve learning.
Engaged Communities	Community resources should be fully engaged to support learners, including expertise, facilities, services and learning opportunities. Community resources—whether local, provincial, national or global—should actively participate in the education of learners.	Today's technologies provide a window to the world. Local, provincial, national and global connections enable authentic, real-world contexts to the students' academic studies.
Inclusive, Equitable Access	Every learner should have fair and reasonable access to educational opportunities regardless of ability, economic circumstance, location, or cultural background. Their needs and ways of life should be respected and valued within an inclusive learning environment. Some learners will require additional, specialized supports to fully access these opportunities.	Technology can provide equitable access to learning opportunities (e.g., online learning; multimodality of digital content; specialized software, apps or websites to accommodate unique learning needs).
Responsive, Flexible Approach	Children and youth should have meaningful learning opportunities appropriate to each learner's developmental stage, including learning that is experiential, multi-disciplinary, community-based and self-paced. To ensure the learning opportunities are relevant, the education system must be nimble in responding to the changing needs of communities and the world.	The access to networked technologies can provide students with expanded educational opportunities. Technologies enable teachers to adapt resources, activities and instructional strategies to better meet the needs of each student, offering authentic learning as well as community-based, independent and global learning.
Sustainable and Efficient Use of Resources	Decision-makers should identify and adopt strategies and structures that optimize resources (financial and human) and minimize duplication.	Technology can serve as a vehicle for optimizing and sharing resources, minimizing duplication and providing data to monitor progress over time.
Innovation to Promote and Strive for Excellence	Creativity and innovation are central to achieving excellence in education. Learners, educators and governors must be creative, innovative and entrepreneurial to attain the highest possible standards.	Creativity and innovation are fostered through access to new people, experiences, ideas, cultures and locations. Technology offers options for such connections as well as a platform for creation and sharing.

The *Learning and Technology Policy Framework*

The 2013 policy framework is intended to serve as a policy development guide to help government and Alberta school authorities achieve the vision of *Inspiring Education* through the innovative and effective use of technology in K–12 schools. The first decade of the 21st century saw a convergence of affordable and innovative technologies, sophisticated web applications and sound research on how people best learn. The inspiration and rationale for this updated framework comes from that convergence—in the context of the pioneering work that has come before it.

At the centre of the policy framework are five interdependent policy directions:

1. Student-Centred Learning
Technology is used to support student-centred, personalized, authentic learning for all students.

2. Research and Innovation
Teachers, administrators and other education professionals read, review, participate in, share and apply research and evidence-based practices to sustain and advance innovation in education.

3. Professional Learning
Teachers, administrators and other education professionals develop, maintain and apply the knowledge, skills and attributes that enable them to use technology effectively, efficiently and innovatively in support of learning and teaching.

4. Leadership
Education leaders establish policy and governance structures, cultivate innovation and build capacity within the system to leverage technology in support of student-centred learning and system efficiencies.

5. Access, Infrastructure and Digital Learning Environments
All students, teachers, administrators and other education professionals have access to appropriate devices, reliable infrastructure, high-speed networks and digital learning environments.

The context for each policy direction includes a rationale/research base, associated outcomes and recommended actions for the provincial government and school authorities. The outcomes serve as targets to guide Alberta's journey towards achieving the vision of *Inspiring Education*. They will be accomplished by implementing the recommended actions, which reflect the principles that guide Alberta's education system.

The interplay between the elements of the framework is represented in Figure 1.

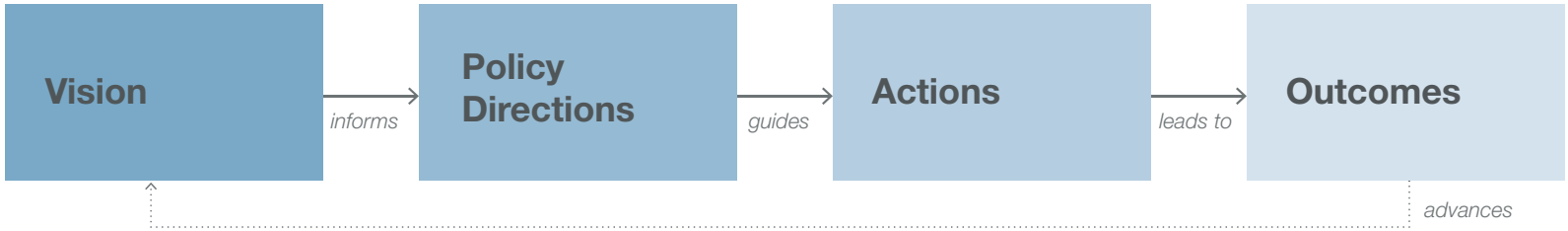


Figure 1: Model for a Policy Framework

Policy Direction 1: Student-Centred Learning

Technology is used to support student-centred, personalized, authentic learning for all students.

