Innovation for Sustainable Development
*Mike Chartier*

Sustainable Development

- Net positive impact
  - Consuming less than we produce
  - Renewable inputs

- No "White Elephants"
  - Positive social surplus (bridges, stadiums, and airports people actually use)

Innovation for Development

Hydraulic Mining
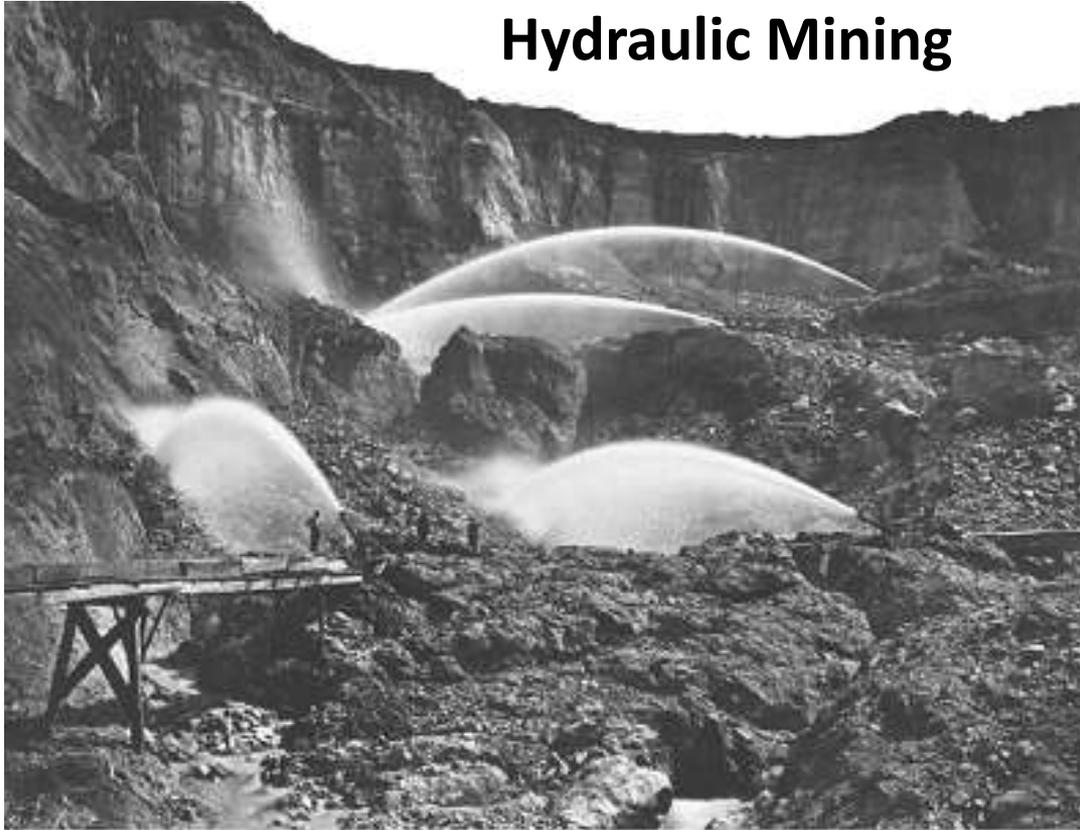
Innovations
- *high-pressure nozzles*
- *mercury and arsenic amalgamation gold extraction*

Innovation for Sustainable Development

• New technologies and techniques that produce a positive return for investors, and positive social surplus

Sustainable Development Goal #4

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Why ICTs

New papyrus (or vellum, or parchment).

New coin of the realm for conducting business

E-literacy mandatory requirement for economic advancement in the 21st century.

ICTs can help

- Can be an gender equalizer

- Helps engage younger children in primary school

- Substantial help in secondary education
  - Benefits from distance learning- allows secondary programs to reach more students
  - Flexible timing fits with life (work)
  - Increased collaboration
  - Customized learning

Sustainable

Information and Communication Technology Models in Education

School Station

Primary usage is for administrative tasks. Students and Teachers have limited access.

School Station
Labs
In Class
Personal 1:1

LIBRARY

MEDIA CENTER

ADMINISTRATION OFFICE

DESCRIPTION

· The basic ICT configuration relies on just a few computers at school where usage is focused on School Administration Tasks and Professional Learning.
· Teachers and Students may have limited access to computers in the Media Center / Library primarily for research purposes.

Sustainable

Information and Communication Technology Models in Education

Labs

Computers are stationary. Focused primarily on Digital Literacy (ICT skills) and limited integration of Core Curricula activities.

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School Station | Labs | In Class | Personal 1:1

DEVICES

Wired (Ethernet) / Wireless Internet Access.

ACCESS POINT

TEACHER DEVICE

STUDENTS LEARNING DEVICES

Desktop

ALL in ONE

NUC

Next Unit of Computing (Nuc) +40

For more information click here

Tower Server 200

Use Multiple Servers Or Blades +200

For more information click here

PROJECTOR

SERVER

For more information click here

USAGES

Digital Literacy

Language Labs

Some integration into core curricula

SECURITY SOFTWARE

For more information click here

CLASSROOM MANAGEMENT

For more information click here

All students devices are connected with the teacher's computer.

