

Environment and Sustainability Studies in Post Secondary Education: Reflections on the Past, Present and Future

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The goal of education is to make people wiser, more knowledgeable, better informed, ethical, responsible, critical and capable of continuing to learn...Education, in short, is humanity's best hope and most effective means in the quest to achieve sustainable development.

-UNESCO, 1997

Universities educate most of the people who develop and manage society's institutions. For this reason, universities bear profound responsibilities to increase the awareness, knowledge, technologies and tools to create an environmentally sustainable future

- ULSF, 1990

Looking at the future, there is a window of opportunity for colleges who are in a unique position to be leaders for action in their communities.

- ACC Summary Report:
Environmental Sustainability 2007

Environmental degradation is not the work of ignorant people, “rather, it is largely the result of work by people with BA’s, BSc’s, LLB’s, MBA’s and PhD’s”

- Orr, 1995

How have Canadian colleges and universities responded?

- Declarations
- Programs and Curriculum
- Research
- Operations
- Policy and assessment

Chronology of Institutional Commitments to Sustainability

Year	Declaration
1990	<ul style="list-style-type: none">• Talloires Declaration
1991	<ul style="list-style-type: none">• Halifax Declaration (Canadian universities)
1994	<ul style="list-style-type: none">• Copernicus Charter
1997	<ul style="list-style-type: none">• Declaration of Thessaloniki
2000	<ul style="list-style-type: none">• Luneburg Declaration
2002	<ul style="list-style-type: none">• Ubuntu Declaration

Chronology (cont.)

Year	Declaration
2005	<ul style="list-style-type: none">• UN Decade of Education for Sustainable Development (2005-2014)• Graz Declaration
2007	<ul style="list-style-type: none">• Pan Canadian Protocol for Sustainability (currently 59 signatory colleges)
2009	<ul style="list-style-type: none">• Turin Declaration• Bonn Declaration
2015	<ul style="list-style-type: none">• Nagoya Declaration on Higher Education for Sustainable Development

What did we commit to?

Based on Wright, 2010, and Lozano, 2013

- Making SD an integral part of the institutional framework
- Greening operations and creating on-campus life experiences
- Encouraging sustainability research
- Creating partnerships with community and other universities
- Increasing ecological literacy
- Developing interdisciplinary curriculum and fostering transdisciplinarity

Environmental Programs

- Seminal
 - York University (1968)
 - University of Waterloo (1969)
- 2015: over 200 degree, diploma and certificate programs offered in French and English related to the environment across the country (AUCC)

Sustainability Programs

- Seminal
 - Dalhousie University, Assinaboine, NSCC, and Humber College
- 2015: 22 degree, diploma and certificate programs offered in French and English related to sustainability across the country (AUCC)

College and University Curriculum

- Curriculum
 - Mandatory courses
 - Bolt-on courses
 - Integration efforts
 - College-wide learning outcomes (e.g. NSCC 5 Sustainability learning outcomes)

Learning Transitions to Sustainability in Higher Education

Shift from	Moving towards
Bolt-on additions to existing curricula	Innovation within existing curricula
Passing on knowledge and raising awareness	Questioning and getting to the root of issues
Teaching about attitudes and values	Encouraging clarification of values
Seeing people as the problem	Seeing people as change agents

Learning Transitions to Sustainability in Higher Education (cont.)

Shift from	Moving towards
Sending messages about SD	Creating opportunities for reflection, negotiation and participation
Raising awareness and trying to change behaviour	Challenging the mental models which influence decisions and actions
More focus on the individual and personal change	More focus on professional and societal change
Negative problem-solving approaches	Constructive creation of alternative futures

Research

- **Major component of Third Phase of College Greening** (Knibb and Paci, 2016)
 - Pan-Canadian Scan show college strengths in environmental science and technologies, natural resources, energy and clean tech sectors (AUCC)
- **Dedicated Research Centres**
 - (e.g. Canadian Consortium for Sustainable Development Research at the University of British Columbia)
- **Publications**
 - Bibliometric study (Wright and Pullen, 2009) found approximately 70% of manuscripts related to sustainability in higher education from Canadian or US universities.
 - Countless more publications on environment and sustainability related subjects