DEFINITIONS

Authentic Learning is real-world learning where students investigate important questions, construct knowledge and apply their learning outside of the classroom.

Digital Resources are educational documents, content and processes that are in digital formats.

Digital Learning uses digital media and technology in a significant way to support learning.

Online Learning is education in which instruction and content are delivered primarily over the Internet.

Personalized Learning focuses on learners—their individual needs, passions, interests and learning abilities—and encompasses meaningful connections, engaging learning experiences and flexible learning environments that support choice, collaboration, student voice and shared ownership (co-investment) in learning.

Student-Centred Learning is learning where the child is the centre of all decisions related to learning and education.

Rationale

Students today live in an increasingly knowledge-based and globally interconnected society, impacted by evolving economic, environmental and social conditions. To achieve success and fulfillment as citizens, students need to be self-directed learners, critical thinkers and problem solvers. In today's networked communities, communication and collaboration skills are essential skills. Due to the complexity and rapid rate of change in contemporary society, students will need to be flexible, creative and innovative as they adapt to the changes around them. Preparing students to become independent, lifelong learners with such a repertoire of competencies requires that education systems shift to student-centred learning.

In student-centred learning, the child is the centre of all decisions related to learning and education. Teachers are the chief architects of student learning. They plan, design and oversee learning activities as they consider the interests, passions, talents, abilities and natural curiosities of the learner. This calls for personalization of learning. Personalized learning encompasses meaningful connections, engaging learning experiences and flexible learning environments that support choice, collaboration, student voice and shared ownership in learning.[4]

An important role of the teacher is to inspire, motivate and plant the seeds of life-long learning. When students are engaged in authentic real-world learning, where students investigate important questions, construct knowledge and apply their learning outside of the classroom, they are intrinsically motivated to make sense out of the world around them—to learn.

4 Alberta Education. (2010). *Inspiring Education: A Dialogue with Albertans.* Edmonton, AB: Alberta Education.

Research/Background

Over the last 20 years, the learning sciences, neuroscience and psychological sciences have built a strong knowledge base for understanding how people best learn. The challenge for educators today is one of implementation—how to ensure that every child has access to research-based learning opportunities. Technology represents a vehicle to move schools into more research-based, student-centred learning. The following are highlights of emergent research on increasing student learning and ideas for how technology can be leveraged to bring these research findings to life in Alberta schools. This list is not meant to be exhaustive, but rather indicative of emergent research.

The strategic use of feedback can double the rate of student learning.

Researcher Dylan Wiliam has argued that effective feedback can double the rate of learning.[5][6] For example, peer and teacher reviews can be embedded digitally in student work; students can monitor their own progress through online portfolios or simple spreadsheets; discussions can take the shape of blog interactions, wiki entries or online threaded conversations; and collaborative digital learning spaces can offer opportunities for important interactions and feedback.

Students who are self-directed do well in school and in life.

Self-direction is the capability and natural tendency to set goals related to learning, plan for the achievement of these goals, independently manage time and effort and independently assess the quality of learning and associated products.[7] Studies indicate that self-directed learners understand concepts more deeply and achieve at higher levels than their peers.[8][9] Technology can support student self-direction. For example, students can use calendars to do their advance planning, with alerts to keep them on schedule; rubrics can be available digitally so students can continually self monitor the quality of their work; and digital forms of their work enable multiple revision cycles based on feedback.

Providing students with choice acts as a motivator that increases and deepens student learning.

One of the most effective ways in which to engage students intrinsically is to provide them with choice within a safe learning environment that encourages measured risk-taking and innovation. This increases their

5 Wiliam, D. (2010). "The role of formative assessment in effective learning environments." *The Nature of Learning: Using Research to Inspire Practice*. OECD Publishing. doi: 10.1787/9789264086487-8-en.

6 Wiliam, D. (2007). "Changing classroom practice." *Educational Leadership* 65(4): 36

7 Metiri Group and NCREL. (2003). "enGauge: 21st Century Skills for 21st Century Learners." Accessed February 25. http://www.metiri.com/features.html.

8 Fetcher, A.K. and G. Shaw. (2012). "How Does Student-Directed Assessment Impact on Learning? Using Assessment as a Learning Process." Journal of Multiple Research Approaches Vol 6, No 3.

