

# Building a Pathway to the Profession of Engineering for Aboriginal Young People

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# Greetings and Thanks

- We bring you greetings from the people of the Tuscarora First Nation, from the Six Nations Reserve at Ohsweken, Ontario, and from our new neighbours in the Mohawk Territory of Kahnawake, near Montreal.
- We offer thanks to the people of the Algonquin First Nation on whose territory this meeting is being held, and we look forward to bringing our hearts and minds together around this very important subject.



# An Engineering Design Approach Begins with Questions :

- Who are we?
- What steps have we taken?
- Who do we know?
- What have we learned?
- Who has supported our journey?
- Where have we come from?
- What have we done?
- Who have we worked with?
- What tools have we created?
- Where are we located?



What can CCPE do to address the issue?

What can MPES do to help?

Where do we go from here?



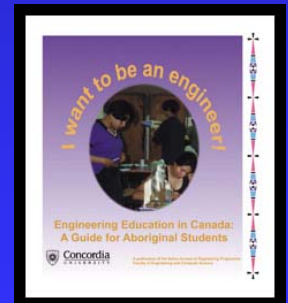
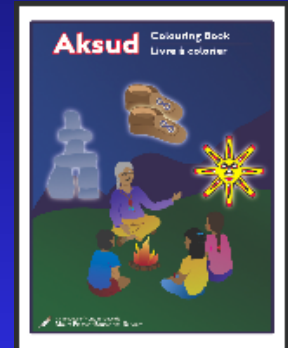
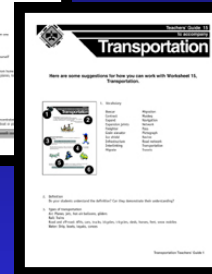
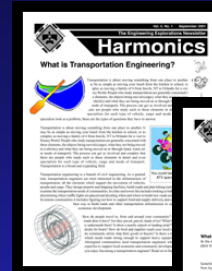
# How did we get here?

- Established 1993
- Formerly known as Native Access to Engineering Programme (NAEP)
- Goal: To address issues related to the underrepresentation of Aboriginal peoples within the pure and applied sciences in Canada
- Focus: K-12 math & science



# What steps have we taken?

- Summer Camps
- Curriculum Resources
- Career Resources
- E-learning
- Professional Development
- Outreach
- Policy intervention



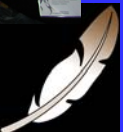
# What we have done? - Hard copy

- Curriculum resources
  - ◆ 25 titles, 5 in development
  - ◆ 50,000 copies in circulation, available as PDFs
- *I Want to be an Engineer*
  - ◆ 2 printings, 10,000 copies in circulation
- Elementary activity books
  - ◆ 3 titles, 2 in development
  - ◆ 45,000 in circulation
- *Aksud Colouring Book*
  - ◆ 18,000 copies in printing



# Who do we know? - Outreach

- Face-to-face outreach with over 12,000 people, primarily educators and students, since 2000





# Who do we know? - Network

- Our product may be educational resources  
..... But our strength is people!
- Academics, professional engineers,  
corporate HR specialists, teachers, guidance  
counselors, graduate students, Directors of  
Aboriginal education organizations, listserv,  
government officials, graduate students.....



# Who have we worked with?

- PSE Institutions
  - ◆ ENGAP, ASU, UCLA, USU, UMaine, MemorialU, USask, URegina, FNUC, Yukon College, UBC, McGill, UAlberta, UoT, Guelph, UWO, Lakehead, Dalhousie
- School boards, schools, community groups both on and off-reserve
  - ◆ ATA, FNECQ, Chiefs of ON,, FNECQ, CSB, KSB, EPSB, ECS, Ahkwasahsne Mohawk Board of Ed., Six Nations Library, Kahnawake Ed. Centre, MFNERC, SkCathSB, Membertou
- Engineering professional organizations
  - ◆ CCPE, ASEE, NCDEAS, IOIQ, CASTS, CASEA, AISES
- Federal gov't depts - CA/US
  - ◆ INAC, InduCan, HRDC, NRCCan, StatsCan, NSERC, NRC, EnviroCan, US BIA, SSHRC
- Provincial governments
  - ◆ MEQ, Dept. of Ed. YK, NWT, NU, AB Learning, Northern Territory (Australia), SK Learning, MB Learning
- Other organizations
  - ◆ NCTM, CMS, NSTA, NIEA, Conference Board of Canada, AUCC, Actua, Cdn. Millennium Scholarship Fdn., BEAHR, AFN, IBM Global, Air Canada, Hydro Quebec



