Take Action with Infrared

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

At the beginning of last summer, I was reading an article in the magazine Actualité that I noticed on Twitter. This article was the spark that inspired this presentation because it highlighted a problem that is close to my heart: the health of my students and the people around me.

A sedentary lifestyle affects more than two thirds of the population and $54 billion is spent annually coping with a sedentary lifestyle. We also note, losses of 14 billion which are related to the decline in productivity. 1-3% of national costs are related to sedentary living, not counting mental health costs. I do not think it's a secret: most people know that we need to eat a balanced diet and exercise. It's a motivation problem. How to change one's lifestyle to include exercise?

According to the World Health Organization, integrating physical activity into everyday life, such as active transportation, is one of the best ways to proceed.

I would like to share my personal cycling experiences with my infrared camera to encourage you to be active.

Proportional Universality

Proportional universality is about prioritizing the least active who are facing the biggest barriers. We can think of women, for example. They are less likely than men to be physically active. Coloured people are also less likely than whites to be active, for all sorts of reasons.

But first, consult your doctor to make sure there is no danger to your physical activity. A teacher I worked with had a heart attack, by increasing her level of physical activity suddenly. She had to be away from work for several months to get better.

You can see your medical test results for yourself using the dot health app.

With the bike, I personally went from high blood pressure to a healthy rate, while losing more than 35 pounds, and that in 6 months. I started to be round like an apple. I prefer my look a little thinner. I do not know if I'm ever going to look like the CN Tower, but I prefer to exercise to prevent disease and to stay healthy.

Benefits for Mental Health

Study after study has demonstrated what we know instinctively: regular exercise is essential for good mental health. I speak of the daily feeling of well-being. We can cure ourselves of stress, anxiety, depression, our sorrows, and bad mood. For mental health, exercise is a very effective remedy. It's a medicine. Exercise increases the levels of endorphins that allow us to feel good. Only 36% of children and 18% of adults exercise enough.

In addition, I found it interesting, the exercise stimulates our creativity by 60%. Imagine, 60% !!! When we feel we have no more ideas, we get closer to the daily burn-out, we do a little cycling and our brain becomes 60% more creative. I need it and my students too. Students in poor health are three times more likely to drop out than their healthy peers.

Government Contribution

The aging of the population is not a very popular subject, but it is very real. Why not do prevention and keep the entire workforce healthy? Cycling regularly greatly reduces the risk of illness. It also reduces your transportation costs.

To encourage active cycling, you do not work alone. The Canadian government is working with provincial and municipal governments to build accessible and safe bicycle paths in urban and regional centers. The safe bike infrastructure is already in place in many places and that is increasing.

If you discuss all this from several angles with your class using an application like

Padlet, you will work on the Redefinition of the SAMR model.

iPhone + FLIR ONE

To encourage myself to cycle, I take pictures of places where I go by bicycle noting the number of kilometres travelled. I created a very small social network with my family to share my discoveries. Social networks work as a personal trainer and also suggest places to go, based on what you share.

I have an iPhone that I am using right now to make my presentation. I also have a FLIR ONE infrared camera that attaches to the phone.

We know the visible light we see with our eyes, the ultraviolet for sterilization, the X-rays to see our decayed teeth. Infrared allows us to see the heat. It's like a thermometer in picture. There is no danger of radiation like X-rays. Infrared detects the surrounding heat. With this palette, yellow is the hottest and the coldest blue.

Infrared Thermography

Infrared thermography is becoming more and more used to diagnose health problems in the context of sports. With this new technology, sports scientists are needed to interpret the results of the images. The records of these professionals can also be placed on dot health for you.

While cycling, the knees sometimes become painful. So, I did like sports scientists, and I decided to experiment. I took a picture of my knees before and after a long mountain bike ride. Mountain biking is more difficult for the legs and I feel my knees after a long hike. I thought it's it, my knees are going to be inflamed. In infrared, abnormal temperature changes point to a problem.