The Shift of Sustainability Research in Higher Education

Shift from	Moving towards
Research which is discipline-focused	Research which is inter- and multidisciplinary
Research that has academic impacts	Research which has social impact
Research that informs	Research that transforms
Research on technological and behaviour change	Research that focuses on social and structural change
Researcher as expert	Researcher as partner
Research on people	Research with people

Greening Operations

- Becoming models of sustainability
- 77 universities and colleges in Canada have a sustainability office or officer situated on campus and reporting to the institution's administration (Vaughter *et al.* 2015)
- Greening the campus courses

Policies and Assessments

- 110 AUCC and/or ACCC PSE institutions have an institution wide policy or plan (Vaughter et. al. 2015)
- 93 AUCC and/or ACCC PSE institutions have reported conducting a sustainability assessment under a variety of different frameworks (Vaughter et. al. 2015)
 - Canadian Sustainability Assessment Framework (early 2000s)
 - Sustainability Tracking, Assessment and Rating System (STARS)
 - Some credits related to programs and programming
 - 21 institutions in Canada using this self-reporting assessment (Lidstone et. al, 2014)

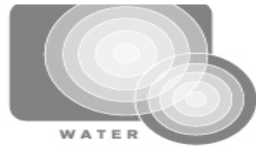
Reflections on the Past, Present and Future

- Strong foundations
- More holistic current approach (three realms of sustainability)
- Fundamental changes in how we think of “education programs” and “delivery”
- More buy-in from administration
- Immense growth, and growth potential



Past/Present/Future of environment and
sustainability programming:

A Case Study at Capilano University



Environmental Education

...across disciplines

...across campus

A bit of data...

CapU is a special-purpose teaching institution...

Mandate

- focus is on teaching excellence
- do not have a broad mandate for original research
- conduct applied research and scholarly activity that supports the institution's programs
- broad range of programs are offered, similar to colleges, with several bachelors degrees and a few applied graduate degrees

A bit of data...



Place-based learning a focus...

3 campuses all in areas of population bubbles BUT in areas with functioning natural ecosystems, agriculture, forestry, fisheries & industry

A bit of data...

We are small...

- 7000 students enrolled in credit programs
- 4000 in non-credits students
- 900 international student

A few of the degrees offered...

Bachelors of...

- Liberal Studies
- Business Administration
- Early Childhood Care and Education
- Tourism
- Motion Picture Arts
- Communication Studies
- Applied Behaviour Analysis-Autism
- Legal Studies
- Music in Jazz Studies
- Design in Visual Communication

Associates of ...

- Associates of Science – General
- Associates of Science - Biology
- Associates of Arts

*Diverse faculties...diverse expertise...BUT
one common goal*

Capilano University is committed to:

Using educational activities to engage the University Community and promote environmental awareness, local action, and global thinking.

The Environment is the Issue

of the 21st century...

Overarching question...

How are we preparing graduates to tackle our biggest problems and why should we be preparing them?

