AI – Artificial Intelligence

Definition

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ar·ti·fi·cial in·tel·li·gence
/ˌärdəˈfiSHəl inˈteləjəns/

noun

the theory and development of computer systems able to perform tasks that normally require human intelligence

Today

- Background – How did we get here?

- Change – What can we do differently?

- Examples/Applications
  - Data Intelligence

  - Cognitive Intelligence
- Discussion

"

I will argue that we are living through one of the greatest inflection points in history.

Thomas Friedman
Thank you for Being Late

The three largest forces on the planet – technology, globalization, and climate change – are all accelerating at once.

Thomas Friedman
Thank you for Being Late

When you push the pause button on machines they stop, but when you press the pause button on human beings they start.

Dov Seidman

Mandate for the School System of BC

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Mission Statement

The purpose of the British Columbia school system is to enable learners to develop their individual potential and to acquire the knowledge, skills, and attitudes needed to contribute to a healthy society and a prosperous and sustainable economy.

Statement of Education Policy Order, 1989

Goals of Public Education in BC

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Prime Goal of Public Schools – Supported by the Family and Community

Intellectual Development

To develop the ability of students to analyze critically, reason and think independently, and acquire basic learning skills and bodies of knowledge; to develop in students a lifelong appreciation of learning, a curiosity about the world around them and a capacity for creative thought and expression.

Statement of Education Policy Order, 1989

Goals of Public Education in BC

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Goals that are shared among Schools, the Family and Community

Human and Social Development

To develop in students the sense of self worth and personal initiative; to develop an appreciation of the fine arts and an understanding of cultural heritage; to develop an understanding of the importance of physical health and well being; to develop a sense of social responsibility, and a tolerance and respect for the ideas and beliefs of others.

Statement of Education Policy Order, 1989

Goals of Public Education in BC

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Goals that are shared among Schools, the Family and Community

Career Development

To prepare students to attain their career and occupational objectives; to assist in the development of effective work habits and the flexibility to deal with change in the workplace.

Statement of Education Policy Order, 1989

Is this still relevant?

What happened in 2007?

- Steve Jobs announced that Apple had reinvented the mobile phone.

2007

VMware translation software made it possible for one computer to run multiple operating systems and software all at the same time

Software called **Hadoop** made big data possible for all

Development began on an open source platform for writing and collaborating on software called **GitHub**

2007

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In 2006, Facebook opened to everyone

Twitter was launched in 2007

2007

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Why now?

Mobile devices
+ big data
+ cloud storage =

**cognitive computing +
artificial intelligence**

Moore's Law

Gordon Moore, Intel Co-founder, 1965

The expectation that the power of microchips would double roughly every two years.

Moore's Law

In 1992, the ASCI Red supercomputer was the size of a tennis court, used the electricity of 800 houses, and cost $55 million.

Today it is equivalent to a **PS3**
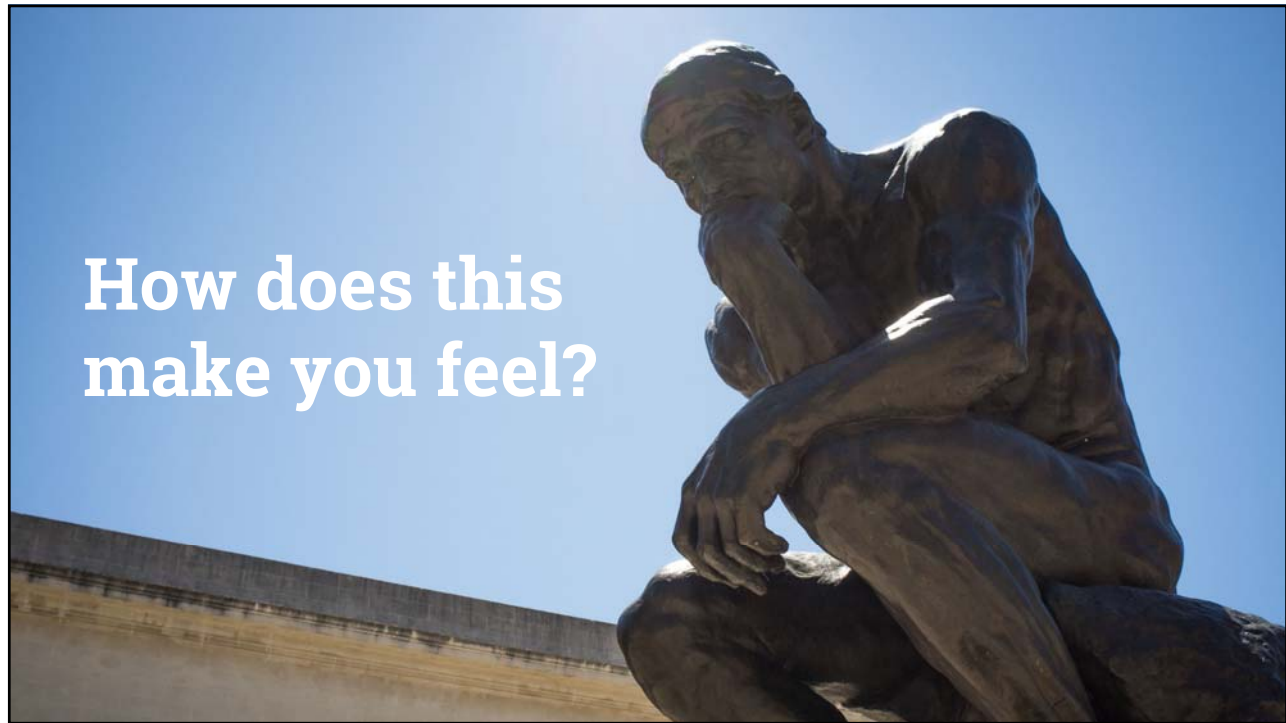
Moore's Law

