STRATÉGIE NUMÉRIQUE DU QUÉBEC

At the core of the economic plan

DIGITAL ACTION PLAN

FOR EDUCATION AND HIGHER EDUCATION

EDUCATIONAL SUCCESS FOR ALL

ENSEMBLE on fait avancer le Québec

Québec

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> “The shift to digital is a unique opportunity for the development and growth of Quebec, its citizens and its businesses. Quebec society, which is built on boldness, creativity and an innovative spirit, must now find full expression in this digital era. . . .
> From now on, digital technologies must be at the core of all our development efforts in the fields of economy, culture, education, health care . . . and public services.”

– Philippe Couillard, Premier of Québec
Launch of the Québec Digital Economy Action Plan
May 20, 2016

> “Digital technology is important and strategic for Québec. It is neither a luxury nor an option; it is an absolute necessity that Québec keep up with other industrialized societies and even become a leader when it comes to making the shift to digital, which is a true harbinger of the new world, the new society emerging around us.”

– Philippe Couillard, Premier of Québec
Launch of the Québec Digital Strategy
December 13, 2017

MESSAGE FROM THE MINISTER OF EDUCATION, RECREATION AND SPORTS AND MINISTER RESPONSIBLE FOR THE CAPITALE-NATIONALE REGION

The time for a shift to digital is now. It is happening every day in the classroom with innovative and inspiring experiences and in interactions between teachers and students. We know that digital technologies play a role in the educational success of our young people by offering them new ways to learn, communicate, share, create and collaborate; in short, by breathing new life into our schools. The shift to digital in schools also provides an opportunity to develop learners' digital literacy and to make sure they understand what it is to be a citizen in the digital age.

We are now launching the Digital Action Plan for Education and Higher Education, which is part of the Québec Digital Strategy launched last December in collaboration with several other ministries and agencies. This action plan is also in line with the orientations of the Policy on Educational Success, one of whose aims is to integrate 21st-century competencies and digital technologies more effectively.

The objectives of the action plan are to create an environment conducive to the deployment of digital technologies for educational purposes, to make use of digital technologies to enhance and diversify teaching and learning practices, and to develop digital skills. Training and support for teachers and other school staff are extremely important, since they are the cornerstone of the action plan. Of course, all of this involves its share of challenges, but it will pave the way for tremendous educational and social possibilities.

The action plan does not belong to the Ministère. It belongs to the entire education system, and was therefore developed with this in mind. It is the result of wide-ranging consultations conducted by the Ministère, which allowed it to significantly expand its thinking and to arrive at a result supported by research and in line with the needs of the various educational settings. Its aim is to facilitate the implementation of conditions conducive to the success of all learners at every level of education. I would like to thank my colleague, the Minister for Higher Education, for her collaboration on this ambitious project.

The Digital Action Plan is for people of all ages living in a society in which they must be increasingly engaged and proactive with regard to their learning and their educational path. At a time when digital technologies are driving major social, economic and technological shifts, skills development takes on a broader and more complex meaning, since we must not only respond to change, but, above all, prepare for it. By taking a bold and ambitious approach for the sake of the current generation and those to come, we will be doing our part to ensure equal opportunity, educational success and the development of every individual's full potential.

Sébastien Proulx

MESSAGE FROM THE MINISTER FOR HIGHER EDUCATION AND THE STATUS OF WOMEN

I am pleased to be unveiling this exciting Digital Action Plan for Québec's education system, and I am proud to say that it was made possible through the contributions of every education stakeholder in the province.

Since I became Minister for Higher Education, I have seen that digital technologies provide an unprecedented opportunity for innovation in teaching and learning. The question is no longer whether we should promote the use of digital technologies in education, but rather how we can all contribute to ensuring their efficient and fair deployment throughout our education system while respecting individuals and organizations.

That is why several measures proposed in the action plan are resolutely focused on the human aspect of education. We believe that, by putting the emphasis on sharing and collaboration as well as support, training and professional development for the people who are the driving force of our education system, we can make the most of technology to face the challenges of the digital age.

This action plan provides us with the means of implementing our vision of digital technology as a driver of collaboration and innovation, of an education system whose stakeholders, while remaining autonomous and distinct, are interconnected and focused on shared objectives.

This vision is at the heart of every measure in this action plan, with each measure given concrete expression through the efforts of dedicated, creative and engaged people working in Québec's institutions of higher education. They are all, in their own way, agents of change and play a role in the shift to digital in our education system.

I would like to thank each and every one of them. Thank you for helping make Québec a society whose education system puts human potential first and is a source of innovation, success and pride.

Hélène David

SUMMARY

A BRIEF LOOK AT THE ACTION PLAN

Given the ubiquity of digital technologies in every area of our lives, Québec's education system must not only adapt, but become an agent of change and innovation. Students, staff and educational institutions must be able to seize the many opportunities afforded by digital technologies for teaching, learning, communication and creativity.

Major advances in digital technologies, namely robotics, automation and artificial intelligence, confirm the need to respond to the technological, ethical and social issues associated with innovations that are changing how we live and work. Québec's education system must become a leader in the digital revolution by focusing on digital skills and better educational practices in order to prepare learners for the challenges of tomorrow.

That is why the Digital Action Plan for Education and Higher Education is based on the **effective integration and optimal use of digital technologies to foster the success of all Quebecers in order to promote lifelong skills development and maintenance.**

The action plan's 33 measures are intended to give new impetus to the shift to digital in the education system and to contribute actively to the development of Quebecers' digital skills.

These measures are a means of achieving nine objectives, which are related to eight areas of intervention that reflect three major orientations, all aimed at meeting the education system's needs. The first orientation involves contributing to the modernization and adaptation of the types of education and training offered, supporting the development of the digital skills of young people and adults, and promoting a digital culture. The second involves the optimal use of digital technologies by generating innovative practices, pooling resources and services, and developing distance education offerings adapted to the needs and realities of today's and future generations of learners. The third orientation involves monitoring learners' educational path, implementing adapted and flexible governance, and ensuring fair and safe access.

These actions will be implemented over a five-year period, from 2018 to 2023, the same period covered by the Québec Digital Strategy, in close collaboration with education system stakeholders and partners. **This action plan is intended to initiate an iterative and continuous process, since education must allow people to strengthen their ability to think and act in the face of rapidly evolving technologies.**

$1.186 BILLION

FOR THE IMPLEMENTATION OF DIGITAL ACTION PLAN FOR EDUCATION AND HIGHER EDUCATION FROM 2018 TO 2023

Including **$963 million** in new investments over this period, announced in the economic plan of March 2018

For **pedagogical and social innovation** aimed at consolidating the foundations of our collective future

To give new and stronger impetus to the shift to digital in the education system and to better **prepare students and future Quebecers to live in society and achieve their full potential** with respect to the many avenues and job prospects that will emerge and that we can hardly even begin to imagine today

INTRODUCTION

THE DIGITAL AGE

In the past two decades, and at an unprecedented rate, digital technologies have completely changed how people around the world interact, communicate, find information, create, work, consume, and express and entertain themselves. The way we communicate, create, share and learn has changed as we gain access to a greater variety of information sources and continue to produce and disseminate knowledge at an accelerated rate. This raises serious questions about the quantity, reliability and processing of information.

Most people born in the 21st century begin to use digital devices before they even learn to read and write, so their interests and aptitudes are a product of their time. In light of this reality, new forms of teaching and new learning tools are being developed and are changing the very foundations of our education system.

Québec's education system must continue to support Quebecers in their development by integrating these tools and by guiding learners through the process of understanding the possibilities and challenges of digital technologies. Starting in elementary school, the use of digital technologies must focus on the pedagogical and social aspects of the development of civic values.

Today, the use of digital technologies in daily life is forcing the education system to consider the importance of helping learners adopt a creative attitude and develop a critical eye in this regard. **If the education system is to achieve its goal of ensuring equal opportunity, it must introduce children to digital technologies from a very early age.**

All of history's industrial revolutions have led to major changes in the world's education systems. The fourth industrial revolution, the digital revolution, which is still in the active development stage, is no exception. Québec must take action to ensure a successful economic and social future, and it can do so by having its education system play an active role in the digital revolution. Equipping Quebecers with the appropriate digital skills will ensure a positive outcome to the revolution.

THE FOURTH INDUSTRIAL REVOLUTION: THE DIGITAL REVOLUTION

The first industrial revolution in the 18th century focusing on mechanization, the second at the beginning of the 20th century marked by electrification, and the third at the beginning of the 1970s involving electronics, telecommunications and computerization set the stage for the changes that are drawing us into a fourth industrial revolution, the digital revolution, consisting in the rapid and massive influx of digital technologies in all sectors of activity as well as in daily life.

Obviously, every education system is affected by these changes. The world's education systems have had to adapt and innovate, and are now a part of the dynamic of change, as can be seen in the explosion of educational technology in recent years. In 2015, global investment in this area stood at $4.5 billion, an annual average increase of over 30% since 2011.[1]

Digital technologies are changing every component of the educational mission, which is to provide instruction, socialize and provide qualifications. They are broadening the range of pedagogical practices, opening new avenues for innovation and offering user-friendly and interactive learning opportunities for young people and adults alike.

Education is the primary means by which Québec will be able to develop as an inclusive, fair and innovative digital society and become a world leader in the digital field.

Our education system must ensure that today's students as well as future generations acquire the knowledge and skills they will need to become free, creative, responsible and autonomous critical thinkers who can communicate and collaborate in a constantly changing world.

1 World Economic Forum, *New Vision for Education: Fostering Social and Emotional Learning through Technology*, 2016, http://www3.weforum.org/docs/WEF_New_Vision_for_Education.pdf.

GLOBAL TRENDS IN THE INTEGRATION OF DIGITAL TECHNOLOGIES IN EDUCATION

National education systems play a key role in helping societies understand and master the digital technologies essential to their development. Today, they must not only adapt to digital technology; they must be able to harness its full potential and put it to use for learners and society as a whole.

According to a 2015 investigative report by the Organisation for Economic Co-operation and Development (OECD), the countries leading the world in terms of the integration of new technologies in school are Australia, Denmark, the Netherlands and Norway.[2] Most of these countries, as well as others like the United States, France, New Zealand, Ireland and Italy, have developed digital strategies in education and higher education, while others took concrete measures before developing a specific action plan.

The topics generally addressed in digital strategies developed by education systems:

- Teacher training to foster and accelerate the enhancement of pedagogical practices
- Creation of more digital pedagogical activities and resources
- Innovation in the evaluation, development and dissemination of new ways of using digital technologies
- Improvement of the digital skills of teachers, learners and the general public
- Development of the infrastructures needed to support all of these changes
- Development of a culture of innovation and the conditions necessary to achieve it
- Reliance on networks and professionals to initiate change
- Accelerated adoption of digital tools

Other trends observed around the world include:

- Massive open online courses (MOOCs)
- Games and gamification
- Virtual and augmented reality
- Creative labs
- Use of tablets
- Access to e-books
- Flipped classroom
- Online collaborative solutions
- Digital evaluation
- Exostructures (cloud computing)
- Wearable technology
- 3D
- BYOD (bring your own device)

2 OECD, *Students, Computers and Learning: Making the Connection*, 2015, 49-69, https://read.oecd-ilibrary.org/education/students-computers-and-learning_9789264239555-en#page1.

ARTIFICIAL INTELLIGENCE: A VITAL EMERGING SECTOR

There is a veritable revolution under way in the job market. In most economic sectors, digital technologies and automation are already changing the skill profiles companies are looking for. The development of artificial intelligence (AI) is driving this change even faster. AI is a rapidly growing field of research and innovation, and its applications will offer promising job opportunities.

In its Digital Action Plan, the Ministère intends to foster the development of key digital citizenship and vocational skills without overshadowing the need for proficiency in literacy and numeracy. It also intends to promote the emergence of Québec's AI ecosystem for AI-based education by funding promising innovation and action research projects for the future of Québec's education system. Lastly, it intends to provide incentives and support in this area for educational institutions, which can play any number of roles in the development of AI for the benefit of Québec society. It goes without saying that the development of these tools must be predicated on an analysis of ethical issues, notably the protection of privacy. Critical positioning and civic action with respect to these issues go hand in hand with the development of digital skills.

Québec is a major player in both AI basic research and industrial innovation. The Québec government endorses the development of expertise in AI, notably through support for the creation of a supercluster that will make Montréal a leading economic and scientific hub for research, training and technological transfer, as well as for the creation of value added products and solutions, jobs and businesses specializing in AI.[3]

3 Québec, Ministère de l'Économie, de la Science et de l'Innovation, *Québec Research and Innovation Strategy 2017-2022*, 2017, 81-82, https://www.economie.gouv.qc.ca/fileadmin/contenu/documents_soutien/strategies/recherche_innovation/SQRI/sqri_complet_ang.pdf.

THE CURRENT SITUATION IN THE QUÉBEC ELEMENTARY AND SECONDARY EDUCATION (EDUC) SYSTEM

The emergence of innovative pedagogical practices in the school system is often driven by local initiatives. Several educational institutions and their teaching staff and non-teaching professionals have been able to adapt and welcome new pedagogical approaches, engaging in a process of change. CEFRIO's summary report entitled *Usages du numérique dans les écoles québécoises*[4], gives examples of this dynamic, which is already well under way in several schools.

As part of the 2011-2016 ministerial action plan for the use of digital technologies, School 2.0: Connected Classrooms, the vast majority of Québec classrooms were equipped with interactive whiteboards (IWB) or their equivalent. In addition, many teachers now have access to a laptop computer. The plan also included training and guidance to help teachers integrate these technological tools into their teaching practices, as well as the acquisition of digital educational resources (DER) to optimize the use of technology in the classroom. This measure was an important first step in equipping schools with technological tools.

In recent years, leaders in techno-pedagogy have taken bold initiatives, driving the shift to digital in their educational institutions. Increasing numbers of teachers in Québec are connected and engaged in an innovative dynamic, and many students are now familiar with computational thinking and coding, carry out projects using digital tools, and work in collaboration on a daily basis in contexts where creativity is at the forefront. We must, however, do more to support these leaders in techno-pedagogy. **The schools of tomorrow will be built on the foundation of today's schools thanks to the efforts of stakeholders who are already at work throughout the education system.**

THE ADDED VALUE OF DIGITAL TECHNOLOGIES IN EDUCATION: INNOVATIVE INITIATIVES AND PROJECTS

École Alexander-Wolff

At École Alexander-Wolff in Shannon, Elementary 6 students study coding one hour a week. They learn in a flipped classroom environment, which is adapted to meet their needs and immerses them in an extremely creative context. In addition, their teacher is a firm believer in play-based learning and takes pleasure in immersing them in different contexts in which they encounter challenges and develop their full potential.

CFER de Bellechasse

The Centre de formation en entreprise et récupération (CFER) de Bellechasse caters to young people between the ages of 15 and 18 who are unable to pursue their education in the regular stream. Five years ago, the centre began looking to technology to meet the needs of its creative, inventive, collaborative and curious students, who now enjoy a different way of learning. Interactive whiteboards, tablets and environments conducive to learning are part of everyday life at the centre, where students learn about robotics using an Nao humanoid robot. According to the centre's principal and teaching staff, working with the robot enables the students to take up challenges and overcome some of their limitations.

4 CEFRIO, *Usages du numérique dans les écoles québécoises*, 2015, http://www.cefrio.qc.ca/media/uploader/Rapport-synthese_Usages_du_numerique_dans_les_ecoles.pdf.

Commission scolaire Marguerite-Bourgeoys (CSMB)
Introduced in 2014, the CSMB Fab Lab project now includes a network of seven permanent digital creation labs in seven secondary schools, as well as one mobile unit. Students can create any object from information in a digital file. By allowing students to engage in concrete activities associated with the theoretical concepts learned in the classroom, the CSMB Fab Lab promotes science and stimulates students' interest in new technologies.

École secondaire Saint-Jean-Eudes
In an effort to implement a philosophy of active learning using technology, École secondaire Saint-Jean-Eudes has adopted the BYOD (bring your own device) approach, which allows students to work with their own technological devices. In most BYOD activities, students draw on the Internet's vast range of resources, which allows them to become better digital citizens by exercising their critical judgment. Pedagogical practices take advantage of the added value of digital technologies, either in flipped classroom environments or by fostering collaborative work online or the use of a variety of tools. The BYOD project at École secondaire Saint-Jean-Eudes was nominated for an education innovation award by the Fédération des établissements d'enseignement privés (FEEP) in the secondary school pedagogical innovation in an educational project category.