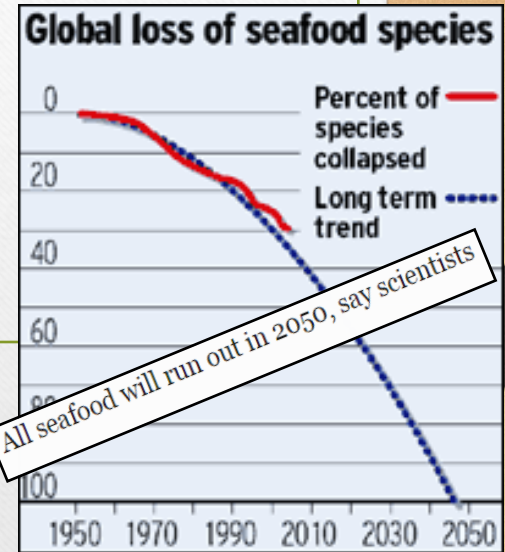


THE VANCOUVER SUN

Canada's economy battered by climate change catastrophes in 2013



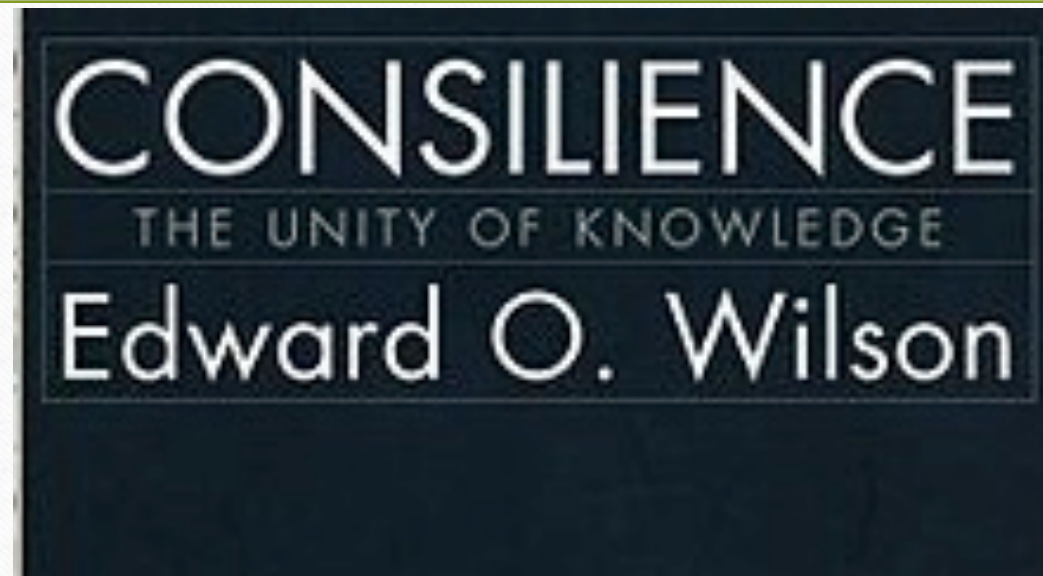
The Telegraph



Canada dead last in ranking for environmental protection

Still shrinking: New record low for extent of Arctic sea ice: monitoring agency

*Curriculum and Connections informed
by...a need for consilience.*

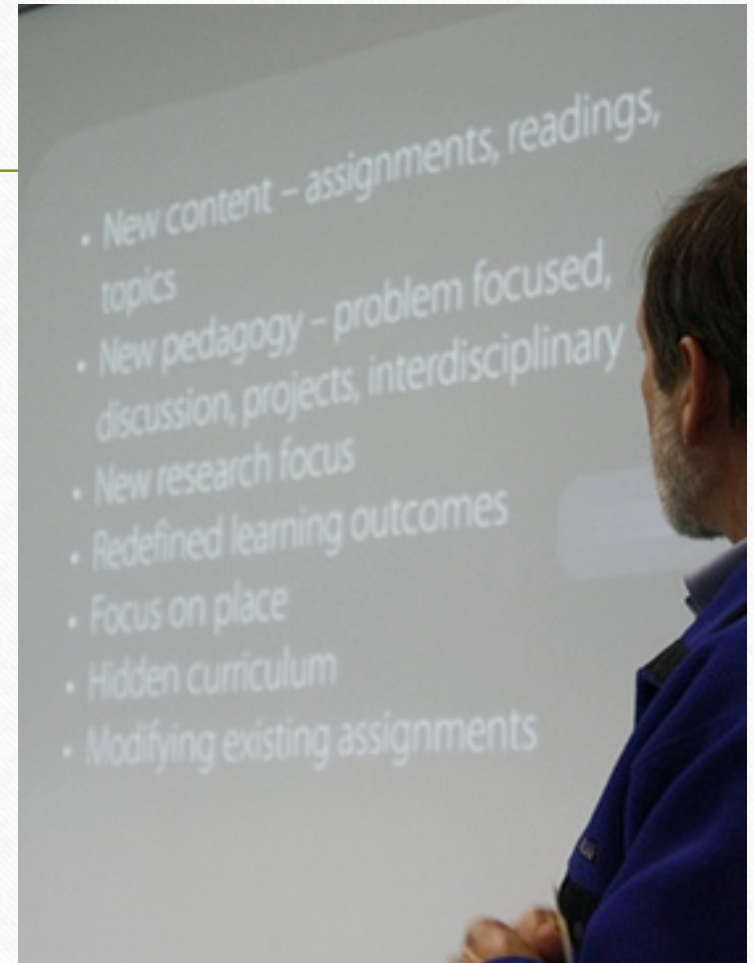


"Literally a 'jumping together' of knowledge by the linking of facts and fact-based theory across disciplines to create a common groundwork of explanation."

Curriculum and Connections informed by...a need for consilience.

Every country has three forms of wealth: material, cultural, and biological. The first two we understand well because they are the substance of our everyday lives. The essence of the biodiversity problem is that biological wealth is taken much less seriously. This is a major strategic error, one that will be increasingly regretted as time passes.

E.O. Wilson, The Diversity of Life



Key pillars of delivery...

- **EarthWorks**...an environmental science based lecture and film series & on site campus activities - open to any and all students
- **ChatLive**...a series of student-driven but faculty curated weekly discussion forums
- **Specific courses** with environmental themes **and specific lower-level educational pathways**

Key pillars of delivery...

- **Service-learning projects** within Global Stewardship program and Outdoor Recreation and Tourism degrees
- **Green Concentration** within the Business degree
- An **Environmental Stewardship minor** – package of courses open to any student in any degree program (in progress)