| 500,000 km/hr | 3 Million km/tank | 4¢ |

How does this make you feel?

Change is not occurring at a constant speed; the pace of change is accelerating
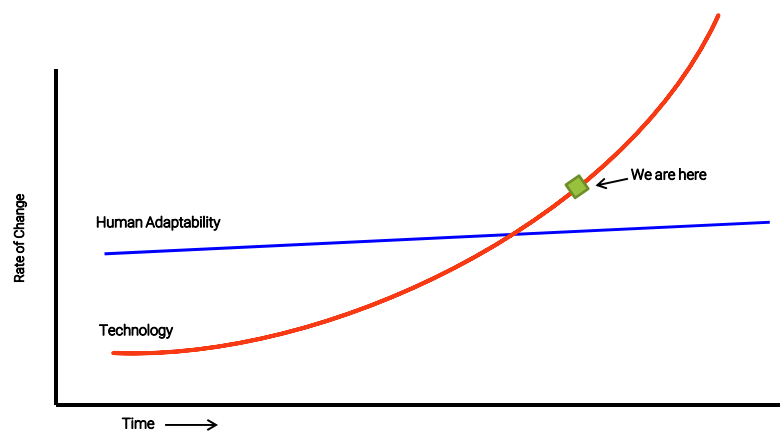
Change

- When the rate of change exceeds the ability to adapt we experience 'dislocation'

- Our lives are being reshaped faster than we are able to reshape ourselves

- We are not able to develop the learning systems, management systems, social safety nets, and government regulations to keep pace

Teller's Graph

The pace of change is accelerating
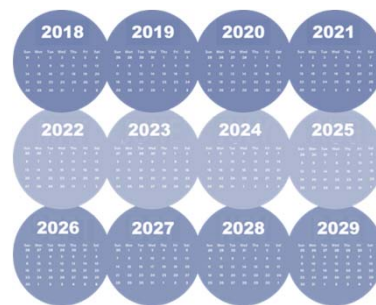
Dilemma

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Now it takes only **5 to 7** years from the time that an idea is introduced to it being ubiquitous and changing the world

Examples: Robotic surgery, gene editing, cloning, artificial intelligence

Dilemma

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But if it takes **10 to 15** years to write laws and regulations ...

2018 2019 2020 2021
2022 2023 2024 2025
2026 2027 2028 2029

Dilemma

How do we regulate these changes if the technology has come and gone in 5 to 7 years?

Education

What does this mean for education?

- None of us have the capacity to understand more than one field of study

- The sum of human knowledge has far outstripped the human ability to learn
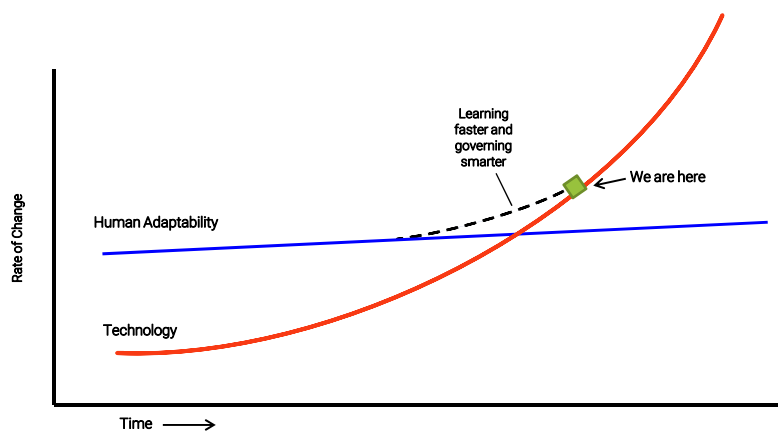
Education

- We went to school for 13 to 20 years as young people to learn a set of skills and then we were done

- Now the only way to retain a lifelong working capacity is to engage in lifelong learning

Teller's Graph

The pace of change is accelerating

What can we do differently?

Solutions

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We must try to increase our ability to adapt	We must rewire our societal institutions so that they will be able to keep pace
We need to become more agile	We need to learn faster and govern smarter

Impact on Education

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We need to re-evaluate the curriculum more	Put a "use-by" date on resources	Innovate – experiment, learn, apply, evaluate	Fail fast – make the same mistakes in half the time

Data Intelligence

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Data is the new oil.