HIGHER EDUCATION (HE)

Digital technologies are also transforming higher education, not only in terms of pedagogy, but also in terms of work organization, infrastructure and governance. This transformation is driven by the experimentation of a multitude of stakeholders and trend setters who were able to use technologies as they evolved to enhance their institutional, organizational and pedagogical practices.

Nursing labs equipped with high-fidelity mannequins, mathematical computer models, computer physics simulations, active learning rooms, distance education, teleteaching and digital environments fostering collaborative work among peers are only a few examples of digital initiatives that have been under way in colleges and universities for a number of years.

Institutions of higher education are adapting to the needs and opportunities generated by the digital revolution, in terms of both skills development and research and knowledge creation, in complex but stimulating areas such as information security, the Internet of Things, artificial intelligence and big data.

ADVANCES IN DIGITAL TECHNOLOGIES IN HIGHER EDUCATION: INSPIRING PROJECTS AND INITIATIVES

The digital badges project of the Fédération des cégeps

There is currently an interest in digital badges recognizing proficiency in digital skills. The ITREP Network (Réseau des répondantes et répondants TIC or Réseau REPTIC) of the Fédération des cégeps recently piloted two projects involving digital badges to recognize college students' digital skills, one in the area of the recognition of competencies and the other in regular education. At the end of the projects, in which five colleges are currently participating (Collège Ahuntsic, Cégep Édouard-Montpetit, Cégep de Lévis-Lauzon, Cégep Limoilou and Cégep de Valleyfield), all colleges will be able to award their students digital badges..

Université de Sherbrooke's Pôle d'innovation technopédagogique

Several innovative projects are currently under way in Québec universities. One of these is the Pôle d'innovation technopédagogique recently launched by the Université de Sherbrooke. Under the responsibility of the faculty of education, the Pôle's mandate is to improve the quality of education and support techno-pedagogical innovation in online, blended and digital learning. The main goals are to promote the judicious and informed use of technology in both distance and classroom-based education, to foster the emergence of innovative initiatives, to develop synergy among university stakeholders and partners with a view to pooling resources and expertise, and to offer support and advice in the development of online education and digital and other technologies.

CHALLENGES AND PROSPECTS

Like Québec society, the Québec education system is going through a stimulating but demanding period that has put pressure on its ability to adapt and change. Motivated by the importance of working together for the benefit of learners, its stakeholders and partners must take the time to think about and adopt the attitudes and practices needed to be able to change.

These are real challenges, and it is important to understand them completely to be able to meet them so that young people, adults and future generations can benefit fully from the opportunities afforded by digital technologies.

Three major challenges have emerged:

1. Leadership and professional development

To facilitate and stimulate the emergence of innovative pedagogical practices, it is necessary to foster innovation, responsible risk taking, tolerance for ambiguity and the right to make mistakes. We must capitalize on the leadership of teachers, non-teaching professionals and support and administrative school staff, and encourage and foster professional development and continuing education. We must encourage, support and facilitate collaboration among government institutions, the education networks, researchers, businesses, parents and the community as a whole.

This is the type of dynamic in which schools will become places where learners can evolve, develop skills, and discover, express and achieve their full potential.

2. Optimal use of digital tools for teaching and learning

Digital tools must not only be available; they must above all be tailored to teaching and learning. In addition to making communication easier, they are powerful creative, collaborative and problem-solving tools which, among other things, encourage learners to develop a sense of curiosity and critical thinking skills.

These benefits will be enhanced by the availability of quality digital educational resources that make it possible, if not easier, to achieve the learning outcomes described in the curriculum. However, the optimal use of digital tools goes hand in hand with further development of 21st-century competencies and enhanced learning.

Although the use of digital technologies in education and higher education must ultimately serve a pedagogical purpose, such technology cannot be integrated without enhancing technological infrastructures and investing in computer equipment for educational institutions.

3. Bridging the digital divide

Access to digital equipment and expertise has become a major source of inequality. The digital divide constitutes both a technological and skills gap between learners depending on their age, where they live and their socioeconomic status.[5]

The Ministère has always supported educational institutions in their efforts to integrate technology. However, the uses of technology and the available expertise vary greatly among institutions and even among teachers in the same institution. In the future, the Ministère must not only increase its support to help educational institutions face the challenges posed by digital technologies, but must also act as a catalyst, fostering cohesion among stakeholders and partners and ensuring the emergence of a fair education system.

Also, given the growing importance of digital media in written communications and mathematics, if we do not bridge the digital divide, we run the very real risk of accentuating current gaps in literacy and numeracy skills.

5 OECD, *Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills*, 2016, 9 and 65, http://www.oecd.org/education/ceri/GEIS2016-Background-document.pdf.

GLOBAL ISSUES AND THEIR IMPACT ON EDUCATION SYSTEMS: A CHALLENGE FOR QUÉBEC

In addition to technological change, societies around the world are facing three major issues:

- Changes in demographics: The composition of societies is going to change considerably in the coming decades as a result of an aging population and migration.
- Climate change: Representing both a challenge and a risk, the transformations and disturbances brought about by climate change will have an effect on our lifestyle.
- Changes in the economy: Economic issues, particularly in terms of income disparities and wealth gaps, create pressure for public action.

These issues will have an impact on the world's education systems because they play a central role in society. They may change how institutions are governed and organized and how educational services are offered.

Technology has a huge potential for dealing with these issues (e.g. climate change computer modelling, the development of massive open online courses, or the optimization of processes using computerized or robotic systems), but it also involves risks such as cybercrime and phishing.

Although we cannot foresee the actual evolution and repercussions of technology on education and higher education with any certainty, the Ministère will play a key role in ensuring that stakeholders in Québec's education system are adequately equipped to face these challenges. That is why the Digital Action Plan for Education and Higher Education is resolutely focused on the human aspect of education, why it is open-ended and why it will foster flexibility, adaptability and collaboration.

TEACHING AND LEARNING IN THE DIGITAL AGE

ROOTED IN THE QUÉBEC DIGITAL STRATEGY

On December 13, 2017, the Québec government unveiled its digital strategy (the Strategy), which defines the priorities, focuses and strategic objectives that will allow Québec to become an effective and innovative digital society. The Strategy implements a coherent and comprehensive framework for the digital action plans currently implemented and those yet to be unveiled by Québec's ministries and agencies. The Digital Action Plan for Education and Higher Education (the Action Plan) is a key component of the Strategy and is the means for achieving Objective 2.1 of the Strategy, which is to accelerate the shift to digital in Québec's education system. The Action Plan will help achieve the target associated with the second focus of the Strategy, which is to ensure that all Quebecers develop better digital skills in order to position Québec as a digital technology leader in the OECD within the next five years.

The common principles set out in the Strategy are reflected in the Action Plan. Thus, transparency, openness, data security and survivability, public participation and collaboration, the creation of public values, experimentation, flexibility and efficiency will all be assured by a coherent set of objectives and measures.

Like the Strategy, the Action Plan is flexible and open-ended in order to allow for the continued integration of digital technologies in the education system and to provide its stakeholders with guidance in carrying out its mission, which contributes to the advancement of Québec society.

ALIGNMENT WITH THE POLICY ON EDUCATIONAL SUCCESS

The Action Plan is also a key tool in the implementation of the Policy on Educational Success launched in June 2017. The policy is the result of a wide-ranging public consultation of all education stakeholders and partners, as well as the general public. It is based on a coherent and shared vision of an inclusive education system that supports lifelong educational success, a system built on the commitment of the stakeholders and partners that help educate responsible, competent and creative citizens who are prepared for the digital world. More specifically, the Action Plan is in line with two of the policy's major orientations:

- Orientation 2.2: Integrate 21st-century competencies and digital technologies more effectively
- Orientation 6.1: Ensure access to quality educational and pedagogical resources and technological infrastructures and foster the optimal use of digital technologies

It will also help improve educational and pedagogical practices, one of the challenges mentioned in the policy and that can be addressed by focusing on initial and continuing education of school staff.

CONSULTATION OF VARIOUS NETWORKS

In order to be able to properly identify the digital technology needs of the education system, the Ministère consulted various educational institutions and their partners in the fall of 2016. Through this consultation process, participants discussed the various aspects of digital technology in education and higher education, learned about local initiatives, identified the various issues at stake and defined the best possible orientations for Québec.

The Action Plan also takes into consideration the results of the online consultations held by the Ministère de l'Économie, de la Science et de l'Innovation (MESI) and those of the six Rendez-vous numériques held in the winter of 2017 as part of the process of developing the Strategy. These activities allowed both individuals and organizations to share their concerns and interests with respect to the issues raised by digital technology and to make proposals. Not surprisingly, challenges relating to education and higher education were mentioned by many of the individuals and organizations that participated in the consultations.

THE MINISTÈRE'S VISION AND GUIDELINES

The Action Plan is a coherent framework aimed at helping the education system integrate and use digital technologies in order to foster continuing innovation. Digital technology has an impact on all education system activities and creates both new needs and new opportunities. However, its integration raises complex questions that require answers rooted in a long-term vision. The Ministère's actions and its ambitions in terms of digital technology are based on a global vision:

The effective integration and optimal use of digital technologies to foster the success of all Quebecers in order to promote lifelong skills development and maintenance.

To ensure the optimal implementation of the Action Plan, the Ministère has adopted four governance principles:

1. **Collaboration:** The Action Plan's various measures will be implemented in close collaboration with education system stakeholders and partners. Collaboration among individuals, institutions and ministries will be one of the keys to success. A veritable ecosystemic approach is needed to successfully implement this joint project.
2. **Flexibility:** Like digital technology, the Action Plan is flexible, open-ended and capable of adapting to current realities and changes to come. Several measures include an exploratory component that will help orient subsequent steps. This approach will ensure the Action Plan's success.
3. **Pooling:** The Action Plan promotes the pooling of ideas and solutions for the benefit of the education system, the student groups it serves and the entire population. The sharing of experiments, learning and innovations will help reduce costs, reproduce achievements, better manage risks and ensure greater coherence.
4. **Fairness:** The Action Plan aims to democratize the use of digital technology in teaching and learning and recognizes the diversity of individuals and needs. All student groups must be able to benefit from the Action Plan's measures.

FIRST NATIONS AND INUIT

The measures resulting from the Action Plan will be taken for the benefit of all Quebecers, including the First Nations and Inuit. That being said, in order to provide a concrete response better adapted to the realities of the First Nations and Inuit, the government is adopting a distinct approach that takes into account their cultural and sociological characteristics and differences. In order to meet the digital needs of the First Nations and Inuit, the Provincial Round Table on the Educational Success of Indigenous Students will be asked to recommend actions to the Ministère de l'Éducation et de l'Enseignement supérieur. The measures developed by the Round Table will be incorporated into the Government Action Plan for the Social and Cultural Development of the First Nations and Inuit.

ORIENTATION 1

Support the development of the digital skills of young people and adults

Twenty-first-century competencies comprise multiple dimensions in which individuals can realize their full potential. Literacy and numeracy are essential for learning and developing digital skills, and are the foundations on which various types of subject-specific and cross-curricular competencies are built.[6]

Twenty-first-century competencies incorporate qualities and aptitudes such as computational thinking, critical thinking, complex problem solving, communication and collaboration, entrepreneurial spirit, the ability to harvest the potential of digital technologies and resources, creativity and innovation. They also include other qualities such as self-determination, self-regulation, personal management, social responsibility, ethical citizenship, and cultural, global and environmental awareness. The Policy on Educational Success emphasizes the development of 21st-century competencies and states that it is important to "re-examine these competencies and consider better ways of integrating them into the basic school regulations, the subject-time allocation and the individual programs."[7]

By developing learners' digital skills, we will help mould them into citizens fully engaged in our changing society.

> Digital culture involves more than just technology. It redefines human activities and communications processes and reconfigures social relations and the exercise of citizenship.

6 OECD, *Literacy, Numeracy and Problem Solving in Technology-Rich Environments: Framework for the OECD Survey of Adult Skills*, 2012, http://www.oecd.org/skills/piaac/PIAAC%20Framework%202012--%20Revised%2028oct2013_ebook.pdf.

7 Québec, *Policy on Educational Success: A Love of Learning, a Chance to Succeed*, 2017, 43. http://www.education.gouv.qc.ca/fileadmin/site_web/documents/PSG/politiques_orientations/politique_reussite_educative_10juillet_A_1.pdf.

AREA OF INTERVENTION 1
DEVELOPMENT OF THE TYPES OF EDUCATION AND TRAINING OFFERED

As society faces major technological, organizational, social and economic changes, educational institutions are confronted with the global challenge of modernization and adaptation. In the education system, the challenge is not merely to integrate digital technologies. It is also necessary, and even more important, to determine how digital technologies can contribute to the development of a multitude of competencies, the acquisition of learning and the accumulation of knowledge, while helping prepare students to face the many ensuing changes.

The types of education and training offered must keep pace, first with courses devoted specifically to the development of digital skills, particularly in the secondary-school, vocational training, college-level and university curriculum, then with new methods of teaching and new learning tools based on digital technology. These teaching methods and learning tools can be implemented on a much broader scale than courses devoted specifically to the development of digital skills.

While schools must put digital technologies to work for students, they must also teach students about the realities of the digital world, showing them how to use these technologies responsibly.

- In particular, teachers must instill ethical and responsible behaviours with respect to communications and the use of technologies.[8]
- Digital technologies can also be used as a teaching tool or to support learning.

OBJECTIVE 1.1
DEFINE DIGITAL SKILLS AND INTEGRATE THEM EFFECTIVELY INTO THE TYPES OF EDUCATION AND TRAINING OFFERED

The first step is to define what digital skills are. To this end, the education system will have access to a shared reference framework. In a context where digital literacy is essential for all Quebecers, the framework will help identify education needs to ensure that different student groups achieve specific digital skill levels. This will make it possible to take well-targeted action to support the development of digital skills and foster quicker adaptation of the types of education and training offered.

8 *Policy on Educational Success*, 15.

MEASURE

01 ESTABLISH A REFERENCE FRAMEWORK OF CROSS-CURRICULAR DIGITAL COMPETENCIES AT EVERY LEVEL OF EDUCATION

EDUC HE

The first measure is structural and involves the establishment and implementation of a reference framework of digital skills for every level of Québec's education system. The framework is currently being developed in collaboration with the major stakeholders in education using a sustainable approach so that it will be applicable to both today's technologies and those of tomorrow. It will include a permanent update mechanism.

The framework will provide a better understanding of digital skills and help all Québec students develop these skills. It will become a reference tool for pedagogical and strategic planning, as well as for educational projects. It will also be used to establish tools for evaluating digital skills.

TOWARD A REFERENCE FRAMEWORK FOR DIGITAL SKILLS IN QUÉBEC

Work is under way with the Groupe de recherche interuniversitaire sur l'intégration pédagogique des technologies de l'information et de la communication (GRIIPTIC) to give Québec a cutting-edge reference framework for digital skills. More than a hundred reference frameworks developed around the world (e.g. in the United States, the United Kingdom, Australia, Canada) have been analyzed. The objective is to develop an open-ended and adaptive reference framework based on best practices and input from our partners in order to cope with technological changes and to allow all learners (e.g. students, teachers, workers) to develop their digital skills throughout their lives. By next year, all stakeholders in Québec's education system will be able to use this new reference framework for digital skills to enhance their teaching and learning practices.

MEASURE

02 INCREASE THE USE OF CODING IN EDUCATION

EDUC

The Ministère will encourage and support the use of coding for educational and didactic purposes in order to help students acquire the learning and competencies prescribed in the Québec Education Program (QEP). Given the interdisciplinary potential of coding, it will be introduced in a cross-curricular manner. In the longer term, pilot and action research projects will help determine the best way of integrating coding into the curriculum.

According to the Action Plan, coding is to be used in most elementary and secondary public and private schools by the 2020-2021 school year. Research is under way in collaboration with the Centre de recherche et d'intervention sur la réussite scolaire (CRIRES) in order to document existing initiatives. This will help develop deployment scenarios. The integration of coding will be driven by schools.

In order to ensure that as many students as possible benefit from this measure, the Ministère will finance the procurement of equipment, teacher training and various structuring projects.