EarthWorks is...the academic catalyst



CAPILANO
UNIVERSITY

Mission Statement

EarthWorks educates and inspires students across disciplines to understand complex environmental issues, enabling them to take action for positive change.



EarthWorks

Earthworks...

- ✓ Delivers... the science behind the environmental issues.
- ✓ Demonstrates... environmental integrity and sustainable development.
- ✓ Create bridges... between CapU's institutional vision and actions of faculty and students.
- ✓ Links...the campus with community and business partners to facilitate the application of the knowledge gained in the classroom.
- ✓ Creates... a campus that functions as a living classroom.



Film Screenings, Speakers & Panels



AT WHAT COST

A compelling, two-part event featuring a rough-cut film screening and a panel discussion, proudly presented by EarthWorks and Capilano University's Neil Brown Speaker's Series.

A preview of Fractured Land

A modern Indigenous warrior: A Goliath industry. A new way forward. Filmmakers Damien Gillis and Fiona Raylor will screen a rough cut of *Fractured Land*, which follows young First Nations lawyer Caleb Sale as he confronts the fracking industry in northeast B.C. This is a unique opportunity to see the film and to provide your feedback as the documentary nears completion.

11:30 a.m. to 1:00 p.m., Thursday, March 12
Bosa Centre for Film and Animation

11:30 a.m. to 1:00 p.m., Thursday, March 19
Bosa Centre for Film and Animation



DO THE MATH

COME WATCH!

FREE SCREENING

THE MOVIE

Do the Math is a fast-paced and inspiring film about the rising movement to solve the climate crisis.