To stabilize the image, I used a black body, a bag of frozen berries. You can see the difference. Picture 1 does not have the black body and Picture 2 has a black body as a reference. Picture 3 was taken after a long bike ride. The picture tells

me that my knees are doing very well. The temperature has not really changed. Big surprise, it's my feet that need attention. They are very hot because I put on socks and running shoes when I rode my bike. So, everything is normal. My knees just need a day off.

Get More Time

Is the bike faster than the bus? I did the experiment with my son. He went by bus to work and I went on a bike. He must walk to the bus stop, wait for the bus, stop at all stops with the bus to board other passengers before disembarking, wait in red light before crossing the street and walk to the train station. He must wait for the train and so on. For short distances, cycling is faster. He took my picture after he got off the bus.

My son bought himself a foldable bike to get on the train during rush hours to save time and shorten the time to get to work. The bike gives him an hour of free time every day in addition to the exercise.

The bike does not prevent relaxation after work. Here, we went together on the ferry to the islands of Toronto, just beside the Martin Goodman trail, and we went around the 3 islands before going home.

Working together

I grew up in nature. I always spent a lot of time outdoors. I feel like a better person when I spend more time outdoors. Being outdoors allows us to get closer to nature, to develop scientific thinking and to begin to understand the science behind the environmental movement. I think we need to include the outdoors in the schools we need.

Nature is not just for 2 weeks of vacation per year. We can have it every day!

Here we see a website with a photo of one of the most beautiful bike paths in the region. The bike path is right behind the school. The Culham Trail offers

spectacular views just meters from the Credit River. It's a beautiful stream and you can even see salmon coming up the river in the spring. This student wants to help you organize the bike club.

Several students code at home with Hopscotch. They are exposed to coding, to programming by their older brother or sister who learned because of the work of another teacher. They make their website during their free time because they are passionate about it.

Hopscotch offers feedback, an evaluation of all programs published by students. Feedback from the programs by Hopscotch facilitates by a lot, teacher's work.

Once Hopscotch students have mastered coding with Hopscotch, they have the tools they need to try another computer language. If they choose to develop websites, Pastel is an indispensable tool to help them in their work. Pastel allows website evaluation by developers and their customers. This is professional feedback for websites.

Assessment of the measure

Math teache rs often face the challenge of teaching complex mathematical concepts to mathematically anxious students or those with very little French vocabulary. Communicating visually often with a single image can be an expression of excellent understanding.

The Nearpod app allows teachers and students to have instant communication. The teacher can prepare a visual lesson and students can respond live and at their own pace by choosing a bubble or writing a sentence from their own device. The teacher can share the students' best ideas with the whole class while evaluating the students' work.

Infrared thermography allows us to measure the temperature visually. In mathematics, a measure is not only linearly expressed, with a rule. A measurement can be expressed in many creative ways, including visual, as here.

The bike photo was taken during a hot summer day using the FLIR ONE PRO camera. We can see with the scale at the bottom of the photo that the temperature varies between 16.4 degrees Celsius, the temperature of the water bottle, in dark blue, and 45 degrees Celsius, the temperature on the beach in the

sun, in white. In addition, by using personal pictures, the student makes richer connections with the concept of mathematical measurement.

It is 15:30!

I already spend a lot of time on social networks. Our free time an ideal time to take new habits and also to explore new technologies because it's really fun. We put together our most beautiful photos of trips on the great trail in an artistic way with pic collage and we put them on social networks like Twitter. We learn to code by watching the videos already prepared by the Hopscotch team or by reading the code of the thousands of programs already written by the Hopscotch community. The first month is free. It's interesting, motivating and engaging. I can report my learning in my classroom.

Inspire your students

Last February, David Saint-Jacques spoke to young Quebeckers in Montreal. With Twitter, this interview was available to all young people across Canada. He showed us what a French Canadian can do. To be a doctor, an astrophysicist, a scientist and an astronaut. He inspired us with the possibilities of technology to work together to build a better world. His mission in space was only possible through the collaboration of several governments, companies, and universities from several countries around the world including Canada. He even rides a stationary bicycle in the International Space Station.

This cyclist on Earth is absolutely dazzled by the beauty of our planet and the possibilities of technology to take care of it. He dreams of a better world.