ROBOT 360 PILOT PROJECT

On January 22, 2018, the Ministère launched the Robot 360 pilot project in collaboration with the Service national du RÉCIT du domaine de la mathématique, de la science et de la technologie, Kids Code Jeunesse, Vitrine technologie-éducation (VTÉ) and Ordinateurs pour les écoles du Québec (OPEQ). The project involves exploring and targeting the best implementation solutions and supporting schools in the use of coding in the classroom as a pedagogical tool aimed at fostering the development of computational thinking and educational success.

In March and April 2018, 29 teachers volunteered to take a two-day course on the pedagogical uses and technical aspects of coding and robotics. Each teacher is now paired with an education consultant from his or her school board who helps him or her incorporate coding into his or her teaching practices.

The results of this pilot project will help guide the Ministère in its implementation of this measure.

CODE MTL: DIGITAL LITERACY PROJECT INVOLVING MORE THAN 3000 STUDENTS

The Fondation de la Commission scolaire de Montréal (CSDM) implemented the Code MTL project, a program that introduces students to coding. Its aim is to introduce students in Elementary Cycles Two and Three to computer language and problem-solving logic.

The program targets the 28 000 students between the ages of 8 and 12 in the CSDM's elementary schools. In the first phase, 3240 children from 65 schools took part in the initiative thanks to the involvement of 135 volunteer teachers. Students participate in eight workshops facilitated by a teacher specially trained by the CSDM's educational services and a qualified instructor from Kids Code Jeunesse, where they learn coding using the educational and play-based software program called Scratch.

INTEGRATION OF CODING IN EUROPE

Estonia incorporated coding into its curriculum in 2012, followed by England in the fall of 2014 and France at the beginning of the 2016 school year. At key stage 3 (ages 11 to 14) of the computer curriculum, students in England must use at least two programming languages to solve problems.[9]

INTEGRATION OF CODING IN CANADA

Nova Scotia introduced coding to its curriculum in 2015 in order to promote skills that include problem-solving, teamwork and innovation[10], starting in kindergarten. In 2015, British Columbia embarked on a transition to a new curriculum that includes coding, computational thought and robotics.[11]

9 Government of the United Kingdom, *Statutory Guidance: National curriculum in England: computing programmes of study*, 2013, https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study.

10 Government of Nova Scotia, *Nova Scotia's Action Plan for Education 2015*, 2015, https://www.ednet.ns.ca/docs/educationactionplan2015en.pdf.

11 British Columbia Ministry of Education, "BC's New Curriculum," 2016, https://curriculum.gov.bc.ca/.

MEASURE

03 SUPPORT INTER-INSTITUTIONAL COOPERATION BY CREATING INNOVATION CLUSTERS IN DIGITAL EDUCATION

HE

The Ministère will support the creation of regional higher education clusters in order to foster cooperation among public colleges and universities in a given territory that wish to implement joint initiatives. In addition to contributing to the development of greater synergy among institutions of higher education in a given region, the actions taken will help improve access to higher education, student success and ties with the main development agencies in the region. These regional clusters will take various forms.

The Ministère will encourage concerted initiatives aimed at developing the types of education and training offered in Québec in cutting-edge and emerging sectors involving digital technology.

For example, a higher education artificial intelligence cluster will soon be created in cooperation with Montréal universities and members of the Regroupement des collèges du Montréal métropolitain. Institutions will be able to quickly adapt the types of education and training they offer to meet current and future qualified labour needs in this area given the scope of the changes brought about by artificial intelligence in a number of sectors of economic activity.

AREA OF INTERVENTION 2
DIGITAL SKILLS AND CULTURE

While it is now essential that learners develop the skills needed to evolve in a digital world, it is also essential that stakeholders in education be steeped in a digital culture and that they provide environments and teaching and learning methods that foster the development of 21st-century competencies. **Technology is one of the most efficient means of gaining access to knowledge.**[12]

If the Action Plan is to produce the desired results, the Ministère must rely on the skills and commitment of teachers, non-teaching professionals and support staff at every level of education. The Action Plan's second area of intervention focuses on the following two objectives: the development of the digital skills of teachers, non-teaching professionals and support staff and the adoption of a strong digital culture in the education system.

OBJECTIVE 1.2
SUPPORT THE DEVELOPMENT OF THE DIGITAL SKILLS OF TEACHERS, NON-TEACHING PROFESSIONALS AND SUPPORT STAFF

Increasing numbers of teachers in Québec are using or would like to use innovative practices involving digital technologies. However, their good intentions can be stymied by their limited digital skills. This results in a hesitation to invest the time needed in this regard, thereby reducing the possibility of benefiting from the positive effects of such practices.

Québec must harness the potential of teachers as the main agents of change. The effectiveness of digital educational resources is inextricably linked with the context and quality of their use. The participation of teachers in the development of these educational tools and support for the development of their ability to use them are key to the education system's successful shift to digital.[13]

Teachers, non-teaching professionals and support staff have always needed training and guidance, but these factors are all the more important today, since they are directly related to their ability to innovate and inspire learners to pursue their education. We must continue to train teachers and education teams in the use of digital technologies and improve guidance and the sharing of expertise in institutions.

12 *Students, Computers and Learning: Making the Connection*, 4.

13 *Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills*, 110.

MEASURE

04 DEVELOP A NEW COMPETENCY FRAMEWORK FOR THE TEACHING PROFESSION TO FOSTER THE INTEGRATION OF DIGITAL TECHNOLOGIES INTO THE EDUCATIONAL PRACTICES OF FUTURE TEACHERS

EDUC

The Ministère will foster the integration of digital technologies into the educational practices of future teachers by developing a new competency framework for the teaching profession. This is in line with the orientations of the Policy on Educational Success that are related to the integration of digital technology and teacher training.[14]

The new competency framework for the teaching profession, expected to be released in the winter of 2019, will meet the needs of the education community and take into account the evolution of digital technology in society and its contribution to teaching and learning. Once the framework is published, Québec universities will review their teacher training programs in order to integrate digital technologies more fully.

MEASURE

05 FOSTER THE CONTINUING EDUCATION OF TEACHERS, NON-TEACHING PROFESSIONALS AND SUPPORT STAFF IN DIGITAL PEDAGOGY

EDUC HE

Teachers, non-teaching professionals and support staff are front-line workers in the development of the digital skills of young people and adults in Québec and are therefore at the heart of the deployment of digital technologies in the education system. Thus, the Ministère will foster their continuing education in digital pedagogy. The related actions will involve three components:

- The development and implementation of educational activities by institutions and partners in education
- Time off for teachers so that they can participate in continuing education activities
- Amounts allocated to educational activities for staff in schools and institutions of higher education

If they have the means of participating in a variety of educational activities, teachers, non-teaching professionals and support staff will be able to improve and update their skills and will be better equipped to integrate digital technologies into their practices. The skillful use of digital pedagogy will contribute to the perseverance of learners, as well as to their learning and educational success.

In fall 2018, to mark the initial implementation of the Action Plan, the Ministère will organize province-wide digital technology days for teachers, non-teaching professionals and support and administrative staff. Thanks to strategic partnerships, including those with the various RÉCITs, CADRE21 and L'École Branchée, the province-wide digital technology days will offer a series of accessible activities and training workshops free of charge for all staff and institutions in both the public and private education sectors.

14 *Policy on Educational Success*, 43 and 53

CAMPUS RÉCIT

The education consultants at the RÉCIT offer a platform on which they share their expertise in short online training sessions free of charge. Intended for teachers, education consultants and principals, the Campus RÉCIT website provides content on a variety of subjects associated with the Québec Éducation Program (QEP) in order to foster the integration of digital technologies into teaching practices. Various activities and resources allow learners to learn at their own pace, either alone, with colleagues or accompanied by an education consultant.

CENTRE D'ANIMATION, DE DÉVELOPPEMENT ET DE RECHERCHE EN ÉDUCATION POUR LE 21e SIÈCLE (CADRE21)

The aim of CADRE21 is to develop a culture of professional development among Québec teachers by accompanying them as they comment on and take stock of the major issues affecting education in the 21st century. CADRE21 is a physical location where educators can meet but, more importantly, it is a virtual location that provides access to resources, a blog and customized training in various subjects related to pedagogical innovation, including ICT skills. The training sessions are certified by digital badges.

MEASURE

06 MAXIMIZE CURRENT RÉCIT SERVICES AND SUPPORT TECHNO-PEDAGOGICAL LEADERSHIP IN EDUCATIONAL INSTITUTIONS

EDUC

The Ministère wants to broaden and consolidate the services of the *Réseau pour le développement des compétences des élèves par l'intégration des TIC* (RÉCIT) in order to support techno-pedagogical leadership initiatives in educational institutions. This measure will support the effective and fair integration of digital technologies into teaching practices by:

- supporting, guiding and accompanying teachers and other educators with regard to the various school subjects and the content related to the broad areas of learning
- respecting the pace at which they develop digital skills
- bridging the digital divide, in particular among teachers, students and parents, in an effort to ensure equal opportunity and success for all
- developing the digital skills of students and teachers

The Ministère will therefore increase the budget envelope for RÉCIT services in order to provide teachers with more support and guidance.

A second budget envelope will finance time off for teachers with a view to developing and supporting techno-pedagogical leadership initiatives in educational institutions. This may take different forms, depending on the pedagogical priorities of each institution (e.g. the implementation of communities of practice, time off for a teacher to act as an expert for the school team, or the training and guidance of teams of expert students). In collaboration with RÉCIT services and educational services, schools will be able to develop the model that best meets their needs.

THE RÉSEAU POUR LE DÉVELOPPEMENT DES COMPÉTENCES DES ÉLÈVES PAR L'INTÉGRATION DES TIC (RÉCIT)

This network groups together more than a hundred resource-persons throughout school boards and subsidized private schools in Québec. The role of these resource-persons is to provide training and support for teachers in the area of digital technology and to foster the emergence of a network culture. The Ministère coordinates the network and manages its online presence.

The network offers a variety of services:

- Local services for general education in the youth sector (one service for each school board and one service for private schools)
- Regional services for adult general education (one service for each administrative region and one service for the anglophone community)
- Provincial services providing specific support for a subject area of the Québec Education Program or a for a specific student group, including vocational training (12 services)

MEASURE

07 MAXIMIZE THE ROLE OF STAFF MEMBERS RESPONSIBLE FOR INTEGRATING DIGITAL TECHNOLOGIES IN INSTITUTIONS OF HIGHER EDUCATION SUPÉRIEUR

HE

Teaching staff in institutions of higher education must also receive the support they need to integrate digital technologies into their teaching practices. The Ministère will equip institutions of higher education to rely more heavily on non-teaching professionals who support the teaching staff.

To this end, the Ministère will:

- provide new funding for colleges and universities to support staff activities, especially those initiated by education consultants, aimed at integrating digital technologies into teaching practices
- increase funding for the facilitation and support of staff members responsible for the integration of digital pedagogy

In collaboration with the institutions, the Ministère will also evaluate scenarios that could foster the pooling and sharing of expertise in peer counselling between colleges and universities.

ITREP NETWORK (RÉSEAU REPTIC): AN INSPIRING COMMUNITY OF PRACTICE

In 2002, the Ministère mandated the ITREP Network (Réseau des répondantes et répondants TIC or Réseau REPTIC) to create a province-wide network of education consultants responsible for the integration of information and communications technologies into teaching and learning.

This bilingual community of practice coordinated by the Fédération des cégeps provides support for and fosters collaboration and knowledge sharing among education consultants responsible for the integration of ICTs in every college in Québec. The ITREP Network also makes tools and resources (e.g. tutorials, lesson plans, learning activities) available to college students and teachers in order to develop ICT skills adapted to the different college courses and programs.

OBJECTIVE 1.3
SUPPORT INDIVIDUALS AND ORGANIZATIONS IN MAKING THE TRANSITION TO A DIGITAL CULTURE

In order to achieve collective awareness and define common objectives, it is necessary to continue raising awareness of the potential of digital technologies among stakeholders in education. **Teachers, non-teaching professionals and support and administrative staff must recognize the benefits of digital technologies and understand the need to equip learners to evolve in a society in which these technologies are playing an increasingly important role.**

Digital culture implies citizenship in the digital age. The education system must help learners learn to use digital technologies as informed citizens. Educational institutions must provide students with effective guidance in their use of digital technologies and help them adopt responsible behaviour.

Since promotion and recognition are drivers of change, **the following measures will be implemented to disseminate, promote and share innovative practices and initiatives.**

MEASURE

08 PROMOTE INNOVATIVE PEDAGOGICAL PRACTICES AND THE POTENTIAL OF DIGITAL TECHNOLOGIES IN EDUCATION

EDUC HE

The Ministère wants to encourage teachers, non-teaching professionals and support and administrative staff to invest more heavily in the shift to digital and to adopt innovative pedagogical practices. Training in digital technologies and their educational applications must first involve raising awareness of the added value of digital technologies in education.

The integration of digital technologies requires time and resources in order to bring about sustainable changes in practices. This initial effort, which is necessary if there is to be a true impact on learners, will prevent the simple transfer of old practices to a new technological context. The promotion of innovative pedagogical practices and the potential of digital technologies in education is a strategic element in the successful transition to a digital culture.

The Ministère will help plan awareness activities and develop tools (e.g. information sessions and campaigns, videos and expertise sharing activities) with a view to promoting innovative practices and initiatives and encouraging their dissemination, sharing and further use. To this end, it will form partnerships with agencies that promote innovative practices and the potential of digital technologies in education.

L'ÉCOLE BRANCHÉE AND THE PROMOTION OF INNOVATIVE PEDAGOGICAL PRACTICES

As part of the Policy on Educational Success and this Action Plan, the Ministère formed a partnership with *L'École branchée* in order to promote innovative pedagogical practices using its information vehicles, including CréaCamps and the *École Branchée* magazine. L'École branchée's mission is to help teachers use digital technology to foster their students' success.

MEASURE

09 HELP LEARNERS UNDERSTAND THE OPPORTUNITIES, ISSUES AND IMPACTS ASSOCIATED WITH THE USE OF DIGITAL TECHNOLOGIES, INCLUDING THOSE RELATED TO THE PROTECTION OF PRIVACY

EDUC HE

The use of digital technologies for educational purposes also requires that learners be given the tools they need to understand and manage the digital world, taking into account Québec's social, ethical and legal norms and values. This means that they must be aware of the related issues, such as the protection of privacy and the use of digital objects, platforms and media.

The transition to a digital culture presupposes an awareness of what it means to be a citizen in the digital age. It also requires that learners develop the skills they need to fully exercise their role as citizens in this context and to envisage choices and actions that foster the ability to live together.

It is a matter of fostering an understanding and informed use of digital technologies so that learners' experiences are enriching, respectful and fulfilling and make a positive contribution to their development and that of society.

Existing resources, activities and tools in the school system will be inventoried and shared. The first project in this regard was implemented in January 2018 in collaboration with the *Service national du RÉCIT du domaine du développement de la personne*.

Agencies and institutions at all levels of education will be encouraged to continue developing initiatives aimed at fostering good digital practices by pooling the expertise of various professionals in the system.

SUPPORT FOR EDUCATIONAL INSTITUTIONS AND AVENUES FOR FOSTERING CITIZENSHIP IN THE DIGITAL AGE

The Ministère partnered with the *Service national du RÉCIT du domaine du développement de la personne* in order to identify actions taken in the system, to support educational institutions wishing to experiment with various measures aimed at fostering the development of informed and critical citizenship, and to ensure the dissemination of best practices. The project will also involve university researchers in related fields, such as media education, ethical thinking and the integration of digital technologies in education. Its aim is to recommend models and resources that could help Québec's school boards and educational institutions meet the challenge of turning out informed citizens who are able to think critically and play an active role in society in the digital age. Ultimately, it will lead to the recommendation of concrete avenues for action in the future in accordance with the digital skills framework.

THE DIGITAL CITIZENSHIP WEBSITE: AN INITIATIVE OF THE ANGLOPHONE EDUCATION COMMUNITY

Given the importance of the issues associated with the use of digital technologies, initiatives have been taken in recent years to meet the needs of educational institutions. One of these initiatives is the Digital Citizenship website, whose content is available in both English and French. It helps raise awareness of online safety issues among Internet users and, more importantly, provides information about positive habits and behaviours that foster appropriate participation in virtual communities to everyone's benefit. The website, built on the values of respect, protection and education, is divided into nine themes related to citizenship in the digital age. It is the result of a collaborative effort by the *Direction des services à la communauté anglophone* and teachers, education consultants and librarians in Québec's English-language schools.