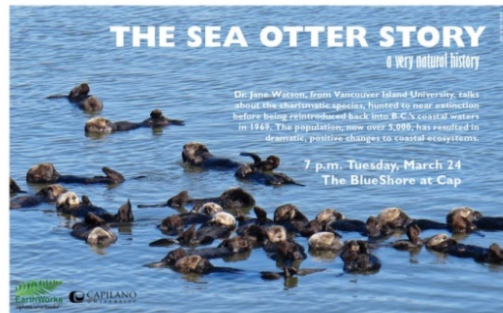
TIME/DATE: 7 p.m., Wed., Jan. 14

LOCATION: BOSA 5 Capilano

ADDITIONAL DETAIL

Do the Math chronicles "America's leading in a David vs Goliath battle to fight the four terrifying math of the climate crisis. A group of activists are going after the fossil fuel industry, the people who are putting their bodies on the line. Pipeline and leading universities and real corporate polluters hellbent on burning fos

More Info at 350.org/math

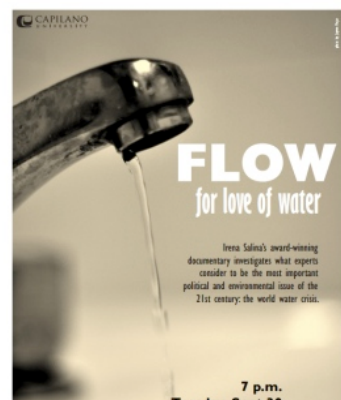


THE SEA OTTER STORY

a very natural history

Dr. Jane Watson, from Vancouver Island University, talks about this charismatic species, hunted to near extinction before being reintroduced back into B.C.'s coastal waters in 1949. The population, now over 3,000, has resulted in dramatic, positive changes to coastal ecosystems.

7 p.m. Tuesday, March 24
The BlueShore at Cap

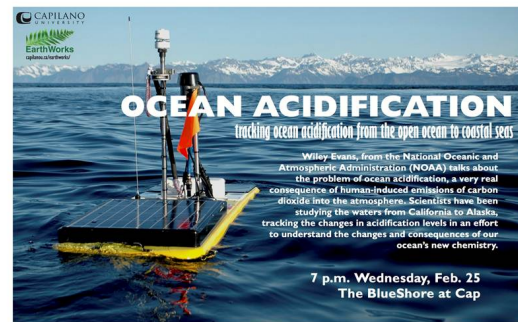


FLOW

for love of water

Irena Salina's award-winning documentary investigates what experts consider to be the most important political and environmental issue of the 21st century: the world water crisis.

7 p.m.
Tuesday, Sept 30
BlueShore Financial
the Performing Arts
Capilano University



OCEAN ACIDIFICATION

tracking ocean acidification from the open ocean to coastal seas

Wiley Evans, from the National Oceanic and Atmospheric Administration (NOAA) talks about the problem of ocean acidification, a very real consequence of human-induced emissions of carbon dioxide into the atmosphere. Scientists have been studying the waters from California to Alaska, tracking the changes in acidification levels in an effort to understand the changes and consequences of our ocean's new chemistry.

7 p.m. Wednesday, Feb. 25
The BlueShore at Cap



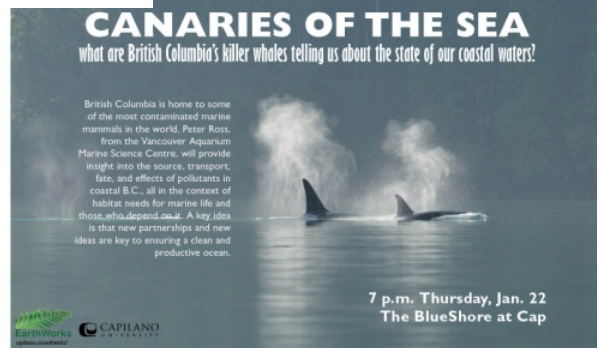
FROM THE DIRECTOR OF MANUFACTURED LANDSCAPES

"An immense experience, with stunning visual language, that will transform the way we think about water, and our relationship to it."

WATERMARK

(NR) (G)

7 p.m.
Wednesday, October 15
BOSA Film Centre



CANARIES OF THE SEA

what are British Columbia's killer whales telling us about the state of our coastal waters?

British Columbia is home to some of the most contaminated marine mammals in the world. Peter Ross, from the Vancouver Aquarium Marine Science Centre, will provide insight into the source, transport, fate, and effects of pollutants in coastal B.C., all in the context of habitat needs for marine life and those who depend on it. A key idea is that new partnerships and new ideas are key to ensuring a clean and productive ocean.