9 National Research Council. (2012). Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century. Committee on Defining Deeper Learning and 21st Century Skills, J.W. Pellegrino and M.L. Hilton, Editors. Board on Testing and Assessment and Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

motivation and perseverance, thus deepening learning.[10] [11] [12] Technology opens the door to choice by providing students with multiple ways to learn, communicate, collaborate, ask important questions, solve problems and demonstrate what they know and can do.

Building on the prior knowledge of students increases learning.

A key element of student-centred learning is building on students' existing knowledge, adjusting for any preconceptions or misconceptions they may have prior to the study of a topic.[13] Technology enables teachers to collect, analyze and interpret data on students' prior knowledge, skills, beliefs and attitudes about subjects they will be teaching. Through online surveys, observational notes organized digitally and student reflections in online portfolios, teachers can gain insights into students' preconceptions, and perhaps misconceptions, that must be addressed before deep learning can take place.

Working collaboratively on complex tasks increases and deepens student learning.

Students working collaboratively outperform students who are working competitively or individually when the tasks are moderately or highly complex.[14] Technology enables collaboration in school and beyond. For example, technology enables document exchanges, joint work on documents in shared workspaces where multiple students can work simultaneously, wikis, blogs, texting, chat rooms and communities of interest.

10 Fredricks, J. A., P.C. Blumenfeld, and A.H. Paris. (2004). "School engagement: Potential of the concept, state of the evidence." Review of Educational Research, 74(1): 59.

11 Hattie, J. (2009). Visible Learning: A synthesis of over 800 meta-analyses relating to achievement. New York: Routledge. Location 8492-8502.

12 Ibid, Location 6728.

13 Bransford, J. D., and A.L. Brown, and R. Cocking. (1999). How people learn: Brain, mind, experience, and school. Washington, DC: National Academy Press.

14 Johnson, D. W., and R.T. Johnson. (1994). Learning together and alone: Cooperative, competitive, and individualistic learning. Needham Heights, MA: Allyn and Bacon.

Outcomes

Students use technology, online learning and digital learning to:

a. access, share and create knowledge

b. discover, develop and apply competencies across subject and discipline areas for learning, work and life, as described in the *Ministerial Order (#001/2013) on Student Learning*, to enable students to:

- know how to learn: to gain knowledge, understanding or skills through experience, study, and interaction with others
- think critically: conceptualize, apply, analyze, synthesize, and evaluate to construct knowledge
- identify and solve complex problems
- manage information: access, interpret, evaluate and use information effectively, efficiently, and ethically
- innovate: create, generate and apply new ideas or concepts
- create opportunities through play, imagination, reflection, negotiation, and competition, with an entrepreneurial spirit
- apply multiple literacies: reading, writing, mathematics, technology, languages, media, and personal finance
- demonstrate good communication skills and the ability to work cooperatively with others
- demonstrate global and cultural understanding, considering the economy and sustainable development
- identify and apply career and life skills through personal growth and well-being

c. develop and apply digital citizenship and technological skills

d. demonstrate what they know and are able to do through effectively using a range of resources and media

e. monitor their learning progress and inform decisions through the use of data and evidence-based reasoning

Actions

School Authorities:

a. establish a vision for technology-supported, student-centred learning and attainment of competencies for all students in an inclusive K-12 education system.

b. develop a coherent alignment for the use of technology across curriculum (i.e., programs of study, assessment, learning and teaching resources), instruction and online and digital learning

The Ministry of Education:

a. aligns curriculum (i.e., programs of study, assessment, learning and teaching resources), workforce planning and professional standards, digital resources, technology investments and other key initiatives with the five policy directions

b. ensures coherence across initiatives, programs and policies of the provincial government regarding technology for learning, teaching, administration and management

c. provides guidance and support for online and digital learning

The outcomes and actions from each of the five policy directions are interdependent.

Policy Direction 2: Research and Innovation

Teachers, administrators and other education professionals read, review, participate in, share and apply research and evidence-based practices to sustain and advance innovation in education.

DEFINITIONS

Evidence-based reasoning is the process of identifying evidence and drawing logical conclusions based on this evidence. Evidence is considered to have three major credentials: its relevance, its believability and its inferential force or weight with respect to the context.

Innovation is a creative work or idea that has caused significant change within a system.

Research is an investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws.

Rationale

To truly transform education, the education system must empower innovation throughout the province.
- *Inspiring Education*

"It is incumbent upon education leaders in Alberta to create cultures of innovation in every school. Technology has been melded into the fabric of today's society, and technology will be a critical part of educational innovations in Alberta. Students must be prepared to thrive in a high-tech, networked society."