CYBERSELF.CA: AN INITIATIVE OF QUÉBEC COLLEGES

CyberSelf.ca is a reference tool for students on risks associated with the use of social media and cyber communication. The site can also be used by college teachers and other staff to implement pedagogical or awareness activities. It addresses various risks that can arise when using social media.

MEASURE

10 SUPPORT INSTITUTIONS IN THE DEVELOPMENT OF CONTINUING EDUCATION AND PROFESSIONAL DEVELOPMENT OFFERINGS IN THE AREA OF DIGITAL TECHNOLOGY

EDUC HE

The Ministère wants to increase its support for adult education centres, vocational training centres and colleges to help them develop their continuing education and professional development offerings in digital technology for individuals and needs not covered by regular education services. These offerings are essential for businesses that have just begun or are undergoing the shift to digital or the integration of new technologies.

Access to a larger qualified workforce and continuing education for its current and future employees is definitely a determining factor in the vitality of a business and its ability to innovate.

In recent years, the business services departments of educational institutions have used a number of means to support continuing education and professional development in digital technology. While the offerings must be constantly updated to keep up with technological developments and changes in the labour market, they must also provide learners with the solid foundation they need to become more autonomous in their current and future learning.

The funds allocated under the Action Plan will help with canvassing, training and the production of professional development materials and activities for adult education centres. Colleges will benefit from funds allocated in the economic update for costs associated with the development of continuing education and professional development offerings.

This measure takes an open-ended digital literacy approach focused on the individual, which will help learners develop their digital skills throughout their lives. Digital literacy skills involve technology-related soft skills and know-how; they are at the heart of the occupations of the future and essential for functioning in a digital society.

ORIENTATION 2

Make use of digital technologies to enhance teaching and learning practices

The second orientation focuses more specifically on the major benefits of using digital technologies in the education system. According to the Policy on Educational Success, "digital technology is already transforming our schools. We need to make sure that it is used equitably and that its potential is harnessed more effectively in order to improve teaching and learning."[15]

The appropriate use of digital technologies can foster the engagement and autonomy of learners in their learning. **The availability of digital educational resources and collaborative tools, the emergence of innovative pedagogical practices and distance education are all incentives and opportunities for engagement in a learning process, either in a formal setting in the education system or elsewhere.** With the accelerated evolution of the skills required, the autonomy of learners in a process of continuing education becomes a major challenge.

Consequently, the aim of the proposed measures is to make sure that the use of digital technology is associated with adapted and innovative teaching and learning practices, that the technology is available and shared, and that distance education offerings are diversified, accessible and better adapted to the needs of each individual.

15 *Policy on Educational Success*, 44.

AREA OF INTERVENTION 3
INNOVATIVE PRACTICES

Digital technology affords considerable potential for improving teaching and learning. It lays the foundation for new ways of teaching, learning and collaborating. It also requires new approaches and new pedagogical strategies.[16]

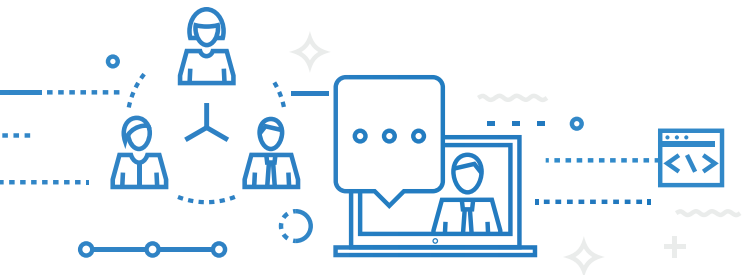
By developing innovative pedagogical practices and disseminating and implementing those that are the most promising, **stakeholders in education will be able to benefit fully from digital technologies and contribute more effectively to learners' educational success.**

The use of technology is recognized as a source of motivation for learners, but its educational effectiveness is directly linked to its compatibility with the targeted pedagogical intention.[17] The optimal use of digital technologies presupposes the adaptation of teaching and learning practices. It is therefore essential to support the development and implementation of innovative practices.

OBJECTIVE 2.1
DEVELOP INNOVATIVE DIGITAL TEACHING AND LEARNING PRACTICES

The adoption of best digital practices in education systems is a gradual process.[18] **Digital technologies help teachers diversify their pedagogical practices. They provide new opportunities for improving the teaching and learning environment. Specifically, they propose strategies focusing on new forms of collaboration and team-based problem solving, as well as project-based and peer learning.** They also offer solutions for special needs learners.

Learners must also adapt to digital technologies, which can stimulate their engagement in their educational path. **It is therefore essential to strengthen the connection between the use of digital resources, autonomy and student success.**



16 *Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills*, 109-110.

17 *Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills*, 109-110.

18 UNESCO, *ICT Transforming Education: A Regional Guide, 2010*, 30-33, http://unesdoc.unesco.org/images/0018/001892/189216e.pdf.

MEASURE

11 SUPPORT THE ACQUISITION AND DEVELOPMENT OF DIGITAL EDUCATIONAL RESOURCES

EDUC HE

The Ministère will increase its support for the acquisition and development of digital educational resources (DER).

First, it will help the networks acquire DER by:

- improving existing budget measures for the school system
- providing institutions of higher education with budgets to this effect

It will then finance the development of DER to meet the needs unmet by current offerings. Projects will be supported on an ad hoc and non-recurrent basis, and could be initiated by institutions, public sector publishers, non-profit organizations or private developers.

These actions will encourage teachers to integrate DER into their pedagogical practices and enhance the offerings available. At the same time, they will foster the reuse of these DER.

DER are the tools of choice for responding to the diversity of learners' needs and educational paths and for fostering success. It is also essential to ensure the development of DER that satisfy accessibility criteria, thereby allowing learners to use the technological aids they require.

THE RÉSEAU POUR LE DÉVELOPPEMENT DES COMPÉTENCES DES ÉLÈVES PAR L'INTÉGRATION DES TIC (RÉCIT) AND OPEN EDUCATIONAL RESOURCES

Education consultants at the RÉCIT have developed substantial expertise in the production and publication of open educational resources (OER). The publication of these resources is based on free licensing, which enables users to use, share, modify or redistribute them freely in accordance with their needs. The RÉCIT is therefore capable of adequately supporting the creation and development of resources for all educators. Thus, various stakeholders pool their expertise in a professional development context (teachers, educational consultants in specific subjects, educational consultants at the RÉCIT and student trainees). These co-design teams continue reflecting on pedagogical practices and their impact on student learning and results, then adapt and create OER.

MEASURE

12 ENCOURAGE INNOVATIVE PROJECTS INVOLVING DIGITAL TECHNOLOGIES

EDUC HE

The Ministère will stimulate the development of innovative practices involving digital technologies. It will foster the implementation of innovative pedagogical projects by:

- improving existing budget measures for the school system
- providing institutions of higher education with budgets to this effect
- increasing its financial support for action research projects in the field of digital technologies in education

These actions will give innovators and researchers more ways of testing their ideas, advancing knowledge and identifying the uses of digital technology that are most likely to foster educational success.

MEASURE

13 DEVELOP DIGITAL MINISTRY EVALUATION TOOLS

EDUC HE

The Ministère will set up a digital environment to support all activities related to ministry examinations using an integrated exam management platform. This environment will allow all stakeholders, in particular exam developers, teachers, students and graders to develop, write, administer and grade exams in digital format. At the end of this gradual implementation process, students in elementary and secondary school, vocational training, adult education and college will be able to write ministry examinations in digital format.

In order to reduce the risk of a breach of confidentiality and to increase the level of security of the exams, the operations involved in the physical handling of exams will be reduced to a minimum, and access to the exams and related documents will be secured and subject to a set schedule.

The availability of ministry exams in digital format will also facilitate the evaluation process, since it will allow for the efficient collection and analysis of data and ensure better monitoring of results. In addition, the Ministère will be able to use these results in a greater variety of ways. The information produced will make it possible to determine specific measures needed to improve teaching and learning.

Work is also under way to establish guidelines for the use of digital reference tools, including dictionaries and grammar books, for ministry evaluation in order to ensure consistency between the tools used in learning and those used in evaluation. Students will be able to develop proficiency in using these more user-friendly tools which, outside the school setting, are far more widespread in digital form than in paper format.

In 2018-2019, the choice of service provider(s) will be based on a public call for tenders. Subsequently, the ministry examination management platform will be implemented gradually, and the school system will be offered support in applying the resulting changes.

MEASURE

14 RELEASE OPEN DATA AND FOSTER ITS USE

EDUC HE

As recommended in the government's IT strategy, the Ministère will release open and useful data. On page 79 of the strategy, open data is defined as follows: "Open data is raw, non-nominal, royalty-free data produced or collected by a public or private organization and made accessible to the public on the Internet. Open data reflects the principle of transparency in public administration, facilitates the participation of citizens in developing innovative solutions and fosters economic development."[19] This open data will provide relevant information for the general public, analysts, developers, innovators and researchers. To this end, a governance structure for the release of data will be implemented at the Ministère, with a view to defining ministerial orientations concerning open data and determining which data sets will be available on the *Données Québec* portal in accordance with the guidelines pertaining to the dissemination of open data.

To foster the use of open data, the Ministère will support the organization of education hackathons in collaboration with stakeholders in society at large, the education networks and technological entrepreneurship.

INNOVATION SUPPORTING EDUCATION

In 2017, two initiatives of this type were launched in Québec: the *Repenser l'école* hackathon and the Desjardins Cooperathon. These initiatives drive pedagogical and social innovation. They open the school door by allowing Quebecers from all backgrounds to collaborate in the development of solutions that could have an impact on the educational experience of current and future generations.

This is the way of the future.

19 Québec, Conseil du Trésor, *Stratégie gouvernementale en TI : Rénover l'État par les technologies de l'information*, 2015, 38, https://www.tresor.gouv.qc.ca/fileadmin/PDF/ressources_informationnelles/strategie_ti/strategie_ti.pdf. [*Translation*]

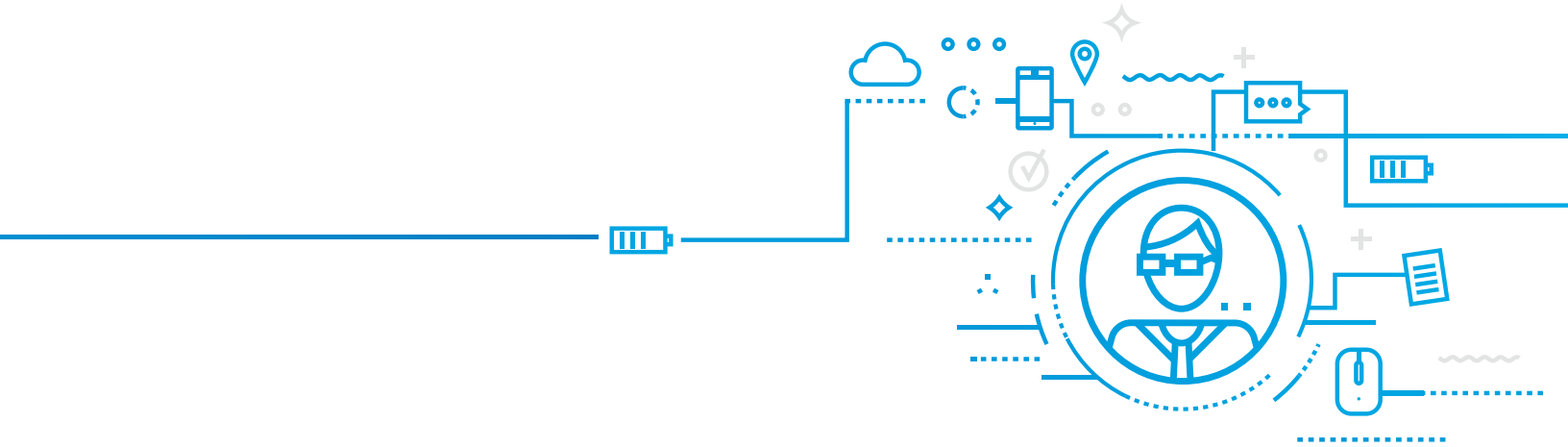
AREA OF INTERVENTION 4
RESOURCES AND SERVICES

Digital technologies facilitate pooling, foster vitality and, ultimately, lead to the improvement of resources and services. They are an important tool for sharing and collaboration.

There are a growing number of initiatives involving digital technologies in the education system. However, they are not always shared or, if they are available, they are hosted on many different platforms. Several projects have been developed to ensure better dissemination of resources, but most of them involve a limited number of educators. **It would be beneficial for the education system to strengthen cooperation and focus its pooling efforts on the more popular structuring projects. The Ministère intends to assume the expected leadership role in this area.**

OBJECTIVE 2.2
POOL RESOURCES AND SERVICES SO THAT THEY CAN BE SHARED AND MADE AS ACCESSIBLE AS POSSIBLE

The pooling of resources and services applies to the entire education system. Elementary-school, secondary-school, college and university libraries provide particularly fertile ground for the implementation of digital solutions aimed at pooling services. This also involves making sharing and collaborative tools available to educational institutions.



MEASURE

15 DEVELOP A PROVINCIAL PLATFORM FOR DIGITAL EDUCATIONAL RESOURCES

EDUC

Digital educational resources (DER) are being developed at a rapid rate. The Ministère will oversee the implementation of a province-wide platform to support and stimulate DER created by Québec developers or produced by and shared among teachers. This platform will foster access to a variety of quality DER, allowing both private schools and the public school system to discover new DER and incorporate them into their teaching and learning. The Ministère will analyze various scenarios in order to ensure the quality of the DER available on the platform.

The DER, many of which are related to the application of the Québec Education Program (QEP), will be presented in a user-friendly and evolving environment that will simplify searches and help improve teaching and learning practices. The platform, which will be accessible on all types of digital devices including computers, tablets and smartphones starting in the 2020-2021 school year, is intended for teachers, non-teaching professionals, students and parents. It can be used in schools for extracurricular activities or at home for tutoring activities, help with homework and for families wishing to delve further into certain subjects on their own.

The Ministère also plans to acquire licences for the entire network in order to generate cost savings, as well as a diversified offering of quality DER. Licensed DER can be made available by institutions, public-sector publishers, non-profit organizations and private companies. Starting in the 2018-2019 school year, the school system will have access to the Curio platform (CBC), the CVE collection of educational videos and the CAMPUS media tool of the National Film Board of Canada (NFB). In addition, Télé-Québec will make educational kits available to teachers in various subject areas.

These actions will make it easier for teachers to incorporate quality DER into their teaching practices and will contribute to pooling and sharing. It will also foster student engagement and educational success and facilitate differentiated instruction.

A QUEBEC ECOSYSTEM OF DER AND OER PRODUCERS: A WEALTH OF RESOURCES TO BE SUPPORTED AND POOLED

- Teachers and education consultants, such as those associated with RÉCIT, who create resources, for the most part royalty free
- Companies and non-profit organizations working in the educational technology sector, many of which belong to EDTEQ, that create and distribute digital educational products and services
- Educational publishers that are developing more and more digital offerings
- Cultural institutions with an educational mission, such as Télé-Québec and Bibliothèque et Archives nationales du Québec
- Other ministries that produce DER, for example, the Ministère de la Culture et des Communications and its digital cultural content
- Various education system partners that contribute to the production of a variety of DER

MEASURE

16 SUPPORT THE CONTINUED DEPLOYMENT OF ÉCOLE EN RÉSEAU

EDUC

The *École en réseau* program was created more than a decade ago to ensure the survival of small elementary schools in remote areas. École en réseau was created to ensure equal opportunity, access to a variety of pedagogical and digital resources and support for pedagogical innovation.

The initial objective was to reach out to remote communities, but the growing presence of digital technologies in schools has made École en réseau a resource for increasingly large numbers of students and classrooms. Although many schools now benefit from the services of École en réseau, breaking the isolation of remote schools is still its main mission.

The Ministère will continue to provide financial support for the development and deployment of this project, and to guide and advise the main stakeholders in its deployment to help meet current and future challenges.

MEASURE

17 PROVIDE ACCESS TO E-BOOKS IN SCHOOL LIBRARIES AND ENCOURAGE THE SHIFT FROM LIBRARY TO LEARNING COMMONS

EDUC

The Ministère will support the deployment of an e-book lending platform for school libraries in private schools and the public school system, which will allow the entire school system, including educators and students, especially those with special needs, to take advantage of the pedagogical benefits and multiple possibilities afforded by simple and legal access to e-books. For this, the Ministère will be partnering with Bibliopresto. A pilot project carried out by *Commission scolaire de la Seigneurie-des-Mille-Îles* has provided insight into the technology involved.