7 p.m. Thursday, Jan. 22
The BlueShore at Cap



Our future. Their pipe dream.

A FILM BY ZACK EMBREE & RAINCOAST CONSERVATION FOUNDATION

DIRECTLY AFFECTED

SCREENING: MARCH 16, 7-9 PM
BOSA Film Centre

Who is directly affected by the Kinder Morgan Trans Mountain Pipeline proposal currently facing British Columbians? And are their voices being heard?

Presented by EarthWorks EN PE RAINCOAST



WINNER! TORONTO
WINNER! TELLURIDE
WINNER! SUNDANCE

★★★★★

"A film that will inspire people everywhere... A MUST-SEE"

THE ISLAND PRESIDENT

www.theislandpresident.co.uk



Fostering dialogue with open engagement with students and faculty from a wide range of disciplines



Direct Action...Invasive species removal

Help stop the wave of invasives

(and love your campus)

PULL IVY.

Feb 14 2013-9:30am-Birch Room 166

Special guest speaker Richard Beard will share with us his knowledge on the invasive plant issue and restoring a natural environment in order to attract more native wildlife.

10:am - 12:30 - Ivy Pull

Coffee and refreshments in the morning
and hot soup at noon.



Direct Action...Environmental Stewardship



...restoration of campus wetland & construction of ecosystem teaching gardens

MOBILIZING LOCAL VOICES



An opportunity for eager Capilano University students, wanting to engage in environmental stewardship activities for their service learning courses, to connect with local environmental stewardship groups.

9:30 a.m. – 2:00 p.m., Saturday, November 15
Library Rooms 321 & 322, Capilano University

to register: eventbrite.ca/e/mobilizing-local-voices-tickets-13527696705

a free event presented by EarthWorks
capilano.ca/earthworks/



Direct Action...

**Community
Connections &
Service Learning**



*Community
Connections offer
Career
Opportunities*

Direct Action...Campus Waste Audits



TAKING OUT THE TRASH

CapU's campus waste audit
Tuesday, October 16, Sportsplex



PLUS: community electronics recycling dropoff



TAKING OUT THE TRASH

CapU's campus waste audit
Tuesday, February 3, behind Sportsplex



Waste Audits...a major focal point

- The Waste Audit takes place on the Tuesday of Waste Reduction Week each year
- The audit highlights how Capilano has steadily been decreasing the amount of waste sent to the landfill
- Since the first waste audit in 2011, CapU has reduced the amount of organic waste being thrown into the garbage by 45 %

Another outcome...Zero Waste Stations



Organics



Containers



Refundables



Mixed Paper

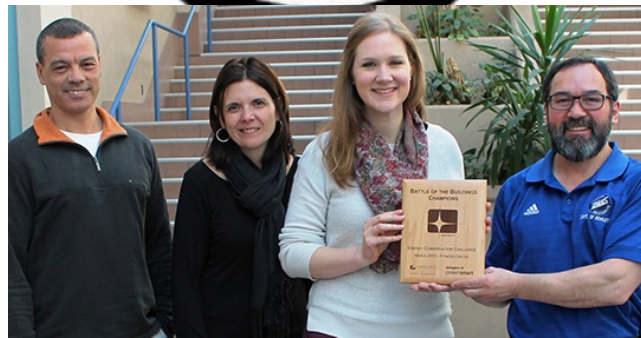


Landfill



Student class projects!

- The creation of these zero waste centres was an indirect result of our 2013 Waste Audit, a campus-wide assessment of one day's trash that underscored the need for more recycling of organics as well as other materials, and a result of suggestions from our BADM 218 and REC 245 class projects on Zero Waste.



Energy conservation

**Curriculum
connections**

Carbon Neutral Action Reporting
We've done it again! For the seventh year in a row, Capilano
University's operations were carbon neutral in 2016.

Energy use & curriculum connections...