# What we have done? E-learning

- 1200+ pages
- 50+ role models
- 7 interactive lessons
- 12 ancestral engineering lessons
- PD opportunities for teachers
- 1000+ vetted links to science/math resources
- 3 Shared Lessons: teacher developed and tested lesson plans
- BearPaw Trail: Pine Cone Creek, Sunset Hollow & Willow Springs (K-4)
- What can one teacher do? In development
- Listserv: 300+ subscribers

## A Day in the Life of an Engineer 5 portraits

A Day in the Life of an Engineer

Mark Green | Mohawk | Civil Engineer

ASK MARK

about REINFORCED CONCRETE

Mark explains how steel cages are used in the construction of reinforced concrete beams. These beams hold up the floors, or slabs, of buildings.

EXIT

05:00 07:00 08:00 11:00 13:00 15:00 17:00 19:00 21:00 23:00

NAEP SITE CREDITS



# E-learning stats

- On average per month
  - ◆ 8,000 unique visitors
  - ◆ 11,000 visits
  - ◆ 1,000,000 hits
- With on-going growth



# DreamCatching:

## PD Workshops in Math & Science for Teachers of Aboriginal Students

- 250+ teachers trained to date
- Assembled best of best to lead workshops
- DC 2007 @ URegina,
  - ◆ Seeking support



# What awards have we won?

- Canadian Education Association Award of Excellence (AMTEC Media Festival 2005)
- Michael Smith Award (NSERC - Industry Canada 2003)
- Eisenhower National Clearinghouse Digital Dozen
- Exploratorium Ten Cool Sites
- Numerous other web awards and inclusion in several reviewed digital libraries



# Who has supported us (among others)

- INAC
- Industry Canada
- HRDC - OLT
- OIQ
- Concordia U
- NRC
- NSERC
- MEQ
- IBM
- NRCCan
- Cree School Board
- Air Creebec
- CreeCo
- UManitoba



# What have we learned?

- People (teachers, parents, students) do not connect the dots between solid K-12 education, PSE, careers and community development
- There are not enough qualified science and math teachers in Aboriginal (or any) schools





# We know...

- Urban teachers are not properly trained to address Aboriginal students in their class rooms
- Low expectations and absence of standards serve children poorly
- Lack of national coordination on Aboriginal education, and math and science education in general, limits information sharing and the potential for implementation of innovative approaches and programs



# We know...

- There are people and communities doing excellent work
- There is a will to address issues at the provincial level
- We will get nowhere without a coordinated effort
- And a lot more



