Coherence (1)

Hello. I am Diane Boulanger and I am a French immersion teacher in Mississauga, Ontario.

Ontario and also Quebec are among the most successful education systems in the world. We all want to prepare our students for the challenges of the world of tomorrow, a world that is becoming more and more complex. The commercial world, with the renegotiation of NAFTA, is very fragile. With the advance of artificial intelligence, the jobs of today and tomorrow are much more complex. We and our students need the emotional intelligence to face all these challenges. Are we all ready? I doubt. How to do? Where to direct your attention? This is where coherence becomes necessary.

"Coherence concerns people individually and especially collectively. To get straight to the point, coherence is the shared depth of understanding the purpose and nature of the work. Coherence is in the minds and actions of people, individually, but especially collectively. "

Coherence is not about imposing solutions by politicians or having ad hoc policies. We must find solutions that work, solutions that everyone can control with concentration and persistence.

Change drivers (2)

It is finished when each teacher, overworked, must fend for herself in her class. I quickly realized that working in a community with Twitter and edublog works much better. This helps develop a professional learning network with inspiring people from around the world who share a passion and a lot of knowledge. They will help you in your journey. You will certainly meet friendly people from your school board, your union, your teachers' association, the media and the CRIFPE, the interuniversity network.

I chose two digital applications for my classes: infrared photography with FLIR

and programming with Hopscotch.

I was already convinced of the value of programming for the world of tomorrow. Everything is done with computers today. Working with the iPad and the Hopscotch programming language was an easy decision. It was the learning network that made me realize, however, that it was really essential. One can think of the example of my nephew Samuel in Santa Barbara. He began to code at the primary level with passion. At age 17, still in high school, he had the expertise of a professional engineer and was hired by FLIR as a junior engineer.

Coherence en action (3)

Do you have students like mine? Here is one in grade 4. Our classes frequently make educational field trips. At the Royal Ontario Museum, students can take part in a workshop on rocks and minerals and hit a meteorite from Mars, taken in infrared. Our host mentions that students are like Matt Damon, from the movie "Alone on Mars," who hit the same meteorite. And it's a go for the students' imagination. The student was already listening to science-based films and science reports on radio and television with his parents. He had access to Hopscotch, the pictures of the educational outing and his toys.

That night, he did homework quite willingly. He has developed a project with an artificial intelligence flavour. He has programmed a robot with an infrared vision that walks on Mars autonomously. With his neural network, the robot decided to work around the obstacles identified by the rectangles. And since he was really in a good mood, the student also added his favourite song to accompany the whole thing. WOW.

Motivation according to a common goal (4)

When it's 29 degrees in the classroom, how do we keep our learning goals? The months of May or September are ideal for environmental field trips in the shade. We go to a nearby park or an environmental centre. Outdoor walking encourages

good physical and mental health and motivates students to explore. The more adventurous travel with their own device in the bike paths after school. Exploring nature helps develop an attachment to our environment while taking photos in visible light or infrared. The best part of all this is that the teacher uses the interest and passion of the students by drawing a parallel between the rocks, the curriculum, and the discovery of Mars, even if it is in grade 4.

Objectives with an impact (5)

We can see here a project that all our teachers and students can do. Even the weakest students are capable of it. We are doing a project related to real life of great interest. We create a website with images of our field trips.

I found a Martian meteorite. Look, I have it in my hand, you can even come and touch it. How do you know that it is a rock from the planet Mars? The scientists analyzed the air bubbles of the rock. The gas that was there is identical to the atmosphere of Mars, measured by NASA's Viking mission.

Look at the code. Here is the most difficult part. When I press the image, the text we wrote will appear on the screen.

The website that really works when published.

Clarity of the strategy (6)

We must improve the learning of all students. You may have combined classes of 5/6 for example with very weak and very strong students. The Hopscotch application makes it easy to do mathematics from grade 3 to the end of high school, in one class. Each student works at his own level of difficulty. The ideas of science are also differentiated. The same great theme idea of going on Mars applies. Ideas abound in magazines, at the library, on the Internet.

For grade 5: 3.5 billion years ago, the planet Mars was habitable, with an atmosphere and liquid water. Greenhouse gases kept the atmosphere of Mars in

place. Suddenly, the climate of Mars has changed. Conditions have deteriorated rapidly to get the desert that is Mars today. We see on the left the sun which strips the atmosphere of Mars of its particles. We must always understand the origins of this climate change.

For grade 6: We see an aurora borealis which covers almost the whole of Mars.

Transform practice (7)

Transforming your practice scares you? It's normal. Remember that with digital you are never alone. You will have access to the best ideas of your professional learning network at the right time.

If you follow the media on Twitter, you may have seen that Elon Musk thinks there is another way to go into space than launching a rocket and throwing it away once. He made reusable rockets that NASA can now rent to go into space.