FEATURES

- Labs are stationary and can foster 1:1 or 1: many learning environments.
- Time spent using technology is limited to availability of Lab.
- The teachers may begin integrating technology into the core curriculum.
- Professional Learning focuses on Digital Literacy.
- Focus areas can include ICT skills development, online assessments, and limited Core Curriculum (math, language, science, etc).

RECOMMENDED ACCESSORIES

Headsets

Printer

Sustainable

Information and Communication Technology Models in Education

In Class

Devices are mobile and foster 1:1 learning environment. Teachers share access to devices and plan curriculum accordingly. Learning becomes more technology-enhanced but in short periods of time.

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School Station | Labs | **In Class** | Personal 1:1

DEVICES

Tablet

Laptop

2 In 1

For more information click here

TEACHER DEVICE

STUDENTS LEARNING DEVICES

Wired (Ethernet) / Wireless Internet Access (mobile devices are connected to the network). **ACCESS POINT**

CHARGING CART — Allows charging, transporting and storing devices

Next Unit of Computing (Nuc) +40
For more information click here

WHITEBOARD

Tower Server 200

Use Multiple Servers Or Blades +200

SERVER

For more information click here

USAGES
- Activity-based
- Project Learning
- Virtual Learning Environment

SECURITY SOFTWARE
For more information click here

CLASSROOM MANAGEMENT — All students devices are connected with the teacher's computer.
For more information click here

FEATURES

- An in classroom set of digital learning tools subject to availability to be used inside the classroom for all subjects.
- Also known as a Computers on Wheels model where the devices are on a charging cart and wheeled from room to room.
- Teachers plan curriculum according to availability of devices.
- In-class digital learning usage prepares students and teachers for a more comprehensive use of technology in a 1:1 environment.
- Professional Learning focuses on integration of technology into core curriculum and movement to a student-centered environment.
- Focus areas can include STEM, staff and parents communication, and online assessment.

RECOMMENDED ACCESSORIES

Headsets | Printer

Sustainable

Information and Communication Technology Models in Education

Personal 1:1
Personalized Learning. Anytime/anywhere/anyway learning. Fully integrated with core curriculum.

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School Station | Labs | In Class | **Personal 1:1**

ACCESS POINT — Wireless Internet Access (A robust network to support all students online at one time).

SERVER
- Next Unit of Computing (Nuc) +40 — For more information click here
- Tower Server 200
- Use Multiple Servers Or Blades +200 — For more information click here

CONTENT — Compelling Content Local / On Server / In Cloud. Cloud computing facilitates sharing of resources / content / software over a network. For more information click here

SECURITY SOFTWARE

INTERACTIVE WHITEBOARD

TEACHER DEVICE

STUDENTS LEARNING DEVICES

DEVICES
- Tablet
- Laptop
- 2 in 1
- Chromebook

For more information click here

USAGES
- Comprehensive Digital Content and Tools integration
- Embedded Measurement of Skills and Content

CLASSROOM MANAGEMENT — All students devices are connected with the teacher's computer. For more information click here

FEATURES
- The Personal model facilitates Personalized Learning, allowing **device** usage anytime, anywhere.
- The one to one computer model allows for improved usage of a wide range of digital materials and focuses on a true student-centered learning environment where students take control of their own learning through high quality education software, comprehensive digital content and tools.[1]
- A faster connection also enables online assessment and evaluation.
- Measurement of skills and digital content is embedded in the curriculum.
- Teacher becomes a tutor and expert facilitator.
- Refresh cycle and security plans take place.

[1] Project RED: A Global Toolkit for Education Transformation, 2014. For more information click here

RECOMMENDED ACCESSORIES — Headsets, Printer

OPTIONAL — Charging Cart

Goal #4

4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education

4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

4.4 By 2030, increase by [x] per cent the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.6 By 2030, ensure that all youth and at least [x] per cent of adults, both men and women, achieve literacy and numeracy

4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

Goal #4

4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

4.b By 2020, expand by [x] per cent globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries

4.c By 2030, increase by [x] per cent the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States all

ICT in Education solution elements

- Technology: devices—cell phones, tablets, netbooks, laptops, PCs, servers and networks—communications and computing
- Connectivity: broadband Internet access, wired or wireless
- Digital Content: learning material from the Net, multimedia CD/DVDs, podcasts, or other digital media
- **Improved teaching methods include student-centric models, project-based learning, etc.; and professional development that helps teachers effectively integrate technology into their curriculum.**

And to facilitate your implementation you should have the following support systems
1. Policy
2. Funding
3. Metrics and assessment
4. Commercial industry partners