Brian Krzanich, CEO of Intel

Data is the new oil

Those that are most adept at drilling for this data – digitizing, storing, and amassing – and then using algorithms to analyze, optimize, customize, automatize will be the winners

Data is the new oil

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- Uber, the largest taxi company in the world,
  owns no cars
- Facebook, the world's largest media owner,
  produces no content
- Alibaba, the world's most valuable retailer,
  has no inventory
- Airbnb, the world's largest accommodation
  owns no real estate

Data is the new oil

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The distance between imagining something,

designing it, manufacturing it,

and selling it everywhere has never been

shorter, faster, cheaper, and easier

Digital exhaust is becoming digital fuel

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Shopping

- Your cell phone is constantly sending out a unique number called a MAC number to detect wi-fi networks

- This signal can be tracked to determine which stores you enter, how often you go to a store, how long you pause in front of store displays

Digital exhaust is becoming digital fuel

Shopping

- This can also be used to determine if you drove by a certain company's billboard and then entered the related store

- Bill board companies use this data to adjust billboards throughout the day

Internet of Things

Examples of IoT

- Fire hydrants broadcast their water pressure to the local utility to monitor equipment failure and avoid costly blowouts

- Garbage containers broadcast when they are full so the route can be optimized to empty them

- The Weather Channel uses sensors and radar data to predict hourly accurate weather in every part of the globe

- Vehicle sensors predict when a tire, battery, belt, fan needs to be replaced

Atypical example

The Dairy Industry

- Sensors on cows can detect when they are in estrus by the number of steps they take, and determine the best time to be artificially inseminated. This signal is sent to the farmer's phone which saves time and eliminated guessing.

Atypical example

- The timing of the artificial insemination can also be used to improve the odds of getting male or female offspring thus shaping the optimum composition of the herd

- The pattern of foot steps can be used to detect 8 common diseases enabling early treatment and improved health of the herd
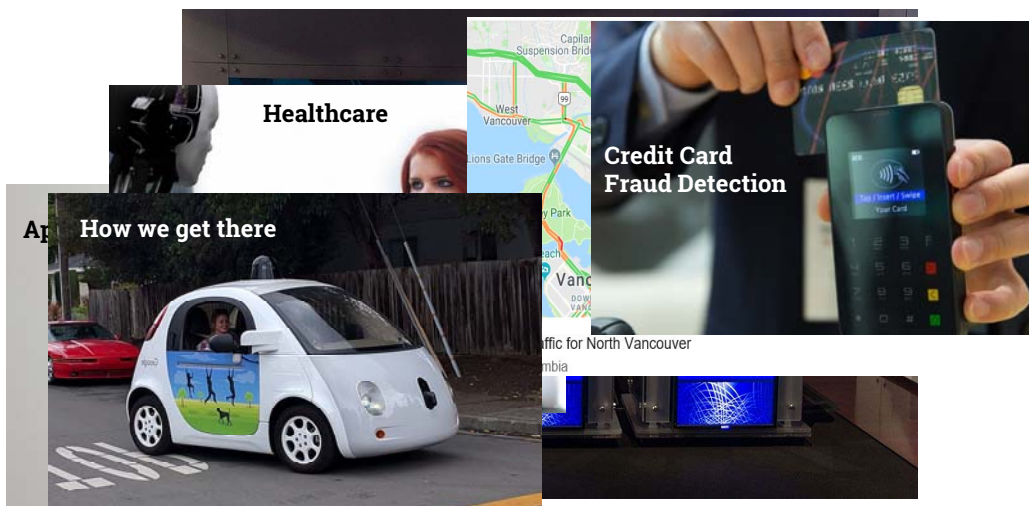

Other Examples?

Our mission…

- Our students need to know what data they need to harness to improve their ability to manage in this changing world

- Our students need to know what the world looks like so they can find their place in it

Examples of Cognitive Intelligence

Healthcare

Credit Card Fraud Detection

How we get there

Examples

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IBM is using Watson to analyze medical research in the 4 most common cancers. Watson is able to diagnose all of the cancers that oncologist can detect **AND** 40% more

Then doctors can get the genetic sequence of the tumour with a lab test, in an hour

Then doctors can use drugs to which those particular tumours react best, also in an hour

Other Examples?

So . . .

Will machines replace humans?

The short answer is … **Not Yet**

- *Computers are very good at a few difficult things and very bad at many simple things*
- *Example*:
  - ➢ Software works in partnership with architects through a concept called 'building information modelling'
  - ➢ As architects draw on the computer screen, the software inputs the drawings, computes the properties of the building, suggests improvements, and calculates the cost of construction
  - ➢ The process removes guessing, reduces mistakes, saving time and money

Goals of Public Education in BC

- Intellectual Development

- Human and Social Development

- Career Development

All of this must be considered in the context of everything else that we know is important for students

- Literacy/numeracy
- Core competencies
- Place-based learning e.g., outdoor education
- Global issues e.g., climate change

Learning

What do our students need to **know**, **understand**, and **do** to be successful in this evolving world of technology?

Ethics

- Is there a need for ethical behaviour with AI?

- The tech industry has most of the influence in most areas, but can education have some influence?

Careers

What career opportunities are available
in this new world?