The project will be implemented in three phases over the next three years: technical and administrative development of the platform and the terms of use in 2018-2019; limited deployment in 2019-2020, which represents the first stage of implementation with adjustments to be made in this phase; and then the final deployment in 2020-2021, when the platform will be made accessible to all institutions.

The Ministère also wants to encourage the shift from school library to learning commons adapted to students' and teachers' needs. The traditional school library will be transformed to allow it to play a larger role in helping students develop 21st-century competencies.

BIBLIOPRESTO

Bibliopresto is a non-profit organization that has been offering public libraries digital tools and services since 2012. In addition to operating an e-book lending program, Bibliopresto negotiates collective licensing with digital resource suppliers, coordinates an online communication environment between libraries and their users, and operates a service allowing libraries to offer users a catalogue of periodicals.

MEASURE

18 IMPLEMENT A SHARED SERVICES PLATFORM FOR UNIVERSITY LIBRARIES

HE

The Ministère supports the development of a shared services platform for Québec university libraries, which will replace their current systems.

This structuring project involves much more than the acquisition of technological infrastructure, since it is based on the pooling and modernization of university library services and resources. In addition to its technological dimension, the project involves the development of a collective strategy for the preservation of the print and digital collections housed in each university, thereby fostering the gradual creation of a shared collection and the sustainability of Québec's educational heritage.

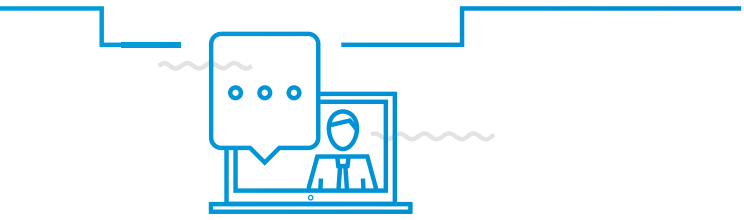
POOLING ALSO ENCOURAGED IN THE COLLEGE SYSTEM

CEGEPs will be provided with funding so they can finance investment projects aimed at increasing access to and the reuse and sharing of services and resources and at making optimal use of digital technology by adopting innovative practices.

AREA OF INTERVENTION 5
DISTANCE EDUCATION

More than half a century ago in the 1940s, the Québec government made its first foray into distance education (DE). Radio, television and correspondence courses were the technologies of the day. [20]

At the turn of the 21st century, the sustained implemetation of digital technologies gave educational institutions the opportunity to accelerate the development of DE and to diversify delivery systems. The number of online, blended, synchronous and asynchronous DE courses and programs, especially at the college and university levels, exploded. Since then, DE has experienced sustained growth and has become an essential component of the world's education landscape.



OBJECTIVE 2.3
FOSTER THE DEVELOPMENT OF DISTANCE EDUCATION OFFERINGS BASED ON NEEDS AT THE VARIOUS LEVELS OF EDUCATION

The accelerated development of online courses and programs in recent years has for the most part been a local phenomenon. To counter this trend, institutions of higher education in some Canadian provinces as well as other countries have implemented joint government-supported programs that have led to the creation of platforms presenting pooled DE offerings. For example, the eCampusOntario platform is the product of a consortium of all colleges and universities in the province.[21] **A provincial platform of pooled DE offerings would enable Québec to improve the visibility of its institutions at the national and international level, in particular in francophone nations, as well as support the development and expanded deployment of DE content and services.**

Québec's DE offerings in adult general education are extensive, and work is under way to extend them to general education in the youth sector. Among other things, DE makes it possible to offer courses to students in remote regions, who are few in number and do not have access to certain courses or need a flexible schedule. These are significant challenges in Québec because of the size of the territory, and DE is already part of the solution. Efforts in this regard must continue at every level of education, especially given the decline in enrolments in certain regions.

Although DE is capable of meeting international imperatives, issues of particular concern in Québec must remain at the forefront of any discussions concerning the development of new DE content and services. DE must allow educational institutions to better meet the needs and expectations of new generations of learners, whose profiles are becoming more and more diversified and whose daily lives are marked by increased mobility and the use of digital technologies.

20 CLIFAD, Soixante ans de formation à distance au Québec, 2007, **https://www.sofad.qc.ca/media/60_ans_fd.pdf**.

21 eCampusOntario, "About eCampusOntario," **https://www.ecampusontario.ca/about/**.

MEASURE

19 FOSTER THE DEVELOPMENT OF DISTANCE EDUCATION AT THE ELEMENTARY AND SECONDARY LEVELS

EDUC HE

The Ministère wants to foster the deployment of DE at the elementary and secondary levels, as well as in vocational training and adult general education in both the English and French sectors. DE can contribute to the educational success of all students.

Thanks to Bill 144, passed in November 2017, DE, once limited to adult general education and vocational training, can now be used in the public general education system in the youth sector.

> **BILL 144**
>
> With the passage of Bill 144 in November 2017, it is now possible to carry out a pilot project and create a framework for DE. Section 459.5.3 of the *Education Act* (EA) authorizes the Minister to establish and implement a pilot project to experiment or innovate in the field of distance education. The pilot project may last up to three years. Services may be provided and received according to standards that depart from those established under the EA or the *Act respecting private education* (APE).

In particular, DE can help meet the needs of students who:

- need to spend time away from school for a variety of reasons (e.g. enrolment in a sport-études [sports-study] program, hospitalization, travel)
- are home schooled
- go to school in a remote region
- attend a small school that does not have the necessary resources to offer all courses on site

It can also satisfy the needs of adults who must balance studies, work and family or who are far away from the institution where they wish to study.

DE is also an effective means of offering francization services to young people and adults, and of providing students in widely dispersed location with instruction that requires rare expertise (e.g. reading Braille). It also facilitates differentiated instruction by allowing students to learn at their own pace.

The Ministère will establish orientations for DE in order to ensure access to resources that meet the objectives of the Québec Education Program (QEP). Starting in 2018-2019, a DE pilot project will be implemented in certain school boards in order to establish a deployment model. A province-wide RÉCIT service for DE (SNFAD) will also be created in order to support distance education at the elementary and secondary levels (in the youth and adult sectors and in vocational training).

THE FIRST STEPS TOWARD DISTANCE EDUCATION AT THE SECONDARY LEVEL

The *Commission scolaire de la Beauce-Etchemin* (CSBE) has several years' expertise in the development and provision of DE courses for secondary-school students. It has been offering remedial courses since 2001 and, in 2016-2017, it offered 25 courses to more than 1300 students in 45 Québec school boards. Since 2014, the CSBE has been offering Secondary IV and V students several complete asynchronous courses in English as a second language, French, history, mathematics, science, and ethics and religious culture.

The Leading English Education and Resource Network (LEARN) has been offering students in English-language school boards online learning services since 1999. LEARN uses a blended learning approach in which resources are accessible at all times. In 2017-2018, some asynchronous courses were also offered to students in Secondary Cycle Two who required a more flexible schedule.

MEASURE

20 DEVELOP MASSIVE OPEN ONLINE COURSES TO MEET LARGE-SCALE EDUCATION NEEDS

EDUC HE

Québec is facing labour shortages in several fields and therefore has substantial education and continuing education needs. Massive open online courses (MOOCs), universally accessible online free of charge, could be an appropriate response to these needs.

The Ministère will support the development of MOOCs in order to meet education needs deemed a priority in Québec. For example, MOOCs related to the digital skills framework could be offered in order to stimulate the development of knowledge in this area.

The Ministère has also considered collaborating in international MOOC sharing and pooling initiatives in order to share and showcase Québec's expertise.

MOOC INITIATIVES IN QUÉBEC

HEC Montréal, Polytechnique Montréal and the Université de Montréal created the EDUlib consortium to offer massive open online courses on a shared platform. Courses in a variety of fields, including management, entrepreneurship, chemistry and physics, will showcase Québec's expertise at the international level. Université Laval also offers several massive open online courses, including one on sustainable development, thereby helping accentuate Québec's leadership in this area.

MEASURE

21 BRING TOGETHER DISTANCE EDUCATION OFFERINGS AT THE COLLEGE AND UNIVERSITY LEVELS – ECAMPUS QUÉBEC

HE

A virtual campus, created in collaboration with the college and university systems, will:

- combine DE offerings at all Québec colleges and universities
- promote the recognition and transfer of equivalencies among establishments at a given level of education
- promote the deployment of quality DE offerings
- foster partnerships among institutions and the joint development of DE offerings
- support the sharing of expertise in DE

This area of convergence will allow Québec's institutions of higher education to showcase their DE offerings to Québec students, as well as to other francophone nations and the world.

Later, other stakeholders in the school system will be invited to contribute to the process.

ECAMPUS AND DE IN HIGHER EDUCATION

This vast undertaking is being developed using a joint approach involving all colleges and universities. The objective is to collectively ponder the eCampus project and DE offerings in colleges and universities, then to determine the actions needed to meet the future challenges of higher education in Québec. The recommendations made will enable the Ministère to implement structuring changes from a technological, administrative and financial point of view.

The work, in collaboration with the Institut de gouvernance numérique, will be carried out in a spirit of independent thinking in order to foster innovative and bold ideas. The Ministère believes that if there is encouragement to share existing expertise, knowledge and know-how in the higher education systems, Québec will be able to emerge as a leader in the field. The sharing of expertise and the best ways of developing collective intelligence in this rapidly growing field will also be addressed.

In this context, digital technologies are used to foster discussion and joint construction, since, throughout the duration of this undertaking, the Ministère is making a collaborative work platform available to help transcend barriers between institutions across the province. Recommendations are expected in the fall of 2018.

MEASURE

22 FOSTER THE SHARING OF EXPERTISE IN DISTANCE EDUCATION

EDUC HE

The Ministère intends to foster the sharing of expertise in DE among stakeholders at every level of education. This will promote best practices and stimulate innovation, collaboration and excellence in the field.

The development of collective expertise in DE will also allow Québec to strengthen its role as a leader in the field and to showcase its expertise in a strategic area of education and higher education on the international stage.

FADIO : AN INNOVATIVE AND PROMISING PARTNERSHIP MODEL

Founded in 2015, the eastern Québec inter-level distance education project (FADIO) enables seven school boards, five CEGEPs, two institutes and one university to collaborate on the development of their collective expertise in DE in order to meet the challenge of ensuring access to education in a vast and sparsely populated territory. This partnership has clearly proven its worth, since this project has piqued the interest of other institutions in several regions of Québec. With this Action Plan, the Ministère wants to foster joint projects like FADIO that will make it possible to share best practices, knowledge and resources for the benefit of the entire Québec education system.

ORIENTATION 3

Create an environment conducive to the deployment of digital technologies in the education system

The deployment of digital technologies is predicated on an environment that will help the education system integrate and exploit their potential for the benefit of learners. The environment will be all the more conducive if it can evolve and adapt. Education system stakeholders must work together on an ongoing basis to take structuring and flexible action.

The Action Plan targets the full deployment of digital technology across Québec, and it is essential that stakeholders in the education system consider it a joint project in their own organizations as well as in their relations with partners. **Teachers, non-teaching professionals, support staff, administrators of institutions, federations, partners in the network and ministry staff must continue to integrate digital technologies in pedagogical, educational and organizational practices in a spirit of collaboration and creativity.** In terms of governance, the proposed actions will be consistent with existing initiatives in the education system.

AREA OF INTERVENTION 6
MONITORING OF EDUCATIONAL PROGRESS

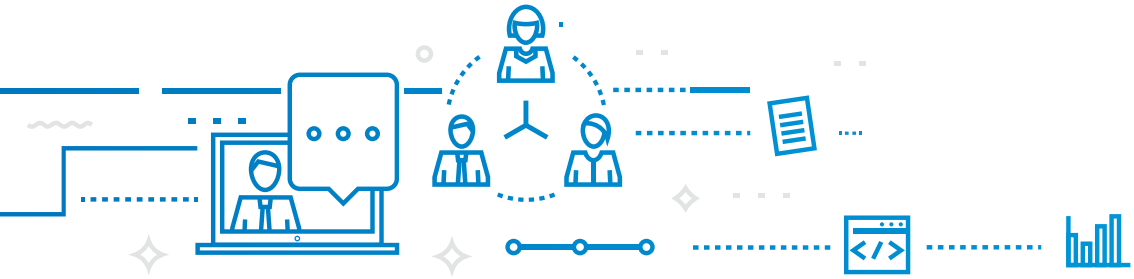
Digital solutions are being used more and more to monitor learners' educational progress. For example, they are used to record and publish academic results, do administrative follow-ups and maximize communication between various stakeholders, and particularly with parents. That being said, they have been implemented unevenly in the various institutions, and there is a need to encourage better integration and the sharing of practices throughout the education system.

OBJECTIVE 3.1
OVERSEE THE DEPLOYMENT OF DEDICATED ADMINISTRATIVE AND PEDAGOGICAL SOLUTIONS TO MONITOR EDUCATIONAL PROGRESS

Educational institutions use digital technologies in their management processes, especially with regard to human, material and information resources, accounting and financial operations, academic monitoring, and decision making. They are also now more likely to use enterprise resource planning (ERP) software.

Digital technology also facilitates communication and collaboration among stakeholders in an educational context. Various tools are used to share information and resources such as diaries, schedules, homework, results, educational resources and performance monitoring data.

Exchanges of data between the Ministère's information systems and those of educational institutions will have to evolve in order to become more flexible and interoperable for the benefit of all education system stakeholders, especially learners. It is also a priority for the Ministère to optimize its own digital service offerings.



PROJECTS TO OPTIMIZE INFORMATION RESOURCES – STUDENT FINANCIAL AID

The student financial aid (AFE) website and portal, like the services they host, were not designed to be consulted using mobile devices such as smart phones and tablets. Students are moving en masse to mobile technology. A project has therefore been implemented to make it possible to use mobile devices to consult the website and the Student Internet File accessible on the AFE portal.

MEASURE

23 IMPLEMENT THE UNIFIED ELECTRONIC FILE THAT STUDENTS WILL HAVE THROUGHOUT THEIR EDUCATION

EDUC HE

As announced in the Educational Services Strategy for Children From Birth to Age 8,[22] a unified electronic file will be implemented. The information will first be made available to private schools and the public education system, then to institutions of higher education. The file will:

- foster communication between parents, students and teachers
- facilitate access to certification data for all Quebecers
- facilitate access to information about students for school teams and parents in the exercise of their functions and roles, while respecting students' privacy
- afford better traceability of student files throughout their education
- facilitate transitions between kindergarten and Elementary 1 and between Elementary 6 and Secondary I

Until the end of the 2019-2020 school year, the Ministère will carry out the work involved in studying and designing the electronic file. Initiatives taken by schools with regard to this project will be analyzed and taken into account, and initiatives around the world will be monitored.

PILOT PROJECT FOR A NEW MEANS OF ACCESSING STUDENTS' ACADEMIC RESULTS

With a view to improving service offerings, the Ministère has launched a project that will enable secondary-school students to obtain their academic results online any time.

The Ministère now offers this new online service to students registered in public sector adult general education (AGE) or vocational training (VT). As part of a pilot project, these students have had access to an initial version of the Online Academic Record (OAR) since April 11, 2018.

This project will serve as a cornerstone for the development of the unified electronic file.

22 Québec, Ministère de l'Éducation et de l'Enseignement supérieur, *It's All About the Children, Educational Services Strategy for Children From Birth to Age 8*, 2018, 30, http://www.education.gouv.qc.ca/fileadmin/site_web/documents/PSG/politiques_orientations/Strategie_0-8_ans_ANG-basse.pdf.

MEASURE

24 SUPPORT AND SUPERVISE THE DEVELOPMENT OF ENTERPRISE RESOURCE PLANNING SOFTWARE IN THE EDUCATION AND HIGHER EDUCATION SYSTEMS

EDUC HE

Educational institutions have access to enterprise resource planning (ERP) software in order to support business processes and ensure the integrated management of academic and administrative functions (human, financial and material resources).

The Ministère will support and supervise the development of ERP software in the education and higher education systems. This will take the form of financial incentives for educational institutions in order to encourage collaboration and the pooling of resources. The Ministère will play a supervisory role in order to ensure that initiatives are in line with government and ministerial orientations in terms of interoperability, manoeuvrability and flexibility.