- School Technology Advisory Committee member

Research/Background

Over the past two decades, the learning sciences, neurosciences and education psychology fields have collectively developed a rich knowledge base on how people best learn. That research base strongly supports student-centred, personalized learning. Numerous meta analyses have been conducted that summarize large bodies of research. Key sources include:

- Hattie's (2009) syntheses of over 800 meta-analyses relating to achievement [15] [16]
- Marzano's (2007) synthesis of "What Works Instructionally" [17]
- Mean's (2012) synthesis of online learning[18]

Such research must be considered in the context of the informed insights and perspectives of educators. The findings from the research conducted over the last decade in Alberta also serve as important sources of guidance.

Student-centred, personalized learning requires that teachers, administrators and other adults deeply understand what the research says works and be adaptable and innovative as they apply that research in practice. Thus, the education community is seeking new ways to approach the use of evidence that are more responsive to the rapid change cycles of technology. A report from the U.S. Department of Education[19] provided insights into how the education community needs to "expand evidence approaches for learning in a digital world."

The report acknowledged the transition in education to digital resources but stressed that "technology based resources and interventions must be up to the task." The authors of the report recommended that teachers and other education professionals test innovative use of digital resources and digital content in their classrooms by using rapid cycles of prototyping, thus gaining insights into the efficacy of the innovation.

As students and teachers begin to use the tremendous range of digital resources and online learning now available, it becomes increasingly important to bring coherence and transparency to that learning. That calls for the establishment of digital learning environments that enable innovation. Such environments should include:

- learning, content and resource management systems
- document management
- communication and collaboration tools/systems
- search and navigation tools
- web 2.0 and social media tools/systems
- digital repositories for digital resources/digital content

Such systems offer differentiated levels of access (teacher, administrator, student and parent) that provide transparency and collaboration focused on student progress. Such systems provide

15 Hattie, J. (2009). *Visible Learning: A synthesis of over 800 meta-analyses relating to achievement*. New York. Routledge.

16 Hattie, J. (2011). Visible learning for teachers: Maximizing impact on learning Routledge.

17 Marzano, R. J. (2007). The art and science of teaching: A comprehensive framework for effective instruction. Alexandria, VA: ASCD.

18 U.S. Department of Education, Office of Planning, Evaluation, and Policy Development. (2010). Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies. Washington, D.C.

19 U.S. Department of Education. (2012). Expanding Evidence Approaches for Learning in a Digital World. Office of Educational Technology.

opportunities for educational innovations by students, teachers, administrators and other education professionals. Experts recommend that schools set a clear vision, develop an evidence-based culture of innovation and establish indicators and metrics for success that align the vision of student-centred learning. Within this environment, it will be important that students are self-directed as they use such data to set and monitor targeted learning goals. [20]

Outcomes

Teachers, administrators and other education professionals:

a. stay current with educational technology research
b. participate in and apply research to learning and teaching
c. use data systems and evidence-based reasoning to monitor and support personalized, student-centred learning

In Alberta's education system:

d. educational technology research is supported
e. decision-making related to technology is informed by data and research
f. technology investments are targeted to areas of greatest effectiveness and need

20 Hamilton, L., and R. Halverson, and S. Jackson, and E. Mandinach, and J. Supovitz, and J. Wayman. (2009). "Using student achievement data to support instructional decision making." (NCEE 2009-4067). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Accessed Feb 25. http://ies.ed.gov/ncee/wwc/PracticeGuide.aspx?sid=12.

Actions

School Authorities:

a. create cultures of innovation in the use of technology for learning, teaching, management and administration that are informed by research and evidence-based reasoning
b. review policies and practices to ensure they support the use of research-based pedagogies, digital resources, support systems and digital learning environments that enable student-centred learning in all schools
c. encourage, build the capacity of and support teachers, administrators and other education professionals in their review, participation in and application of research related to technology, online learning and digital learning

The Ministry of Education:

a. facilitates collaborative development of research among school authorities and research institutions
b. facilitates research-based educational technology innovations among school authorities, post-secondary institutions and the provincial government
c. supports province-wide exchanges and collaborations related to research and research-based models and practices related to educational technology, online learning and digital learning
d. hosts an online provincial resource for educational technology research

The outcomes and actions from each of the five policy directions are interdependent.

Policy Direction 3: Professional Learning

Teachers, administrators and other education professionals develop, maintain and apply the knowledge, skills and attributes that enable them to use technology effectively, efficiently and innovatively in support of learning and teaching.

DEFINITION

Professional learning is defined here to be the gains in attributes, skills and knowledge achieved through formal and informal professional opportunities by teachers, administrators or other education professionals.