Why not blog about your practice? Your educational coach is paid to help you! She cannot answer you? She will ask Jocelyn at Hopscotch to give you other relevant ideas. For example, you blog a lesson that you prepared from a low-profile report that al-Jazeera saw. InSight and its seismograph was launched from California to Mars to study the planet's core. We will answer you with another idea and another Hopscotch program that you can use in class if you feel like it.

For some, this change is scary, but you never work alone with digital. You go forward at your own pace.

Push and pull (8)

The last G7 took place in Quebec in the only inhabited crater in the world. You can see the satellite image of the location. Europe has a satellite in orbit around Mars that takes infrared photos of the surface of Mars! The Canadian government negotiates with other countries to work with them. We will see what happens.

In the field of STEMs, 60% of jobs available are jobs for people who know how to code. And if we look at the number of graduates in mathematics, science and technology, only 2% have the necessary training to be able to work in this field. In addition, most parents want their children to learn to code, but only 1 in 4 principals offer programming classes at their school. How can we teach mathematics to inspire future engineers?

Capacity and integration (9)

Before being able to make technological innovation, one must learn the mathematical, scientific and technological basis. Students learn while playing. Our students see programming with Hopscotch as a video game. It's as fun as that. A little later, we can tell students that they create video games.

All students love volcanoes in grade 4. Did you know that the Olympus Mons volcano of the planet Mars is the highest known volcano in the solar system with its 21 km height. It has been extinct for more than 100 million years.

The Opportunity rover is still active. In this game, a windstorm on Mars dislodges the dust that accumulates on the solar panels of the rover.

Math graph games are fascinating to use. The airflow on Mars resembles airflow on Earth, except for the influence of oceans that are absent on Mars. At night, the temperature on Mars can drop to -100 degrees Celsius and during the day the temperature can go up to -23 degrees.

Our learning ability and motivation are visibly increasing.

Growth mindset (10)

Is the mindset in our class like the engineers who did everything to make the Curiosity rover survive the 7 minutes of terror and land on Mars? Or is it like the one who says, "I've always taught maths like that. Why code? "

With the culture of the growth mindset, we put systems in place so that everyone who tries can succeed. Social networks give ideas and feedback for the attentive and attentive person.

There is even a social network inside the Hopscotch app to ensure your success and that of your class with each of your students and their particular challenges. With the growth mindset system, the student is surrounded by a culture of growth inside and outside the classroom, during school and during the holidays. I invite you to take advantage of it.

Learning Leadership (11)

Your principal probably does not know how to code, but she may ask you how the code relates to reading or math. We make the connection with our current strategies. Code is another way of expressing ourselves mathematically as Kathy Marks Krpan would say.

The strategy of reading the image is an important reading strategy, but for the rover, knowing how to read the image is absolutely critical. These images are his eyes on which his movements are based. Here we see an infrared landscape that has been transformed into 3 dimensions using Hopscotch. This is my way of showing you that I can analyze and interpret the text of the MARS 3D book that I was reading in a mathematical context.

In order to decide where to explore, NASA engineers need to model the terrain according to images received from Mars. I could not design this terrain modelling so Hopscotch wrote this program and I only modified it. The budding mathematician must be able to rely on what others contribute to mathematical discussions. Being able to maintain the code written by other people is also a very necessary profession and in demand.

Reciprocal teaching (12)

Evaluation is an essential tool we have to learn from each other. Evaluation provides regular feedback, and provides the foundation we use to develop new practice opportunities. During feedback, students are also encouraged to reflect on their own work and self-regulate their work. Much to the delight of the teachers, the feedback is integrated into the Hopscotch application.

Scientists are trying to find out more about the heart of the planet Mars. We see the website that has been published and that Hopscotch offers 3 suggestions for improvement. It is possible to program colours instead of having a photo. You can improve the code structure to get a website that works faster. Coded text can be added in a different way. Hopscotch suggests programs at a level similar to that published, for learning purposes. The motivated student will integrate his suggestions into a mathematically and linguistically more advanced program.

Collaboration (13)

How does collaboration work in class? We use Genius Hour. During Genius Hour, once a week, we challenge all our students to create something that they value and that interests them. It's the same concept that Google uses with their employees. They have the autonomy to work on a fascinating project of their choice if they follow the vision of the corporation. For one day a week, Google employees build something they choose that will benefit the business.

The student fascinated by eclipses wondered if it was happening on Mars. The two moons of Mars Phobos and Deimos can be detected by the rovers during the eclipse. The student therefore builds a simulation of eclipses. It's never a total eclipse because of the small size of the moons. During Genius Hour, our students have the opportunity to create exciting projects.