Ride outside in WINTER?

Many people think that cycling is a sport reserved for the summer. Cycling is also a winter sport. Yes, yes, a winter sport. I see a lot of people on the bike lanes in the Toronto area. Le Devoir reported that Montreal is clearing 76% of the bicycle

network.

Canadians know how to dress well to go out in the winter. The main concern is road safety by bike. The safest tracks are the separate bike lanes of the cars. They are cleared and salted by the city at the same time as the streets are. In 3 months, I'm going to be a grandmother and I've been cycling safely for the last two winters. It's not just for the daring young people. It's for everyone.

There are books on the subject and even a conference in Calgary about winter cycling. With a bike with winter tires, these trail are very pleasant to move around or for leisure. Cycling with winter tires is just a little more demanding on your muscles than cycling with summer tires.

The pleasure of riding the winter

For those who cycle in winter, it's a love story. You students may be motivated to write their story on Wattpad. Wattpad is the world's largest platform for reading and writing, with a social community of more than 70 million users and more than 500 million stories already shared. The Wattpad community would like to hear their voices. In addition, their story may be so interesting, that it is selected to create a movie by the film industry.

Fixed mindset or growth mindset?

Many people have a fixed mindset about exercise and their health. They say, "It's too hot, it's too cold, I'm tired, I do not have the time, it's too expensive, I do not have room, I can't, I'm not an athlete, I do not want to know anything." All the excuses are good. We change to a growth mindset by leaving the door open a little and saying, not yet, but I can try.

In the Quirks & Quarks radio show it was reported that the brain, what we say, has more effect on the ability to exercise than our genetic predisposition. In the experiment, irrespectively of the genetic constitution, those who were told you have genes that will protect you, exercised longer, than those who have been told

that you have high risk genes. What we say, our mindset, has more effect on the ability to do the exercise, than our genetic predisposition. Your brain can fool your body.

In winter, we dress a little warmer and go have fun.

Make a movie with infrared! You can see a big difference between day and night pictures. Here, during the day, the ice along the beach seems warmer than the water of the lake because of the sun's rays that are reflected by the ice and absorbed in by the water. At night, without the sun's rays, we can see that the ice is colder than the lake's water. Infrared allows us to see in total darkness.

A visible thought

Here is a fire that occurred near my bike path. We see the smoke that emerges in the sky. This fire was quickly mastered by firefighters, but it changes the quality of the surrounding air. The so-called antipollution masks are not effective. Ultrafine particles can enter our lungs and our blood. Experience forces us to pay attention and ask ourselves questions when we frequently hear about forest fires or news about pollution. Many of these fires are caused by drought, caused by global warming.

It's time to develop critical thinking and scientific thinking and ask fundamental questions about what is happening on a large scale. Why is this so? What can we do? The result of our investigation can be shared with Voicethread. With Voicethread the student can share photos, soundtracks and text. Everything is interactive because the thought is shared in a social network created by the teacher. What the student can create is differentiated.

Daily Physical Activity

Physical education teachers do excellent work, but it's only 2 periods a week at school. According to Canadian recommendations, children should have at least 60 minutes of moderate to vigorous physical activity each day. We can therefore

encourage our students to go to school by walking or cycling. It's for the health of our students. At my school, at the primary level, many students are active and cycle to school. Nothing prevents a bike club from being created to encourage more students to be active.

There is nothing to stop a bike club from encouraging more students to get active by using bicycles donated to school by the community. This would encourage students who would like to learn but who cannot do it at home. You can learn to ride a bike in one hour. By practising a skill both in the schoolyard, students will learn to be very comfortable with the bike before going to the street.

The increased attention of teachers encourages students to excel.

And coding?

There will be about 1 million IT jobs not filled in 2024. Do you want to give all your students the opportunity to have a job? Even the most disadvantaged? These statistics motivate educators and organizations to refocus efforts on teaching computer skills from kindergarten to high school.

We don’t just need computer science graduates to fill computing jobs; we need people with technical abilities to fill jobs in almost every industry.