Rationale

Alberta has set ambitious goals for student learning, with increasing emphasis on complex, higher-order thinking, entrepreneurial spirit, ethical citizenry and 21st century competencies. This will require innovative, equitable and effective uses of technology. Changes of the magnitude envisioned will require a high-quality system of teacher preparation and ongoing professional learning for teachers.

Teachers, administrators and other education professionals have an important role to play in ensuring sound technology use in learning and teaching. They will need to:

- collaboratively develop and implement a shared vision for technology in education within their school community
- recognize the value of technology in education and model, communicate and promote such use within the school and school community
- enable and support the deliberate and purposeful infusion of technology in education to improve pedagogical practice and student learning
- participate in professional communities of practice
- promote digital citizenship with students
- remain current in terms of technology trends that impact education and explore opportunities to support the evolving digital culture

Research/Background

Increasingly, ministries of education are defining teacher effectiveness as a combination of knowledge and expertise, changes in classroom practices and impact on student learning. Lifelong professional learning is an essential condition in addressing these critical elements.[21] [22]

The attributes of highly effective professional learning have been established by leaders in the field. They include, for example, content focus, follow-up, active learning, feedback and collaborative examination of student work.[23] [24] Regarding professional development related to effective and innovative uses of technology for learning and teaching, studies have found that:

- Just teaching teachers how to use technology may result in changes in students' attitudes toward learning, but teaching teachers how to use technology in the context of problem-based learning gets positive results in students' attitudes and in their content knowledge and classroom behaviour. [25]
- Professional development that engages teachers in instructional inquiry across an extended time period through collaborative communities of practice work is effective, both in improving instruction and student achievement. The problem is that such professional development is still not the norm. This is mostly due to two barriers: the lack of shared meeting time and a shortage of teachers in the same subject area. Technology via videoconferencing or web-based communities of practice can address both barriers.[26]

Other research has found that there are generally three outcomes for professional development that happen in the following order: (1) changes in teachers' beliefs and attitudes, (2) changes in teachers' classroom practices and (3) changes in student learning outcomes.[27] Reaching the last two stages requires continued support from school leaders as teachers begin to translate the shift in practice. In order to accomplish the shift to more student-centred learning through technology, professional development must occur within the context of enabling whole-school innovation.

Technology can be a powerful vehicle to ensure that teachers get the follow-up, feedback and ongoing support they need to shift their practice. It can also reach across distances and time to connect isolated teachers with collaborative activities. For example, the analysis of student work could be facilitated by privately posting such work and facilitating online peer reviews and discussions.

21 Lemke, C. (2010). "Professional Development: Ensuring a Return on the Investment". Commissioned by Intel. Accessed June 11. http://www.intel.com/content/dam/doc/white-paper/education-professional-development-paper.pdf

22 Darling-Hammond, L. (2010). *The flat world and education: how America's commitment to equity will determine our future*. New York, NY: Teachers College Press.

23 Ingvarson, L., and M. Meiers, and A. Beavis. (2005). "Factors affecting the impact of professional development programs on teachers' knowledge, practice, student outcomes & efficacy." Education Policy Analysis Archives 13: 10.

24 Yoon, K. S., and T. Duncan, and S.W.Y. Lee, and B. Scarloss, and K.L. Shapley. (2007). "Reviewing the evidence on how teacher professional development affects student achievement" *Issues & Answers report* REL 2007–no. 033. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest.

25 Walker, A., and M. Recker, and L. Ye, and M.B. Robertshaw, and L. Sellers, and H. Leary. (2012) "Comparing technology-related teacher professional development designs: A multilevel study of teacher and student impacts". *Educational Technology Research and Development* Volume 60: 1-24.

26 McConnell, T. J., and J.M. Parker,and J. Eberhardt, and M.J. Koehler, and M.A. Lundeberg. (2012). "Virtual professional learning communities: Teachers' perceptions of virtual versus face-to-face professional development." *Journal of Science Education and Technology* 1-11.

27 Guskey, T. R. 2002. "Does it make a difference? Evaluating professional development." *Educational Leadership* 59(6): 45-51.

Similarly, video examples of new instructional practices could be captured by the teacher and privately posted for peer feedback. For many educators, follow-up and feedback can only be accomplished through online communication.

The single most important influence in student learning is the quality and effectiveness of teaching. Ensuring that teachers have the attitudes, skills and knowledge for effective use of technology in a student-centred environment requires articulation, collaboration and coherence between the K-12 education system and faculties of education.