# Complex multi-faceted problem

Access to  
resources

Political will

Parents

PSIs

Elders

Community-  
defined needs

Teachers

Understanding of  
process

Numeracy  
& literacy

Curriculum  
definitions &  
outcomes

Kids

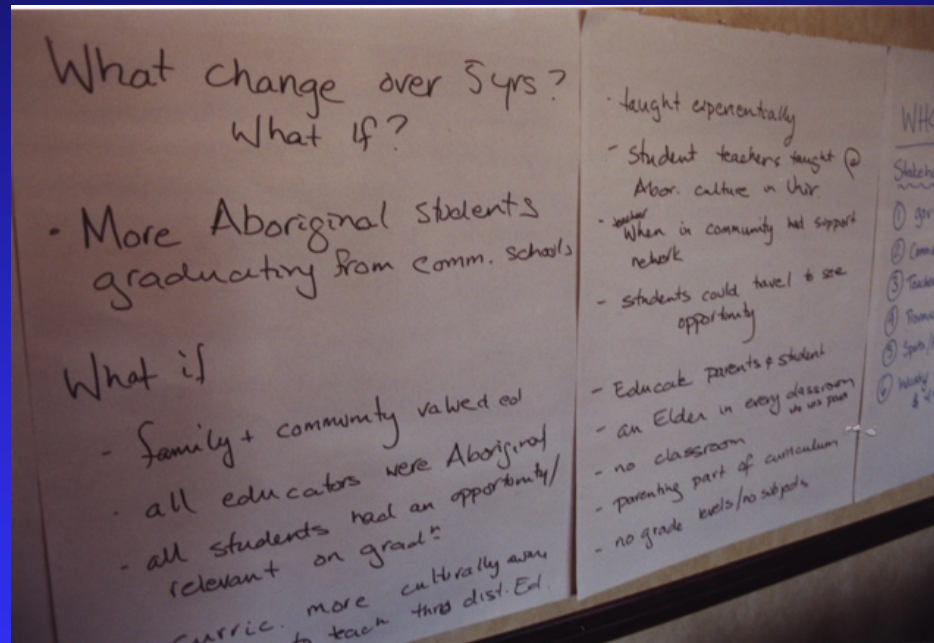
School  
governance

Cultural  
relevance

Urban  
populations

Teacher  
training

Questions  
of who  
belongs



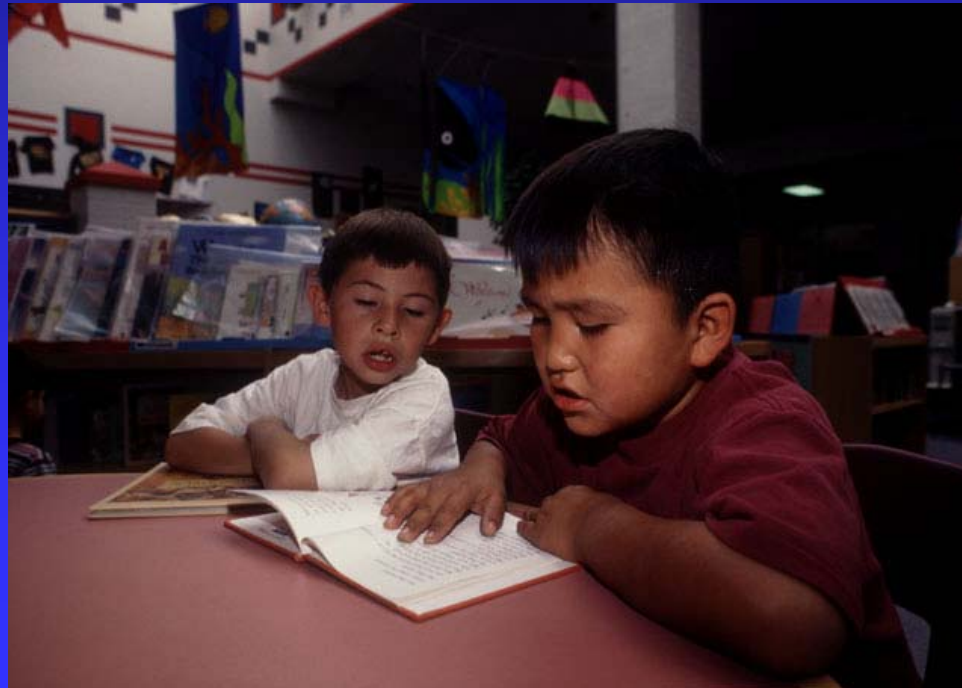
Translating the deficit in Aboriginal education in Canada into readiness for engineering education is a major challenge...

... but we see it as an opportunity.



# What will address the roots of the problem?

- Stress foundational issues in math and science education
- Involve parents, communities, leadership
- Improve teacher training & professional development



# What strategies will work?

- On-going work with K-12 children
- Continued work with teachers (in training & in the field)
- More support for existing university-based access program (ENGAP)



# What can we do to help?

- Maintain national network and coordinate efforts
- Produce & distribute early-learning resources and curriculum
- Maintain e-learning community listserv & website
- Continue outreach & teacher training
- Advise CCPE and member associations



# What needs to be in place?

## ... An engineering design:

- Define the problem
- Account for obstacles along the path
- Intuition/experimentation
- Understand the variables
- Find cost-effective plan
- Seek sustainable solution
- Identify constraints
- Note similarities with previous problems
- Do research in design
- Review all parameters
- Check reliability
- Evaluate all processes





# What can CCPE do?

- Make organizational & financial commitment to concrete program activity delivery
- Form a working group to report to Council in 90 days
- Define partnerships with gov't & private sector for funding base
- Issue a mandate to service provider to deliver resources on a national level
- Produce/provide concrete materials for member associations



# How can CCPE intervene directly now?

- CMEC cannot ignore CCPE
- AUCC cannot ignore CCPE
- NSERC cannot ignore CCPE
- NRC cannot ignore CCPE
- SSHRC cannot ignore CCPE

CCPE has a strong and credible voice ...



# From the time we were children...

Our elders have taught us that the time we are living in now is only borrowed from future generations, and that the children we have are on loan to us as gifts.

We are also taught that we must be mindful of our thoughts, our words, and our actions today, since they will have an impact seven generations from now.



# Building a Pathway to the Profession of Engineering

- MPES would welcome the opportunity to bring its suite of products, services, publications and program activities to a partnership with the CCPE and other committed organizations.



# For further information:

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