The education and higher education systems have similar administrative and academic management needs. Thus, the needs and challenges related to the sharing of data could be met by two complementary solutions:

- Encouragement to devise shared solutions at each level of education
- Use of application programming interfaces (APIs) or software layers ensuring the interoperability of systems

These pooling solutions will generate substantial cost savings and facilitate communication between systems. They will also offer access to information assets and draw more value from them through business intelligence, which, among other things, will make it possible to identify challenges and possibilities in order to make informed decisions.

SAFIRH : STRONG POTENTIAL FOR POOLING

Québec's network of universities and the *École polytechnique de Montréal* have adopted a unified system called SAFIRH for administering finances, capital assets and human resources. This project is a concrete example of resource pooling consistent with the orientations of this Action Plan.

MEASURE

25 IMPROVE COMMUNICATION AND COLLABORATION AMONG EDUCATORS, STUDENTS AND PARENTS USING DIGITAL TECHNOLOGIES

EDUC

The Ministère will strengthen communication and collaboration among educators, students and parents by developing and using digital tools and resources.

In this respect, the Ministère will support projects carried out by school system partners working in the field of educational technology in order to develop open solutions that enable classrooms and schools to communicate with parents. The projects must have the potential to simplify follow-up and communication with the institution throughout the year. The Ministère will foster free access to the tools and resources developed.

Hackathon challenges will also be issued in order to stimulate innovation.

This measure will contribute to the achievement of one of the objectives of the Policy on Educational Success, which is to "promote parental engagement and support the relationship between family and educational setting."[23] Digital tools will have considerable benefits given the key importance for educational success of communications and feedback among stakeholders. In addition to providing stakeholders with a sense of effectiveness and increased engagement in their respective roles, communications and feedback encourage students to take responsibility for their own educational progress. For parents and families, these tools will make monitoring their children's progress more practical, user friendly and interesting, which will help them fulfill their responsibilities and exercise their parenting skills.

SOCIAL MEDIA HAS FOUND A PLACE IN THE SCHOOL SYSTEM

In recent years, social media, with its free and easy access and potential for outreach, has naturally found a place in the school system. Several school boards, institutions and classes have created Facebook pages to communicate more easily with families, sharing everyday information, achievements and experiences. Twitter can also be used to create a network around the classroom and encourage students to collaborate with peers worldwide. The use of social media is becoming increasingly widespread and helps foster students' sense of belonging to their school. However, some organizations are still wary of opening up access to these networks. Provided they are used ethically (policy on their use, netiquette), these platforms can be extremely beneficial.

23 *Policy on Educational Success*, 65.

AREA OF INTERVENTION 7
ADAPTED AND FLEXIBLE GOVERNANCE

Digital governance at the Ministère and in the school system is of strategic importance, since it can act as a powerful lever of change.

The Ministère will take structuring digital governance actions in order to better help educational institutions understand and use new technologies. These actions will be designed with a view to establishing an ecosystemic approach and contributing to the development of a digital culture.

OBJECTIVE 3.2
STRENGTHEN DIGITAL GOVERNANCE AND RELY ON PARTNERSHIPS AS A STRATEGIC LEVER

For decades now, the Ministère has been supporting the education system in the integration of educational technologies. First, it implemented a financial framework to facilitate the process, then made adjustments based on technological changes and the education system's growing needs. The accelerated evolution of digital technologies is making it necessary to review many practices in the education and higher education systems. The Ministère must adapt to these changes, in particular with regard to financing.

In addition to educational institutions and federations, the Ministère supports numerous partners that provide educational institutions with services in a variety of fields related to digital technologies. These partners must share an ecosystemic vision of digital technology in the education system. Their contribution is extremely important, since all stakeholders and partners must work in a spirit of collaboration and sharing if Québec's educational institutions are to pursue the shift to digital in an effective and harmonious manner.

MEASURE

26 IMPLEMENT GOVERNANCE CONDUCIVE TO THE DEPLOYMENT OF DIGITAL TECHNOLOGIES

EDUC HE

The implementation of the Action Plan requires governance conducive to the deployment of digital technologies in order to ensure that the integration and management of these technologies are consistent with a clear and shared vision. Governance will be all the more effective if it respects the realities of the different educational institutions.

With this in mind, the Ministère will stimulate reflection and discussion in order to identify the best conditions for the optimal deployment of digital technologies, which might require changes to current frameworks. The *Conseil du numérique* might be called upon to participate in these discussions. More consistency between these frameworks and stakeholders' needs will help ensure a better return on investments and make it possible to better adapt to technological change and, especially, to benefit from the full potential of digital technologies in teaching and learning.

MEASURE

27 STRENGTHEN COOPERATION WITH PARTNERS IN EDUCATION AND HIGHER EDUCATION

Collaboration among the various partners in the education system is key to ensuring the harmonious and optimal integration of digital technologies in education. For this reason, the Ministère wants to strengthen relations among the various stakeholders, as well as their collaboration in an open communication and joint construction approach for the benefit of the entire Québec school system. Digital technology offers a number of solutions that facilitate collaboration. One of the pilot projects carried out in this area will be the eCampus undertaking presented in Measure 21.

The Ministère will also draw up a map of the ecosystem of partners involved in digital technologies, including a description of their fields of activity and the range of services they offer schools and institutions of higher education.

IMPLEMENTATION OF THE COLAB COLLABORATIVE CAMPUS TO SUPPORT COLLECTIVE ENTREPRENEURSHIP AND DIGITAL CULTURE AT THE COLLÈGE D'ALMA

In May 2018, the *Collège d'Alma*, the *Université du Québec à Chicoutimi* and HEC Montréal were given funding for the start-up phase of the collaborative campus (COlab) project to support collective entrepreneurship and digital culture. This initiative was implemented to meet the regional priority of helping businesses integrate new technologies, and to help implement the Saguenay–Lac-Saint-Jean hub.

COlab will provide opportunities for research, the transfer of expertise and collaboration with different partners. It will foster the emergence and development of a digital culture thanks to new communication, organization and management methods. COlab will be both a physical and a virtual space open to students, business people and the general public.

In the first phase of the project, the *Collège d'Alma* will develop the strategic vision of the future campus, identify its priority focuses of development and ensure that its services are consistent with programs offered in the region. New mechanisms will be recommended to promote collaborative entrepreneurship and partnership efforts.

MEASURE

28 STIMULATE COLLABORATION WITH QUÉBEC BUSINESSES TO DEVELOP EDUCATIONAL TECHNOLOGIES

The Ministère will encourage collaboration between stakeholders in the Québec education system and businesses working in the educational technology (EdTech) sector for the development of educational technologies closely linked with education needs. This will consolidate the ecosystem dedicated to innovation in teaching and learning.

To this end, the Ministère will support the *Association des entreprises pour le développement des technologies éducatives au Québec* (EDTEQ) in order to maximize the impact of its actions to promote educational success and to enhance linkages between its members and the various education system stakeholders.

ASSOCIATION DES ENTREPRISES POUR LE DÉVELOPPEMENT DES TECHNOLOGIES ÉDUCATIVES AU QUÉBEC (EDTEQ)

EDTEQ, made up of some 50 members, promotes access to educational technology and contributes to the outreach of Québec businesses at the local and international levels. The Ministère is proud to support this association, which makes it a priority to ensure access to digital tools and content and which is well aware of the particular characteristics of the Québec education system. For example, the ministry-supported creation of the *Centre de formation EDTEQ* in 2018 will contribute to the adoption of innovative practices by Québec teachers and have a positive impact on students.

AREA OF INTERVENTION 8
ACCESS

Access to digital technology is a major concern of the government, since it is one of the principles, along with fairness and universality, that governs the Québec education system. Reliable access to a telecommunications network and cutting-edge technological infrastructure is a prerequisite for the adoption of innovative digital pedagogical practices. Access to digital technologies is predicated on the creation of an environment conducive to their deployment throughout the entire education system and throughout Québec.

OBJECTIVE 3.3
GUARANTEE ACCESS TO FAIR AND SAFE DIGITAL TECHNOLOGIES IN EDUCATIONAL INSTITUTIONS

There is a high level of disparity among educational institutions when it comes to the technological equipment made available to teachers and learners. Some institutions are very well equipped and have properly trained staff, while others do not have the technological or human resources needed to allow learners to develop their digital skills.

The Ministère will improve its support for educational institutions wishing to acquire digital equipment for teaching and learning purposes. In addition, it will ensure that sufficient technical support is available to accelerate the deployment of digital technologies in the education system.

The growing use of digital technologies makes it necessary to upgrade and consolidate the technological infrastructure in educational institutions, in terms of telecommunications as well as data centres. Reliable connectivity and sufficient data rates are required to meet the needs of every region.

Lastly, the growing role of digital technologies in the activities of educational institutions calls for a significant increase in information security. This aspect of the shift to digital is as important as any other, and is the responsibility of every education system stakeholder. **The Ministère must guarantee the security of its own information systems and ensure that educational organizations and institutions have the support and the means necessary to strengthen the security of their information assets.**

MEASURE

29 SUPPORT EDUCATIONAL INSTITUTIONS IN THEIR ACQUISITION OF DIGITAL EQUIPMENT FOR PEDAGOGICAL PURPOSES

EDUC HE

The Ministère will increase its support to help educational institutions acquire digital equipment for pedagogical purposes. The implementation of numerous measures in this Action Plan is predicated on the availability of digital equipment. Financial support will be allocated in a spirit of free choice so that the equipment meets each educational setting's pedagogical needs and goals.

Improved access to a variety of equipment will foster digital projects in educational institutions. In the school boards, the budget measure to acquire digital equipment for pedagogical purposes will be enhanced, and its scope broadened to include a wider variety of possibilities.

MODERNIZATION OF THE RULES FOR ACQUIRING EQUIPMENT

Measures will be taken to modernize the rules governing purchases. Changes in the procurement process will allow school boards to choose the equipment they need to promote innovative pedagogical practices and exploit the potential of digital technologies in an educational context. The choice of technological tools will be based on pedagogical aims rather than criteria associated with public calls for tender. At this stage of the modernization process, the establishment of a catalogue of digital equipment appears to be the most promising means of offering a variety of products while ensuring freedom of choice for each educational setting, as it was for the *Secrétariat du Conseil du trésor* and the *Centre de services partagés du Québec* in the adaptation of the framework for cloud computing procurement processes.

DIGITAL TECHNOLOGY COMBOS IN ALL QUÉBEC SCHOOLS AS OF THE BEGINNING OF THE 2018-2019 SCHOOL YEAR

In an effort to kick-start the implementation of the Action Plan, all preschools and institutions of general education in the youth and adult sectors will be invited to acquire a digital technology combo, including cutting-edge equipment as well as training and guidance for all staff members, as of September 2018.

In the first phase of this process, school teams will select a variety of equipment in three categories (robotics, creative lab, fleet of devices) based on their situation and needs. The equipment could include devices from more than one category. This approach will allow each school to have a basic assortment of equipment by September 2018. In the coming years, equipment will be provided gradually based on the number of students in each institution.

In the second phase of the process, training will be offered during province-wide digital days (see Measure 5). Varied and accessible training and guidance will also be provided so that staff can learn how to use the equipment effectively.

Investment budgets in higher education will be increased along the same lines. At the college level, there will be an investment budget to support the procurement of digital equipment for pedagogical purposes. At the university level, investment budgets for computer development will be increased.

PROVISION OF TEACHING TOOLS TO MEET THE NEED FOR TECHNICAL TRAINING IN DIGITAL TECHNOLOGIES

The Ministère will support the provision of teaching tools to meet the need for technical training in digital technologies. This support is aimed at ensuring that CEGEPs have the equipment and facilities that will give students in the Computer Science Technology and Multimedia Integration programs access to a cutting-edge pedagogical environment. The provision of tools to meet the need for technical training in digital technologies will strengthen Québec's position as a leader in the training of specialized digital technicians.

MEASURE

30 INCREASE THE USE OF RESOURCES AND SOFTWARE TO SUPPORT LEARNING FOR ALL LEARNERS, INCLUDING STUDENTS WITH SOCIAL MALADJUSTMENTS OR LEARNING DIFFICULTIES

EDUC

The Ministère will encourage the use of resources and software to support learning for all learners, including students with social maladjustments or learning difficulties. These resources and software (e.g. predictive text and speech, speech synthesis, checker/correctors, spreadsheets, dynamic geometry software) can play a key role in making learning environments accessible. This approach will support differentiated instruction and help provide students with better, fairer services.

TRANSITION OF STUDENTS WITH HANDICAPS FROM SECONDARY SCHOOL TO COLLEGE

The Ministère wants to ensure ongoing collaboration between the education and higher education systems in order to help students with handicaps transition from secondary school to college and facilitate their access to support services. This is part of the *Plan 2015-2019 des engagements gouvernementaux visant à favoriser la mise en oeuvre de la politique À part entière : pour un véritable exercice du droit à l'égalité*.[24]

In order to achieve the objectives of this government policy, the Ministère will work with the secondary school and college systems to implement mechanisms that make it easier for students with handicaps to transition from secondary school to college. This will also make it possible to pursue the efforts made to reduce obstacles to the social participation of persons with handicaps by fostering improved access to support services in the education and higher education systems and the educational success of students with handicaps or disabilities.

The implementation of the unified electronic file (Measure 23) will also facilitate the achievement of this objective.

24 Québec, Office des personnes handicapées du Québec, *Plan 2015-2019 des engagements gouvernementaux visant à favoriser la mise en œuvre de la politique À part entière : pour un véritable exercice du droit à l'égalité*, 2015, https://m.ophq.gouv.qc.ca/fileadmin/centre_documentaire/Documents_administratifs/PlanEngGouv2015-2019.pdf.

MEASURE

31 OFFER TECHNICAL SUPPORT IN EDUCATIONAL INSTITUTIONS TO HELP LEARNERS AND STAFF USE DIGITAL DEVICES FOR PEDAGOGICAL PURPOSES

The Ministère will provide school boards and institutions of higher education with the guidance they need to strengthen and improve technical support for learners, teachers, non-teaching professionals and support staff learning to use digital technologies in an educational context. Given the widespread use of digital technologies, this measure will help better meet technical support needs and foster the adoption of innovative practices.

To this end, new budget measures will cover the salaries of technical support staff, thereby making it possible to hire new resources, fund their training or develop tools for supporting users, depending on each educational setting's priorities.

In addition, in collaboration with the entire education system, the Ministère will evaluate scenarios that help educational institutions and systems pool and share expertise for technical support purposes.

MEASURE

32 CONTRIBUTE TO THE EDUCATIONAL COMPONENT OF THE GOVERNMENT ACTION PLAN TO ESTABLISH DIGITAL INFRASTRUCTURES

Meeting digital infrastructure needs is of key importance in achieving the Action Plan's objectives. This response will involve contributions to the educational component of the government action plan to establish digital infrastructures associated with Orientation 1 of the Strategy. A roadmap will be proposed for consolidating, pooling and deploying digital infrastructures based on the needs of the education and higher education systems.

These actions will provide access to a reliable, safe and large-capacity telecommunications network. **It is essential to meet the connectivity needs of all educational institutions, regardless of where they are located in Québec, so that they can have access to digital resources and modernize their services.** The Réseau d'informations scientifiques du Québec (RISQ) is a key partner in the achievement of this objective.

In 2018-2019, the Ministère will implement projects aimed at improving its knowledge of the digital infrastructure network serving schools and institutions of higher education. More specifically, it will inventory and map this infrastructure network. This is a first step in overhauling the infrastructure network and ensuring greater pooling of resources.

RÉSEAU D'INFORMATIONS SCIENTIFIQUES DU QUÉBEC: AN ASSET FOR QUÉBEC

Created in 1989, the *Réseau d'informations scientifiques du Québec* (RISQ) is an non-profit organization whose primary mission is to develop, operate and maintain a telecommunications network, meet the needs of its members (e.g. school boards, CEGEPs, universities, research centres, university hospital centres, government ministries and agencies) and facilitate and promote cooperation among its members. It owns and manages Québec's private education and research telecommunications network. This large-capacity 100-Gbps network extends over 7000 kilometres and boasts almost a million users in Québec. In accordance with its mission, RISQ offers its members the best conditions afforded by the sharing of resources and services since, in addition to being a telecommunications provider, it is a forum for information, coordination and expertise. It fosters discussion and collaboration among educational and research institutions at the regional, national and international levels.