Outcomes

Digitally confident teachers, administrators and other education professionals:

a. are well prepared to use technology and digital resources innovatively and effectively for learning, teaching, leadership and administration

b. use technology and research to design personalized, authentic and student-centred learning opportunities to meet the diverse needs and interests of all students

c. engage in professional growth opportunities that are broadened and diversified through technology, social media and communities of practice

Actions

School Authorities:

a. use data and research to inform the design of professional programs and to ascertain and increase the effectiveness of such programs in making progress toward local goals and priorities

b. use technology to provide options in the type, duration, pedagogy, location, medium and formality of professional development and to differentiate, within professional development offerings, to meet teacher-participants' needs while also achieving local goals and priorities

c. position the school as an innovative learning community that uses technology to engage students, teachers, administrators, other education professionals and their community in 21st century learning

The Ministry of Education:

a. ensures that the professional standards for teachers and administrators reflect the five policy directions in the *Learning and Technology Policy Framework*

b. works with post-secondary institutions and teacher preparation programs to achieve alignment with the *Learning and Technology Policy Framework* across the province

The outcomes and actions from each of the five policy directions are interdependent.

Policy Direction 4: Leadership

Education leaders establish policy and governance structures, cultivate innovation and build capacity within the system to leverage technology in support of student-centred learning and system efficiencies.

DEFINITIONS

Governance, in the context of the Government of Alberta, is often understood as the process by which the government assures outcomes. However, in the larger context it is the action undertaken by government in partnership with other organizations and citizens to establish and implement policy. Policy needs to be continually reviewed and refreshed and the community needs to be involved in its implementation.

Creativity is the production of a product, work or idea that is both novel and useful or valued.

Rationale

Inspiring Education calls for governance that fully engages the community to ensure integrated support and learning opportunities. As stated in *Inspiring Education*, "Governance can better include the community by linking many different stakeholders—both traditional and non-traditional—into a governance team: parents; families; educators; and representatives of municipalities; cultural groups; professional and not-for-profit organizations; businesses; employer groups; libraries; post-secondary institutions; First Nations, Métis and Inuit communities; and government bodies with interests in children and education."

This policy direction honours the lessons learned through years of research in Alberta. School authorities across the province lead locally by embracing research findings, policy directions and principles of learning within the context of a collaborative and distributive leadership. That leadership is supported through professional learning communities, capacity building and cultures of innovation.

Over the last five years, Alberta Education has provided sound guidance on issues related to technology leadership, governance and planning, in part through the following initiatives:

- Emerge One-to-One Laptop Learning, which investigated educational benefits, technical merits and innovative practices in a one-to-one mobile computing environment
- Technology and High School Success, which investigated effective uses of technology to improve student engagement and success in high school
- Innovative Classrooms, which ensured that all Grade 1 to 12 classrooms in the province are equipped with key technologies that promote innovative teaching and learning
- Supporting Innovative Classrooms, which focused on innovative practices in the areas of technology management and leadership development for the effective use of technology.

Research/Background

Leadership matters.

Alberta is renowned internationally for its long-term, strategic commitment to school improvement and is recognized for its high standing on the Programme for International Student Assessment (PISA) tests. A recent Alberta publication reported, "A stronger emphasis on collaborative leadership, developed through teacher leadership, capacity building and professional learning communities, increasingly contributed to the improvement of student engagement and learning."[28] The report findings are summarized in the excerpt below:

Alberta research projects show that leadership is critical to school improvement and attest to the power of a distributive and dynamic blend of formal and informal leadership. The following findings acquired through Alberta research projects are supported by the literature on effective leadership:

- Educational leadership models are becoming less centralized and more distributive.
- Formal leadership is critical to the successful implementation of change and innovation.
- Distributed leadership among formal and informal leaders contributes to capacity building.
- Strong teams play a key leadership role in successful projects

28 Alberta Initiative for School Improvement (AISI). (2013). "Spotlight on Leadership: What we have learned from AISI." Accessed February 18. http://education.alberta.ca/media/6828256/spotlight-on-leadership-jan-2013.pdf.

Internationally, research on leadership and change management finds that, "Providing leadership in the integration, cohesion and alignment of school improvement initiatives is a complex process of change and innovation." [29]

Policy Direction 4 is about setting a compelling, forward-thinking vision, building the capacity of the education system to achieve the vision, systemically ensuring innovation in schools and scaling those innovations that demonstrate potential. Chris Dede of Harvard University indicates that, to accomplish scaling up of innovation, five considerations by leadership are critical:

- Depth: Changing classroom practice, teachers' beliefs, norms of social interaction and pedagogical principles as enacted in the curriculum.
- Sustainability: Maintaining those changes over time.
- Spread: Diffusion of the innovation to large numbers of classrooms and schools.
- Shift: Districts, schools and teachers assuming ownership of the innovation and spreading its impact.
- Evolution: Ongoing revision of the innovation by those adapting it.[30]