Intel Education

We are deeply committed to achieving our shared goals

150M students have used Intel solutions for learning

Transforming education in **100** countries

Professional development for **11M** teachers

7M students in Intel Intl. Science & Engineering Fair affiliated fairs

4M employee volunteer hours for education

**$1B** invested in the last decade

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Training Teachers

It takes **5-6 YEARS** for teachers to **master technology integration**[1]

INADEQUATE PD is a **significant barrier** to successful technology integration in schools[1]

INFORMAL or GENERAL TRAINING has **little effect** on teachers' use of technology[1]

TEACHERS with **49 hours** OF PROFESSIONAL DEVELOPMENT can **BOOST** student results **20%**
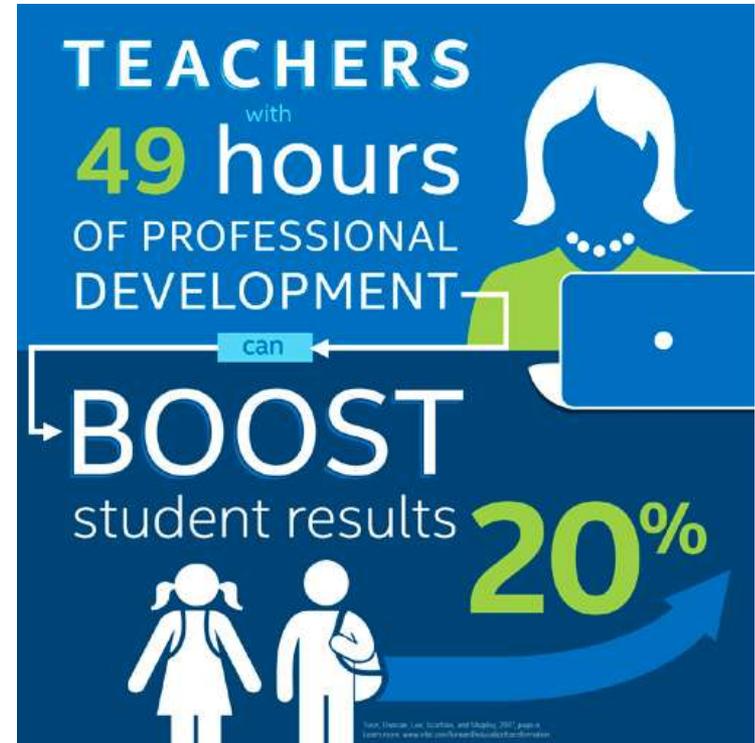
For technology implementations to be successful, teachers need the skills to make effective use of the technology in the classroom

1. Mueller, J., Wood, E., Willoughby, TI, Ross, C. and Specht J. Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration. Computers & Education 51, 1523-1537, 2008.

Intel® Teach Elements eLearning Courses

K12 teachers. Format: Facilitated or self paced online

Moving into Mobile Learning
Learn the benefits and challenges of mobile learning, and how to create a successful mobile-learning environment in their classrooms.

Creativity in the Mobile Classroom
Build on concepts from Moving into Mobile, learning to implement mobile learning effectively, while encouraging students' creativity.

Assessment in 21st Century Classrooms
Learn to plan, develop, and manage student-centered assessment strategies for improved teaching and learning.

Collaboration in the Digital Classroom
Design and manage collaboration activities that integrate online tools and prepare students for a globally connected world.

Designing Blended Learning
Explore transitioning to blended learning experiences where some portion of learning occurs online and outside of a classroom setting.

Inquiry in the Science Classroom
Explore ways to develop students' scientific thinking and practices.

Project Based Approaches
Explore the features and benefits of project-based learning to engage students with self-directed learning.

Thinking Critically with Data
Examine critical thinking with a focus on data analysis – preparing students to think analytically in our knowledge-driven world.

Leadership in the 21st Century
For school Leaders: Explore school leadership practices and policy for effective digital learning

Intel Global Girls and Women Initiative

Empower millions of girls and women through education and technology to advance economic opportunity

Education Access

Drive awareness and action to expand education opportunities for girls

STEM & Tech Careers

Inspire more girls and women to become creators of technology

Technology Access

Connect girls and women to new opportunities through technology access, digital literacy and entrepreneurship
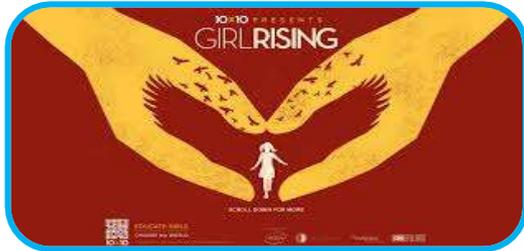
Building upon the foundation: Investing in our own talent and supply chain diversity

(intel)
Education

"*In the twenty-first century, education cannot be separated from technology. Access to quality education for all – which includes access to ICT – is an imperative for building inclusive and participatory knowledge societies.*"

Learn more

Mobilizing Broadband Funds for Education
Creating Skills and Jobs in a New Economy

Session 259
Thursday 28 May, 15:00 – 16:30
Room K, ITU Montbrillant