The size and sparse population of Québec's territory are obstacles to investment by the private and parapublic sector in the field of telecommunications, as well as to the operation and maintenance of infrastructures. **Stakeholders in Québec's education system must consolidate and pool their digital infrastructures in order to increase their accessibility, optimize their use and benefit from their full potential.**

UPDATING OF THE *RÉSEAU COLLECTIF DE COMMUNICATIONS ÉLECTRONIQUES ET D'OUTILS DE GESTION DE GASPÉSIE–ÎLES-DE-LA-MADELEINE* (RCGIM)

In March 2018, the Ministère allocated nearly $3.5 million to the RCGIM. This investment will allow the RCGIM to update its fibre optics network and ensure access to high-speed Internet for all its members, including all schools in the region.

MEASURE

33 IMPROVE INFORMATION SECURITY IN THE EDUCATION AND HIGHER EDUCATION SYSTEMS

EDUC HE

The Ministère wants to improve information security in the education and higher education systems. It will therefore offer support for the implementation and improvement of activities that meet the objectives of the Approche stratégique gouvernementale 2014-2017 en matière de sécurité de l'information.[25]

25 Québec, Conseil du trésor, *Approche stratégique gouvernementale 2014-2017 en matière de sécurité de l'information*, 2014, https://www.tresor.gouv.qc.ca/fileadmin/PDF/ressources_informationnelles/directives/approche_strategique_gouvernementale.pdf.

CONCLUSION

DARE TO INNOVATE AND INVEST IN THE FUTURE

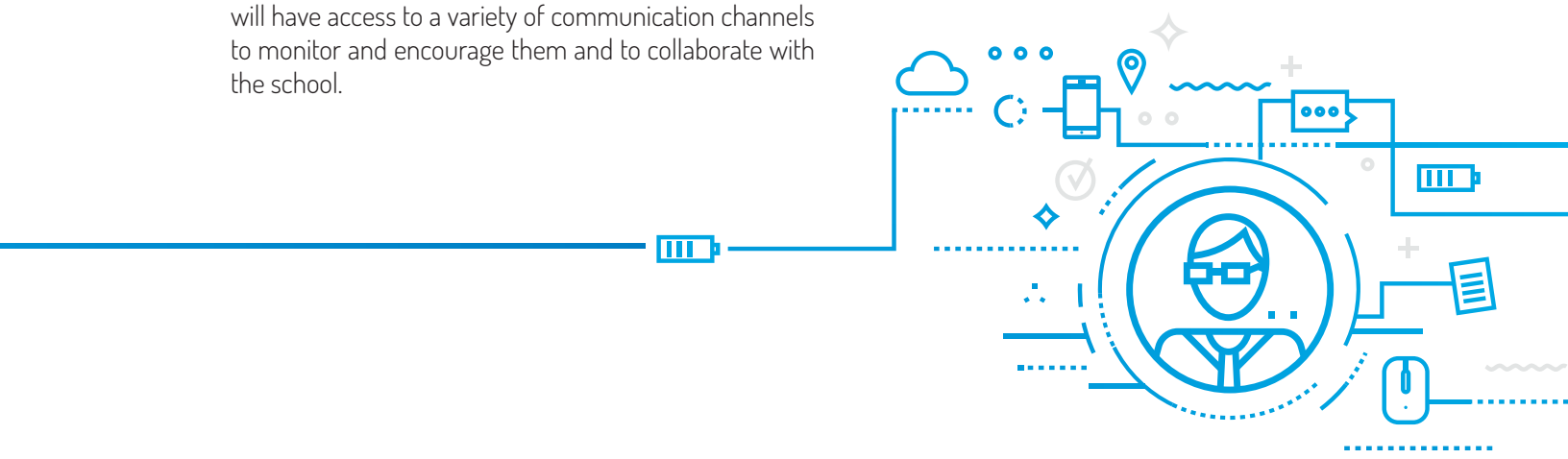
The Digital Action Plan for Education and Higher Education is an opportunity for the Ministère and the education system to accelerate the innovation process and commit to the future through openness and bold action. With collaboration among all stakeholders in education, teaching and learning practices will be better able to meet the demands of the digital age.

Learners are at the heart of the orientations in this Action Plan, since their success is most important. Digital technology must be a tool and resource to help them achieve that success. **The adoption of innovative pedagogical practices, often driven by digital technology and focused on the realities of the 21st century, is intended to help learners become autonomous and develop their full potential.**

There are many benefits for teachers and non-teaching professionals, who will be better equipped and have the necessary support to incorporate digital technologies into their practices. Training, the sharing of expertise and digital educational resources will be more easily accessible, and communication within the networks will be more effective. Parents and families will also benefit. It will be easier for them to help their children, and they will have access to a variety of communication channels to monitor and encourage them and to collaborate with the school.

Closer cooperation between the Ministère and educational institutions will make it possible to better showcase the expertise and everyday initiatives that have a significant impact on learners' educational paths.

The Action Plan is being launched at a critical juncture, with the education and higher education systems prepared to welcome it and the support they need to implement it. **The government is creating the best conditions so that the winds of change sweeping over Québec can be harnessed within the school system to ensure the success of all learners.**



BENEFITS FOR ALL

LEARNERS

- An educational path based on 21st-century needs
- Defined and recognized digital skills
- Educational success predicated on innovative pedagogical approaches
- More autonomy in the learning process
- Access to varied distance education offerings
- Citizens capable of using digital technology responsibly

INSTITUTIONS

- Shared leadership and stronger cooperation
- Stakeholders aware of the potential of educational technology
- Infrastructures for fair and safe access
- International outreach

TEACHERS

- Digital technology supporting teaching and learning
- Better trained and equipped professionals
- Support and guidance
- Easier access to digital educational resources
- The promotion and dissemination of good practices

PARTNERS AND THE COMMUNITY

- Pooling of expertise
- Joint actions based on needs
- Powerful lever of collaboration
- Open environments to prepare for the future
- A stronger ecosystem of digital educational resources, open educational resources and artificial intelligence in Québec

PARENTS

- Better communication, monitoring, collaboration and participation

DARE TO PROPEL QUÉBEC FORWARD

AT THE HEART OF THE DIGITAL REVOLUTION

The fourth industrial revolution affects all of society. That is why the Digital Action Plan for Education and Higher Education focuses on solutions to social and human issues. **Educational institutions are laboratories of social innovation and are at the heart of the digital revolution. They must be proactive rather than reactive when it comes to the digital revolution.** However, digital technologies must remain a means to a pedagogical end. They are key to placing learners at the heart of the learning process and helping them become more autonomous and creative. These technologies also help learners develop critical thinking skills and a sense of ethics so that they can play an active role in society, while acquiring the skills they need to meet the challenges they face and to continue learning throughout their lives.

The aim is also to consolidate the foundation of our collective future and to support learners so that they can develop the skills they need today to become active citizens in the world of tomorrow, with all the avenues and employment possibilities that will emerge and that we can hardly even begin to imagine today. Although it is difficult to predict the changes that will arise as a result of future developments in digital technology, our education system must be sufficiently agile to ensure that society as a whole can benefit from these transformations.

The Digital Action Plan for Education and Higher Education is a lever for pedagogical and social innovation and will help bridge the digital divide, prepare students and future citizens for life in society, self-realization and the achievement of their full potential in the digital age, and consolidate Québec's role on the world stage.

APPENDIX 1

INVESTMENTS TABLE

The March 2018 Economic Plan announced a total of $963 million in funding over five years for the implementation of the Digital Action Plan for Education and Higher Education. This funding consists of $355 million in operations and $608 million in investments.

The March 2017 Economic Plan announced $200 million in funding for the implementation of the education component of the Digital Strategy. Although a portion of this funding was transferred to the education system in 2017-2018, the rest will be integrated into the budget plan for the Digital Action Plan.

Lastly, $23 million was earmarked for the Ministère's investment projects announced in the Digital Action Plan.

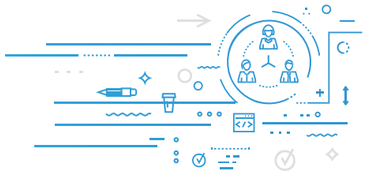
In all, the funding associated with the Digital Action Plan amounts to $1.186 billion (see table on the next page).

NEW INVESTMENTS AS PART OF THE DIGITAL ACTION PLAN FOR EDUCATION AND HIGHER EDUCATION

		BUDGET	PQI	TOTAL
Orientation 1:	**Support the development of the digital skills of young people and adults**	**$163 910 000**	**$27 000 000**	**$190 910 000**
Objective 1.1:	Define digital skills and integrate them effectively into the types of education and training offered	$7 070 000	$27 000 000	$34 070 000
Objective 1.2:	Support the development of the digital skills of teachers, non-teaching professionals and support staff	$152 940 000	-	$152 940 000
Objective 1.3:	Support individuals and organizations in making the transition to a digital culture	$3 900 000	-	$3 900 000
Orientation 2:	**Make use of digital technologies to enhance teaching and learning practices**	**$74 350 000**	**$130 014 200**	**$204 364 200**
Objective 2.1:	Develop new digital teaching and learning practices	$48 875 000	$41 804 000	$90 679 000
Objective 2.2:	Pool resources and services so that they can be shared and made as accessible as possible	$13 050 000	$42 818 200	$55 868 200
Objective 2.3:	Foster the development of distance education offerings based on needs at the various levels of education	$12 425 000	$45 392 000	$57 817 000
Orientation 3:	**Create an environment conducive to the development of digital technologies in the education system**	**$116 740 000**	**$673 559 800**	**$790 299 800**
Objective 3.1:	Oversee the deployment of dedicated administrative and pedagogical solutions to monitor educational progress	$2 500 000	$69 757 400	$72 257 400
Objective 3.2:	Strengthen digital governance and rely on partnerships as a strategic lever	$865 000	-	$865 000
Objective 3.3:	Guarantee access to fair and safe digital technologies in educational institutions	$113 375 000	$603 802 400	$717 177 400
TOTAL		**$355 000 000**	**$830 574 000**	**$1 185 574 000**

INVESTMENTS BY LEVEL OF EDUCATION

Education	$260 000 000	$537 824 000	$797 824 000
Higher education	$95 000 000	$292 750 000	$387 750 000
College system	*$54 275 000*	*$184 875 000*	*$239 150 000*
University system	*$40 725 000*	*$107 875 000*	*$148 600 000*



DIGITAL ACTION PLAN

FOR EDUCATION AND HIGHER EDUCATION 2018-2023

At the core of the economic plan

VISION: The effective integration and optimal use of digital technologies to foster the success of all Quebecers in order to promote lifelong skills development and maintenance

1 SUPPORT THE DEVELOPMENT OF THE DIGITAL SKILLS OF YOUNG PEOPLE AND ADULTS ($191 MILLION)

DEVELOPMENT OF THE TYPES OF EDUCATION AND TRAINING OFFERED

Define digital skills and integrate them effectively into the types of education and training offered

- Establish a reference framework of cross-curricular digital competencies at every level of education
- Increase the use of coding in education
- Support inter-institutional cooperation by creating innovation clusters in digital education

DIGITAL SKILLS AND CULTURE

Support the development of the digital skills of teachers, non-teaching professionals and support staff

- Develop a new competency framework for the teaching profession to foster the integration of digital technologies into the educational practices of future teachers
- Foster the continuing education of teachers, non-teaching professionals and support staff in digital pedagogy
- Maximize current RÉCIT services and support techno-pedagogical leadership in educational institutions
- Maximize the role of staff members responsible for integrating digital technologies in institutions of higher education

Support individuals and organizations in making the transition to a digital culture

- Promote innovative pedagogical practices and the potential of digital technologies in education
- Help learners understand the opportunities, issues and impacts associated with the use of digital technologies, including those related to the protection of privacy
- Support institutions in the development of continuing education and professional development offerings in the area of digital technology

2 MAKE USE OF DIGITAL TECHNOLOGIES TO ENHANCE TEACHING AND LEARNING PRACTICES ($204 MILLION)

INNOVATIVE PRACTICES

Develop new digital teaching and learning practices

- Support the acquisition and development of digital educational resources
- Encourage innovative projects involving digital technologies
- Develop digital ministry evaluation tools
- Release open data and foster its use

RESOURCES AND SERVICES

Pool resources and services so that they can be shared and made as accessible as possible

- Develop a provincial platform of digital educational resources
- Support the continued deployment of École en réseau
- Provide access to e-books in school libraries and encourage the shift from library to learning commons
- Implement a shared services platform for university libraries

DISTANCE EDUCATION

Foster the development of distance education offerings based on needs at the various levels of education

- Foster the development of distance education at the elementary and secondary levels
- Develop massive open online courses to meet large-scale education needs
- Bring together distance education offerings at the college and university levels – eCampus Québec
- Foster the sharing of expertise in distance education

3 CREATE AN ENVIRONMENT CONDUCIVE TO THE DEVELOPMENT OF DIGITAL TECHNOLOGIES IN THE EDUCATION SYSTEM ($790 MILLION)

MONITORING OF EDUCATIONAL PROGRESS

Oversee the deployment of dedicated administrative and educational solutions to monitor educational progress

- Implement the unified electronic file that students will have throughout their education
- Support and supervise the development of enterprise resource planning software in the education and higher education systems
- Improve communication and collaboration among educators, students and parents using digital technologies

ADAPTED AND FLEXIBLE GOVERNANCE

Strengthen digital governance and rely on partnerships as a strategic lever

- Implement governance conducive to the deployment of digital technologies
- Strengthen cooperation with partners in education and higher education
- Stimulate collaboration with Québec businesses to develop educational technologies

ACCESS

Guarantee access to fair and safe digital technologies in educational institutions

- Support educational institutions in their acquisition of digital equipment for pedagogical purposes
- Increase the use of resources and software to support learning for all learners, including students with social maladjustments or learning difficulties
- Offer technical support in educational institutions to help learners and staff use digital devices for pedagogical purposes
- Contribute to the educational component of the government action plan to establish digital infrastructures
- Improve information security in the education and higher education systems

APPENDIX 3

IMPLEMENTATION OF KEY MEASURES

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
EDUC HE **Establish a reference framework of cross-curricular digital competencies at every level of education**	Launching a reference framework of digital competencies for every level of education				
EDUC **Increase the use of coding in education**	Continuation of Robot 360 pilot project Finalization of the action research project and development of deployment scenarios		Deployment of the pedagogical use of coding in schools		
EDUC **Develop a new competency framework for the teaching professions to foster the integration of digital technologies into the educational practices of future teachers**	Development of a new competency framework for the teaching profession Publication of framework in 2019	Initiation of the revision of university-level teacher training programs			
EDUC HE **Digital technology combos** **Foster the continuing education of teachers, non-teaching professionals and support staff in digital pedagogy** **Help educational institutions acquire digital equipment for pedagogical purposes**	Province-wide digital education days Funding for continuing education of staff Assortments of digital equipment for schools Funding for the procurement and maintenance of equipment				
EDUC HE **Develop digital ministry evaluation tools**	Development of the business plan for the implementation of a platform for the management of digital ministry examinations Public call for tenders to acquire a solution	Development phase and gradual implementation of the project		Accessible platform for examination management services	
EDUC **Develop a provincial platform for digital educational resources**	Development of the business plan for the implementation of a provincial platform for digital educational resources	Development phase and gradual implmentation of the project	Accessible platform		
EDUC **Provide access to e-books in school libraries and encourage the shift from library to learning commons**	Development of an e-book lending platform for school libraries		Accessible platform		
EDUC **Foster the development of distance education at the elementary and secondary levels**	Development of ministerial orientations for distance education Implementation of pilot projects	Initiation of implementation depending on the orientations chosen			
HE **eCampus Québec** **Bring together distance education offerings at the college and university levels**	Joint design and construction with institutions of higher education	Development and implementation according to the orientations chosen at the joint construction phase			
EDUC HE **Implement the unified electronic file that students will have throughout their education**	Study and design of the unified electronic file Pilot project for accessing students' academic results		Implementation of the project and gradual deployment		
EDUC HE **Contribute to the educational component of the government action plan to establish digital infrastructures**	Mapping of the network and inventory of infrastructures	Implementation of the education and higher education components of the government action plan			

STRATÉGIE NUMÉRIQUE DU QUÉBEC

Québec

APPENDIX 4

GLOSSARY

A

ACTION RESEARCH

A research method for resolving a problem in a given context through a democratic investigation in which the investigators work with the local actors to seek and apply solutions to a problem that is of major importance to the community.[26]

ARTIFICIAL INTELLIGENCE (AI)

Field of study involving the artificial reproduction of the cognitive faculties of human intelligence with a view to producing software or machines capable of performing functions normally restricted to humans. AI has a variety of applications, ranging from automatic voice and visual recognition to robotic medicine and problem-solving tools.[27]

ASYNCHRONOUS LEARNING

Asynchronous learning is when training takes place in different time frames and information can be accessed at the learner's convenience. Some examples are: self-paced computer based training (CBT); Internet training delivered via a browser; bulletin boards; or email. The advantages of asynchronous learning are convenience, accessibility, the option to reuse material, and the fact that it is self-paced and self-directed.[28]

AUGMENTED REALITY

Digital imaging technique based on virtual reality that uses a transparent display device (in the form of glasses or a helmet-mounted display) to overlay information from a digital source onto a real image. The purpose of this technique is to enhance perception of the real world by adding normally imperceptible elements such as graphic data, animations and video images. It therefore makes it possible to interact with real objects whose extreme size precludes any direct manipulation. Augmented reality has numerous utilitarian applications in decision making, assistance and guidance in fields as diverse as medicine, architecture, industry and tourism.[29]

B

BLENDED LEARNING

Blended learning is . . . educating at a distance using technology, both high and low-tech. It incorporates tools such as the Internet, television, or conference calls, combined with traditional classroom education or training. The importance of blended education is that technology adds as many opportunities as possible for the learner to "get" the content.[30]

26 Termium, "Action research," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=action+research&index=alt&codom2nd_wet=1#resultrecs.