A shift in thinking about learning is often required in order to leverage the full potential technology brings to learning and teaching. That shift in thinking requires leadership, vision, strategic and tactical planning, staging for success and then implementation in a continuous evaluative feedback loop.[31] Michael Fullan and other experts on change (Reeves; Bain & Weston; Leithwood) support the Alberta research finding that relationships among teachers, administrators and other education professionals are key, as are a clear, compelling vision, capacity building, a culture of innovation and strong support on all fronts.[32]

29 Alberta Initiative for School Improvement (AISI). (2013). "Spotlight on Leadership: What we have learned from AISI." Accessed February 18. http://education.alberta.ca/media/6828256/spotlight-on-leadership-jan-2013.pdf.

30 Dede, C. (1998). "The scaling-up process for technology-based educational innovations." *Learning with Technology* 1998 ASCD Yearbook: 199-215. Alexandria, VA: ASCD.

31 Bain & Weston. (2012). *The Learning Edge: What technology can do to educate all children*. Technology, Education—Connections (The TEC Series). New York and London: Teachers College Press.

32 Reeves, D. B. (2004). *Accountability for Learning: How Teachers and School Leaders Can Take Charge*. Alexandria, VA: ASCD.

Outcomes

Education leaders at all levels champion effective and innovative uses of technology for all schools. As a result:

a. government and school authorities have clarity and coherence in the policies and procedures that govern educational and administrative uses of technology in all schools
b. teachers, administrators and other education professionals use technology innovatively, effectively and efficiently
c. economies of scale that achieve cost effectiveness and efficiencies in educational technology are realized
d. up-to-date guidelines and standards on uses of technology inform school authority education plans

Actions

School Authorities:

a. incorporate into their planning systemic, innovative and effective uses of technology to support learning, teaching, administration and management, and regularly assess progress in this regard
b. update technology plans for systemic, community-based approaches to student-centred, personalized, authentic learning and support implementation in all schools
c. seek out and participate in partnership opportunities (e.g., cross-jurisdiction, cross-institution, community, industry) that support innovative use of technology

The Ministry of Education:

a. provides support for school authorities in revising education plans and technology plans to reflect the five policy directions
b. guides capital planning in such areas as school construction, modernization, purchasing and infrastructure investments to ensure that technology innovations are considered vehicles to achieving local goals and priorities
c. facilitates and participates in partnership opportunities (e.g., cross-jurisdiction, cross-institution, community, industry)
d. establishes and updates guidelines and procedures for technology uses, such as online learning and digital resources/content, in order to create opportunities for school authorities to jointly develop, exchange, aggregate and share online offerings
e. provides opportunities for consultation, dissemination of information, and collaboration on educational and information technologies

The outcomes and actions from each of the five policy directions are interdependent.

Policy Direction 5: Access, Infrastructure and Digital Learning Environments

All students, teachers, administrators and other education professionals have access to appropriate devices, reliable infrastructure, high-speed networks and digital learning environments.

DEFINITIONS

Access is the use of a computer device and a network to link a user to the Internet, digital resources, other users and digital communications.

Devices are computers used to process digital information and connect to networks and the Internet. This includes desktops, laptops, smartphones and tablets.

Digital learning environments are integrated digital systems that offer access, communication, resource libraries, file exchanges, learning management, content management and web tools that facilitate learning in school and beyond.

Infrastructure is the physical hardware used to connect computers and users.

Networks are the collection of computers and other hardware connected by communication channels that allow sharing and exchanges of information.

Rationale

Access to appropriate devices, reliable infrastructure, high-speed networks and digital learning environments is essential to achieving the vision of student-centred learning. This access enables students to connect to other communities, experts, digital resources and authentic learning and provides opportunities for cultural and global exchanges.

Digital learning environments are defined here to be integrated digital systems that offer access, communication, resource libraries, file exchanges, learning and content management and web tools that facilitate learning in school and beyond. This type of environment typically provides educators and students with real-time access to a system that integrates and aligns digital and print-based content, student data (formative and summative) and learning standards.

It is precisely this type of access that will enable students to learn in ways that build the three E's (engaged thinker, ethical citizen, entrepreneurial spirit) and the 21st century competencies as they make sense of the world around them. Such access requires a strong information technology system designed and built to support the emerging trends in personalized, mobile technologies; cloud-based computing; and bring-your-own-device (BYOD) models. Access also requires strong collaboration between the information technology and educational technology teams.

Equitable access to technology, as well as to online and digital learning, can level the playing field across the province, helping to overcome educational barriers due to geographical isolation and economic disadvantage while also addressing unique learning needs.