Collaboration in action (14)

The strategy of coding video games can be used to motivate students to learn to code. There are more than 13 different videos distributed in the Hopscotch app

that teaches the basics of programming. In thirteen hours or a week, you can have a great idea of the basics of programming.

At the Royal Ontario Museum, the student finds a large stromatolite. It is a very old rock that contains the first signs of life on Earth. He takes a picture of it and includes it in his game. He wants his rover on Mars to find the equivalent of the stromatolites of the earth. He wants to find the signs of life on Mars.

The student creates a game by following Hopscotch's instructions.

Clear Learning Objectives (15)

At the conference last year, Quebec's education minister said that the education system is still being blamed for going too slowly with digital. Now you have the chance to go fast!

When teachers co-construct criteria of success with students, they benefit from the most powerful aspect of evaluation. Teachers and students develop a common understanding of what to learn. By discussing what needs to be learned, learning objectives, teachers and students clarify their understanding. By examining examples of work with the assessment criteria, students have a better understanding of what is expected, and will work towards that clear goal with more motivation.

We try to solve real-life problems. Twitter informed me of an online conference of NASA. I listened to it live. NASA scientists shared with students, the general public and reporters the latest scientific findings from the Curiosity rover. The clear learning objective here is to use the latest discoveries to find signs of life on Mars.

With the Curiosity infrared instrument, they analyzed the air particles and found traces of methane on Mars. The concentration of methane in the air changes seasonally in a cyclical manner.

Precise Pedagogy (16)

For pedagogy, we have access to a digital culture that promotes learning for all. Precise pedagogy consists in making thought visible in order to push thought to higher levels. Ron Ritchhart from Harvard University offers practices that really work. Pedagogy makes it possible to introduce and explore ideas, synthesize and organize ideas. It also allows you to explore ideas more deeply. With this pedagogy can make visible the understanding of the students. Hopscotch provides a tool where the shyest student can show his understanding.

What comes to mind with the discovery of methane on Mars? Is methane recent? Scientists know that the methane molecule is a compound that cannot last more than 300 years. Is this a proof of life under the surface of Mars? There are three possible sources of methane: either an external meteorite or an inorganic phenomenon of the rocks of Mars or a living source. How are we going to do it? A satellite of the European Space Agency is also studying the issue. It will take other missions to answer this question.

Internal and external accountability (17)

Accountability is about showing responsibility. Responsibility is in the type of tasks that students must perform. We are far here photocopied worksheets of books dated 10 years ago.

During the press conference, the scientist also shared the discovery of a complex organic molecule in rocks dating back 300 million years. So, 300 million years ago, Mars was habitable.

It's motivating enough to be responsible for creating and completing a video game, full of mathematical concepts. The game contains images of Mars taken from the press conference.

Developing leaders (18)

Our students will one day take over. Will my student be able to put in place all that is necessary to answer our questions and also to make major and positive contributions to our society?

The next NASA 2020 mission will have a miniature helicopter that will be able to explore the surface of Mars. It's interesting!

The Hopscotch programs you see are advanced enough to include artificial intelligence concepts, and that in the primary grades! That tempts you?

Synthesizing actions for each chapiter (19)

Hopscotch and the FLIR infrared camera work with the iPad or iPhone. Fifteen iPad is enough to start in a school. Each class can get the iPad for one or two hours a week.

If you do not have an iPad, many students already have their own device. Just encourage them to use them with BYOD.

There is the application "Mars Images" which offers free daily images of Curiosity. The Curiosity drill was no longer working, but the engineers found a way to repair it at sol 5104. The image comes from Mars Images. The Hopscotch program consists here of drawing a line representing Curiosity that digs a hole on Mars. It's a good, easy goal to reach.

For your class, just choose a rich idea of links that interests students.

Evaluate coherence (20)

Portfolios can be used to evaluate students work over time. With Hopscotch the portfolio shows students' thinking visibly and is easy to use. Portfolios contain works selected by the student that show their best work and show what they have learned. The portfolio shows aspects of student learning that cannot be captured during the test. He demonstrates mastery of the curriculum. There are

also several audiences for the portfolio. The audience could be the teacher only, the class, a region or even the whole world.

I suggested a rubric to evaluate the work.

Canadian investment (21)

The Canadian government announced last February the investment of $ 2 billion in the next step to get to Mars. Canada had not updated its space strategy for 25 years. The new strategy is the Lunar Gateway project, a scientific station that will orbit the moon. With the current international space station so close to Earth, scientists can send commands at any time to manage its operation. In the next project, it will be necessary to develop the technology, the necessary artificial intelligence, to manage a space station without human intervention.

During the discussion with the students, Marc Garneau asked them if they wanted to be of those who will go to Mars. Many raised their hands. Not all Canadians will be astronauts, but many more will be in demand to develop the technology needed to live in space.

Coding with Hopscotch in the classroom is a first step in helping our students participate in this great project.