Learning to code in order to build the technology to solve the most important problems that our society is facing right now is probably the most relevant reason for learning to code. I use Hopscotch with the iPhone to create fascinating code. With Hopscotch, you are also working on the redefinition of the SAMR model.

Why not write video games that encourage students to ride a bike? By learning to code at a young age, our students can develop the interest, passion, and know-how to use technology to achieve our goal of taking action and becoming fit. It's a very innovative project that uses technology creatively to solve an important problem that we face. You will expose your students very early to what

technology companies do every day. In fact, they will have the tools to successfully develop their own company that pays them at the age of 25 years old.

Create a Program for You

I have another idea. Why not create an artificial intelligence that tells us about the rules of road safety by bike? These lessons can be integrated into the health, science or mathematics curriculum. To avoid concussions, one must wear a helmet. We must make sure that our bike is the right size, that it is well maintained and that we can easily put our feet on the ground. Hopscotch also allows you to recognize speech. So, instead of saying OK Google, for the phone to answer us, we'll say OK Hopscotch and our Hopscotch program recognizes the sound of our voice and responds to us, in the form of explanatory text programmed by the student. The AI makes comments in French, responding to the sound of the user's voice. It's easy enough to do with Hopscotch. To make things easier, you can use a game already written by the Hopscotch community and only add the controls of artificial intelligence. You see the code on the right, when you hear a sound, the sound of the voice, make a relevant comment.

Getting into the Ultra

For a good mental health, one hour of bicycling a day is ideal. Students with their almost unlimited energy and teachers who have the interest can embark on the ultra- and train for long distances. Reading the book *Endure* discussed on the Radio Canada's show *Les Années Lumières* will take away all your doubts about the endurance of our body and the possibility of our body being subjected to great efforts at any age and at any level of fitness.

The SAMR model is very useful for gradually introducing technology into our classrooms. SAMR is an acronym for substitution, augmentation, modification, redefinition. We use it in our school board. The programming with Hopscotch, is at the level of the redefinition of the SAMR model. It can be used to code all our

certificates of achievement with the photos of the event. I used a photo I took on my first 100 km bike ride.

The ethics of artificial intelligence

Infrared is also used with artificial intelligence software to monitor passers-by or endangered wildlife. With detectors, artificial intelligence uses a deep learning algorithm to analyze images and identify what is in their field of vision.

Why not create such an artificial intelligence program, during hour of codeFdsF?

Do you agree with artificial intelligence? It saves us time, improves services and, even more importantly, reduces costs in our societies. Would you put the future of humanity in the hands of artificial intelligence without discussing it? Several AI projects already designed adopt our worst sexist and racist prejudices. They are not neutral and infallible. You can share your opinions and those of your students with a blog to learn from each other and make societal decisions.

Explore space

With a headlight and the lights of the street, we see very well in the evening. I started riding again with 15 minutes of practice regularly and going further and further. After a few months of practice, my 25 km challenge has become a relaxing hike, which allows me to look at the sky. I use STAR WALK to help me identify celestial objects. I can even ask STAR WALK to warn me at specific times in order look and take pictures. Here we see a picture of the International Space Station crossing the horizon. I coded a simulation of its trajectory with Hopscotch. The International Space Station rotates the Earth every 90 minutes.

Our challenge

Here's a picture at Pier4 Park in Hamilton, the heart of Ontario's industry. This is one of the beautiful cities to visit along the Trans Canada Trail. The health of Lake

Ontario is now very good thanks to industry's contribution to cleaning up wastewater.

Our health and that of our planet occupies a huge part of government and industries budgets and it increases alarmingly, limiting the funds available in the field of education and the environment. Can we have a better vision of our collective health? Cycling is good for physical health, good for mental health, good for the environment. Cycling is the best means of transportation for health.

Many of our students face systemic challenges. There is poverty, drugs, violence, cultural challenges. For some, these challenges are so huge that they eclipse the importance of school for them. Our challenge is to offset the challenges of our students so that they can reach our highest and sky-high expectations. I hope you can join this mission to see each of our students achieve excellence.