Research/Background

Alberta has made great strides in providing equitable access across the province. The provisioning of the Alberta SuperNet by the provincial government has provided equitable, high-speed access to networks for every school authority in the province. The Alberta SuperNet was built to connect public institutions across the province—schools, hospitals, colleges, universities, libraries and municipal offices—to a broadband network for high-speed Internet access, video conferencing and other services. It is a network of fibre cables and towers currently reaching 429 communities across Alberta. The system provides accessibility, reliability, performance, affordability and flexibility. These characteristics, plus the interoperability and security of the network, provide the backbone for *Inspiring Education's* vision for real-time, just-in-time personalized learning.

As learners increasingly expect to be connected 24 hours a day, 7 days a week, they have come to expect access anywhere and anytime, often through personal devices. Alberta has conducted research and development that specifically targets technology use (i.e., Emerge One-to-One Laptop Learning Initiative, Bring Your Own Device Guide, Technology and High School Success). Alberta has also delivered research projects focused on targets such as student engagement, personalized learning and formative assessment, many of which used technology. With the cost of devices rapidly decreasing, the number of Bring Your Own Device (BYOD) programs is on the rise (in many cases students bring more than one device). Also the proliferation of photography, video production and multimedia production by students and education professionals is increasing bandwidth demand.

Some school authorities track the availability of Internet access at home and in the community and actively seek to ensure that all students are connected.

In some cases, the school may serve as a hub of the community. As such, the school might actively involve the community in achieving its learning goals by reaching out to the community to:

- extend learning into community centres, libraries, museums and other public spaces
- bring relevance to curricula through partnerships that take the shape of apprenticeships, community service and the use of community-based experts and resources
- implement community-based exhibitions, reviews, critiques and celebrations of student work
- coordinate after school programs, including collaboration with the school and teachers

Alberta schools currently use broadband access through mobile devices, laptops and desktop computers for videoconferencing, online learning, professional development, communities of practice, access to digital resources (such as LearnAlberta.ca), online testing, communication with parents and community and student media production to demonstrate knowledge and skills.

Over the last five years, Alberta Education has supported numerous educational technology initiatives, which provided school authorities with opportunities to research different device and network configurations (see Policy Direction 4). In support of school authority technology use, Alberta Education provided the following guides in 2012 for educational and information technology:

- Wireless Local Area Network (WLAN) Best Practices Guide Update
- Digital Citizenship Policy Development Guide (with Digital Citizenship Needs Assessment Tool)
- Bring Your Own Device: A Guide for Schools
- iPads: What are we learning?

The following outcomes and recommended actions will launch the next generation of access, infrastructure and digital learning in Alberta.

Outcomes

Students, teachers, administrators and other education professionals have support for and equitable access to:

a. devices and peripherals
b. digital learning environments
c. facilities designed to maximize learning with technology

In Alberta's education system:

d. reliable infrastructures exist that support safe, secure, efficient, interoperable and sustainable networks
e. technology and network governance, policy and procedures ensure access essential to achieving the vision of *Inspiring Education*
f. appropriate technology is available and supported

Actions

School Authorities:

a. ensure equitable student access to devices, other technologies and, as appropriate, to assistive technologies to support student learning
b. provide students, teachers, administrators and other education professionals with access to well-designed, high-speed, reliable and sustainable networks and technology infrastructures
c. consider opportunities for community partnerships that expand access to technology-supported learning experiences
d. ensure the administration of safe and secure networks, infrastructure and technologies

e. provide students, teachers, administrators and other education professionals with access to high-quality digital learning environments

f. provide and maintain timely technical support and services

g. adopt and maintain effective practices and up-to-date technological standards with respect to Information Technology (IT) governance, IT management, and information security management.

The Ministry of Education:

a. supports access to a safe and secure, high-speed network for school authorities

b. seeks out and implements strategies that result in more affordable and sustainable access to technology and networking

c. considers community and private-sector partnerships to support access and system efficiencies

d. develops and periodically updates technology/networking standards

e. tracks and reports emergent technology trends

The outcomes and actions from each of the five policy directions are interdependent.

Summary

Innovation fuels today's global economy. Increasingly, 21st century skills, such as creativity, self direction, collaboration, multi-modal communication and information, communications and technology (ICT) literacy, are being integrated into learning standards of school systems across the globe.

The new national resources that countries are beginning to mine are human ingenuity, creativity and innovation. The good news is that these natural resources are malleable and renewable, but this requires schools that ready students for the complexities of the world today. The linchpin to such learning is highly effective leadership and articulation across the K-12 education system, guided by Alberta's 2013 *Learning and Technology Policy Framework*.