27 Québec, Économie, Science et Innovation Québec, *Stratégie numérique du Québec*, 2017, https://www.economie.gouv.qc.ca/fileadmin/contenu/documents_soutien/strategies/economie_numerique/sommaire-dynamique/strategie-numerique-du-quebec.html#annexe-1. [*Translation*]

28 Termium, "Asynchronous learning," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=asynchronous+learning&index=alt&codom2nd_wet=1#resultrecs.

29 *Stratégie numérique du Québec*, https://www.economie.gouv.qc.ca/fileadmin/contenu/documents_soutien/strategies/economie_numerique/sommaire-dynamique/strategie-numerique-du-quebec.html#annexe-1. [*Translation*]

30 Termium, "Blended learning," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=blended+learning&index=alt&codom2nd_wet=1#resultrecs.

C

CLOUD COMPUTING

[A] computing paradigm in which tasks are assigned to a combination of connections, software and services accessed over a network.[31]

Note: In the computing world, the cloud is the image generally used to represent the Internet. In cloud computing, computing is seen as a service which is externalized via the Internet. It refers to the use of the memory and computational capacity of computers and servers scattered across the globe and connected by the Internet. Pooled computer resources available at a distance include software, storage space and servers.

CROSS-CURRICULAR COMPETENCY

The concept of cross-curricular competency refers to the set of competencies that students must acquire in each discipline outside their area of concentration.[32]

Note: For example, being able to establish conceptual links between subject content, find the best work method for a given learning situation or being able to work in a team. At the elementary and secondary levels, cross-curricular competencies are divided into four categories: intellectual, methodological, personal and social, and communication-related.

CYBERBULLYING

Cyberbullying involves the use of communication technologies such as the Internet, social networking sites, websites, email, text messaging and instant messaging to repeatedly intimidate or harass others.[33]

CYBERSECURITY

Computer security as it applies to the Internet, including everything involved in protecting data transmitted over the Internet, such as authentication, confidentiality and integrity, in particular with regard to online commercial transactions. Cybersecurity activities are part of a framework of prevention, detection, intervention and recovery functions executed using a combination of personnel, processes, services and information. Information security is managed in accordance with information system requirements, legal obligations and recognized standards in a context in which e-business, cloud computing and the sharing of information make organizations more vulnerable to hacking and information leaks.[34]

D

DIFFERENTIATED INSTRUCTION

An approach to teaching in which educators actively plan for students' differences so that all students can best learn.[35]

DIGITAL ART

A general term for a range of artistic works and practices that use digital technology as an essential part of the creative and/or presentation process . . . a term applied to contemporary art that uses the methods of mass production or digital media . . . any art that is made with the help of a computer.[36]

31 Termium, "Cloud computing," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=cloud+computing&index=alt&codom2nd_wet=1#resultrecs.

32 Termium, "Cross-curricular competency," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=cross+curricular+competency&index=alt&codom2nd_wet=1#resultrecs.

33 Termium, "Cyberbullying," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=cyber+bullying&index=alt&codom2nd_wet=1#resultrecs.

34 *Stratégie numérique du Québec*. [*Translation*]

35 Termium, "Differentiated instruction," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=differentiated+instruction&index=alt&codom2nd_wet=1#resultrecs.

36 Slideshare, "Digital art," https://www.slideshare.net/tephnii/digital-art-17398974.

DIGITAL BADGE

A product of the digital world, and more specifically of Web 2.0, digital badges are a validated indicator of accomplishment, skill, quality or interest that can be earned in various learning environments.[37] Badges can serve as motivators and rewards or even as an electronic certification of work or an activity accomplished by an Internet user.

DIGITAL CITIZENSHIP

Having the ICT equipment and skills to participate in a digital society, for example to access government information online, to use social networking sites, and to use a mobile phone.[38]

DIGITAL DIVIDE

A digital divide is an economic and social inequality with regard to access to, use of, or impact of information and communication technologies (ICT).[39] A digital divide can exist not only between industrialized countries and developing countries, but also within a given country. The greater the divide, the greater the gap between men and women, rich and poor, young people and seniors, literate and illiterate, and urban and rural populations. The digital divide is associated with the exacerbation of inequalities in terms of access to personal computers and the Internet, and growing disparities based on income level, geographic location and ethnic background.

DIGITAL EDUCATIONAL RESOURCES (DER)

A set of software, information, technical and organizational support that reflects a certain subject area and implements the technology for its study by different learning activities.[40]

DIGITAL LEARNING ENVIRONMENT

The total of digital resources (computers, software, storage, and systems) used to manage an academic enterprise and support, enable or manage learning.[41]

DIGITAL LITERACY

The knowledge and skills that enable a person to use, understand, assess, engage and create in a digital context and, more generally, those that enable him or her to participate in society. Consequently, digital literacy is not limited to technological knowledge. It also includes numerous ethical and social practices in workplaces and learning environments as well as recreational and everyday activities.[42]

DIGITAL PLATFORM

Service fulfilling an intermediate function regarding access to information, content, services or products published or supplied by a third party. Not merely a technical interface, this service organizes, prioritizes and presents content and links it with the final users.[43]

37 Wikipedia, "Digital badge," https://en.wikipedia.org/wiki/Digital_badge.

38 UNESCO, *UNESCO ICT: Competency Framework for Teachers*, 2011, http://unesdoc.unesco.org/images/0021/002134/213475e.pdf.

39 Wikipedia, "Digital divide," https://en.wikipedia.org/wiki/Digital_divide.

40 IGI Global, "What is digital educational resources," https://www.igi-global.com/dictionary/digital-educational-resources/52341.

41 Michael G. Dolence and Associates, "Digital learning environments," https://mgdolence.com/services/academic-services/digital-learning-environments/.

42 *Stratégie numérique du Québec*. [*Translation*]

43 *Stratégie numérique du Québec*. [*Translation*]

DIGITAL SKILLS
Digital skills include the ability to find, organize, understand, evaluate, create and disseminate information using digital technology. They are therefore multi-faceted and include ICT skills, social and collaborative skills and cognitive skills. They also include the ability to behave ethically and responsibly. Digital skills are related to civic obligations governed by the Criminal Code as well as various laws respecting the protection of privacy and personal information, copyright and intellectual property.[44]

DIGITAL TECHNOLOGIES
Information and communications technologies integrated into the functions and services of a business or organization in order to collect, store and analyze digital information and to share it with employees, customers and suppliers.[45]

DISCOVERABILITY
The quality [of a piece of content, product or service] of being easy to find on a website, using a search engine, etc.[46]

DISTANCE EDUCATION
Distance education must be defined as any activity in which the teacher and learner are more or less separated in space and time.[47]

E

E-BOOK
[A book] published for reading on personal computers, smart phones, or dedicated equipment [such as] e-book readers.[48]

E-CAMPUS
A place on the Internet where students can go to take courses, meet with academic staff, and communicate with other students.[49]

F

FLIPPED CLASSROOM
A flipped classroom is an instructional strategy and a type of blended learning that reverses the traditional learning environment by delivering instructional content, often online, outside of the classroom. It moves activities, including those that may have traditionally been considered homework, into the classroom. In a flipped classroom, students watch online lectures, collaborate in online discussions, or carry out research at home while engaging in concepts in the classroom with the guidance of a mentor.[50]

44 *Stratégie numérique du Québec*. [*Translation*]

45 *Stratégie numérique du Québec*. [*Translation*]

46 Termium, "Discoverability," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=discoverability&index=alt&codom2nd_wet=1#resultrecs.

47 Conseil supérieur de l'éducation, La formation à distance dans les universités québécoises : un potential à optimiser, 2015,http://www.cse.gouv.qc.ca/fichiers/documents/publications/Avis/50-0486Summary.pdf. [*Translation*] Note that an English-language summary of this report is available and entitled *Distance Education in Québec Universities: Maximizing the Potential*, 2015, http://www.eunec.eu/sites/www.eunec.eu/files/members/attachments/distance_education_in_quebec_universities_maximizing_the_potential.pdf.

48 Termium, "E-book," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=e-book&index=alt&codom2nd_wet=1#resultrecs.

49 Termium, "E-campus," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=virtual+campus&index=alt&codom2nd_wet=1#resultrecs.

50 Wikipedia, "Flipped classroom," https://en.wikipedia.org/wiki/Flipped_classroom.

H

HACKATHON

A hackathon (also known as a hack day, hackfest or codefest) is a design sprint-like event in which computer programmers and others involved in software development, including graphic designers, interface designers, project managers, and others, often including subject-matter experts, collaborate intensively on software projects. The goal of a hackathon is to create usable software . . . . Hackathons tend to have a specific focus, which can include the programming language used, the operating system, an application, an API, or the subject and the demographic group of the programmers.[51]

I

INFORMATION LITERACY SKILLS (ILS)

Having the knowledge and skills needed to recognize the existence of a need for information and the capacity and the discipline to find the appropriate information, understand it, use it and share it with a view to solving a problem or making a decision.

INFORMATION SECURITY

The practice of preventing unauthorized access, use, disclosure, disruption, modification, inspection, recording or destruction of information.[52]

INITIAL TRAINING

First education program in a given field, preparing the student to enter the workforce.[53]

L

LEARNER

One who acquires skills or knowledge . . . through instruction, experience, or training.[54]

LITERACY

The ability to understand and employ [written] information in daily activities, at home, at work and in the community.[55]

M

MASSIVE OPEN ONLINE COURSE (MOOC)

Online course aimed at unlimited participation and open access via the Web. In addition to traditional course materials such as filmed lectures, readings, and problem sets, many MOOCs provide interactive courses with user forums to support community interactions among students, professors, and teaching assistants . . . as well as immediate feedback to quick quizzes and assignments.[56]

51 Wikipedia, "Hackathon," https://en.wikipedia.org/wiki/Hackathon.

52 Wikipedia, "Information security," https://en.wikipedia.org/wiki/Information_security.

53 Le grand dictionnaire terminologique, "Formation initiale," http://gdt.oqlf.gouv.qc.ca/fiche0qlf.aspx?Id_Fiche=1199681. [*Translation*]

54 Termium, "Learner," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=learner&index=alt&codom2nd_wet=1#resultrecs.

55 Termium, "Literacy," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=literacy&index=alt&codom2nd_wet=1#resultrecs.

56 Wikipedia, "Massive open online course," https://en.wikipedia.org/wiki/Massive_open_online_course.

MOBILE DEVICE
Wireless portable computing device with a power supply. Mobile devices, such as tablets and smartphones, can usually connect to the Internet via Wi-Fi.[57]

MOOC
See "Massive open online course."

N

NUMERACY
An ability to handle numbers and other mathematical concepts.[58] The concept of numeracy is sometimes integrated into that of literacy, in the sense that literacy also involves the ability to read and understand quantitative texts.

O

ONLINE LEARNING
Method of learning based on the use of new technologies providing access to online, interactive and sometimes personalized education on the Internet, an intranet or another electronic medium in order to develop competencies, making the learning process independent of time and place.[59]

OPEN DATA
Raw, non-nominal, royalty-free data produced or collected by a public or private organization and made accessible to the public on the Web. This data is ideally delivered in an open (non-exclusive) format, making it easier to reuse. Statistics, corporate records, data on cultural facilities (e.g. museum and library rates and attendance), access to persons with reduced mobility and the location of chargers for electric vehicles are some examples of open data. Combined with other sources, open data can be reused in the development of websites and mobile applications of use to citizens. A good illustration would be an application making it possible to locate roadworks on a given route.[60]

OPEN EDUCATIONAL RESOURCES (OER)
OERs include content (e.g. texts, images, videos, textbooks, course modules, tests, homework) and tools (e.g. educational software, digital work environments). According to UNESCO, OERs are any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely copy, use, adapt and re-share them.[61]

S

SYNCHRONOUS LEARNING
Learning event delivered in real time to the learner that can include immediate, two-way communication between participants.[62]

Note: Discussions are conducted through chatting or video conferencing, or through the sharing of interactive white-boards, applications or documents.

57 *Stratégie numérique du Québec*. [*Translation*]

58 Termium, "Numeracy," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=numeracy&index=alt&codom2nd_wet=1#resultrecs.

59 Québec, "Thesaurus de l'activité gouvernementale," http://www.thesaurus.gouv.qc.ca/tag/terme.do?id=877. [*Translation*].

60 *Stratégie numérique du Québec*. [*Translation*]

61 UNESCO, "What Are Open Educational Resources?", http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/what-are-open-educational-resources-oers/.

62 Termium, "Synchronous learning," http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=1&srchtxt=synchronous+learning&index=alt&codom2nd_wet=1#resultrecs.

T

TECHNO-PEDAGOGY

Science that studies teaching methods involving new information and communications technologies (NICT).

Note: Techno-pedagogy offers teachers the support and services they need to enhance their pedagogical practices through the use of NICT.[63]

TELETEACHING

Video conferencing activity (instruction provided or received) through which learners can obtain credits toward a diploma.[64]

TRACEABILITY

The ability to verify the history, location, or application of an item by means of documented recorded identification.[65]

TWENTY-FIRST-CENTURY COMPETENCIES

Twenty-first-century competencies include literacy and numeracy and are essential for learning and the development of digital skills. They encompass qualities and aptitudes such as critical thinking, problem solving, communication and collaboration, entrepreneurial spirit, the ability to harvest the potential of digital technologies and resources, creativity and innovation. They also include other qualities such as self-determination and personal management, social responsibility, and cultural, global and environmental awareness.[66]

V

VIRTUAL CLASSROOM

A virtual classroom is an online classroom that allows participants to communicate with one another, view presentations or videos, interact with other participants, and engage with resources in work groups.[67]

Note: Virtual classrooms allow learners to learn at their own pace and to communicate with other learners in the course or with their tutor either in real time (via chatting or video conferencing, or by sharing interactive whiteboards, applications or documents) or in delayed time (through email or discussion forums).

VIRTUAL REALITY

Interactive computer-generated experience in real time within a virtual 3D environment in which the user is immersed. Virtual reality can engage all of the senses (sight, sound, touch, smell and taste). Currently, the main fields of application of virtual reality include medicine, robotics, teaching, architecture, and art and entertainment[68]

63 Office québécoise de la langue française, "Technopédagogie," http://gdt.oqlf.gouv.qc.ca/fiche0qlf.aspx?Id_Fiche=8360644. [Translation]]

64 *Stratégie numérique du Québec*. [*Translation*]

65 Wikipedia, "Traceability," https://en.wikipedia.org/wiki/Traceability.

66 *Stratégie numérique du Québec*. [*Translation*]

67 LearnDash, "Characteristics of a Virtual Classroom," https://www.learndash.com/characteristics-of-a-virtual-classroom/.

68 *Stratégie numérique du Québec*. [*Translation*]

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