- Business Administration degree students initiated a “Building Challenge” competition
- 11 student teams conduct background research and interview key contacts to select the most appropriate energy conservation behaviour for “their” building
- The Facilities Department tracks energy use and savings through an online metering system, as well as through participation and behavior-change activities
- The building and its team which uses the least energy wins

CapU Works Student Organizers

EarthWorks ...PowerWorks...PatchWorks ...FoodWorks

Student organizers seek to engage other students with the campus and external community. They are encouraged to network broadly and build links with environmental organizations, arts organizations, performance artists, policy makers, and businesses which are a part of the growing green economy.



Curriculum specifics...

- Range of environmental courses offered
 - Environmental Biology
 - Climate Change: from Science to Sustainability
 - Anthropology and the Environment
 - Conservation Psychology
 - Adventure and Ecotourism
 - Global Ecopolitics
 - Environmental Ethics
- Many with field components and/or project components

Future perspectives ...

continuing to green up the curriculum

- Business Students → a green business concentration (at core: Ecological Economics)
- Associates of Science → in green science (at core: Environmental Biology)
- Engineering → environmental engineering

CapU at Work



EarthWorks

Past/Present/Future of environment and
sustainability programming:

A case study of Fleming College



Sustainability Across the Curriculum – Then and Now

Fleming College

LEARN | BELONG | BECOME

Building on our Strengths



Peterborough Campus
- Sutherland



Cobourg Campus



Lindsay Campus - Frost
- School of Environmental and Natural Resources Sciences (SENRS)

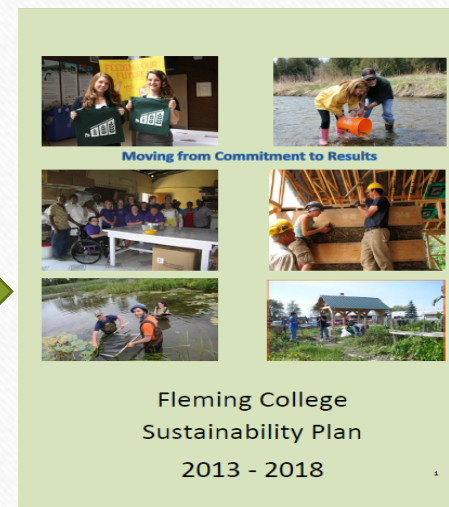
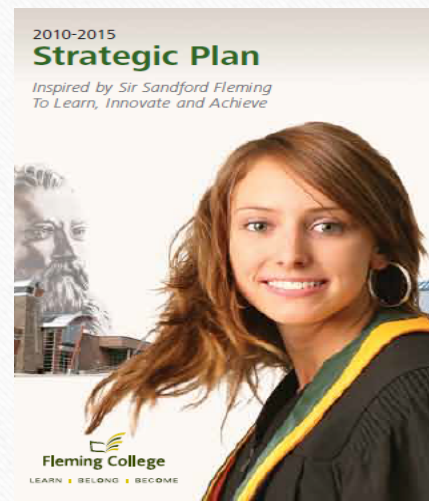
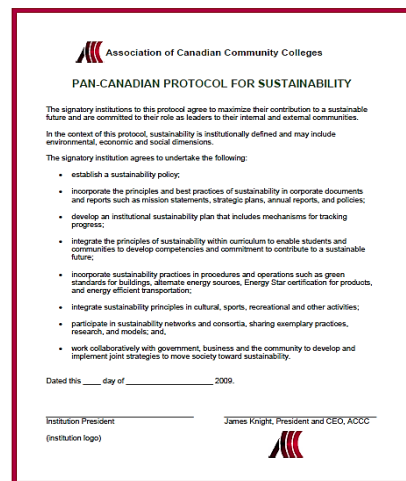


Haliburton Campus

Then and Now...



A Little About Our Journey Since 2009



“Infuse sustainability across the curriculum so that graduates understand and address sustainability issues.”
(Fleming College Strategic Plan)

Fleming College

LEARN | BELONG | BECOME

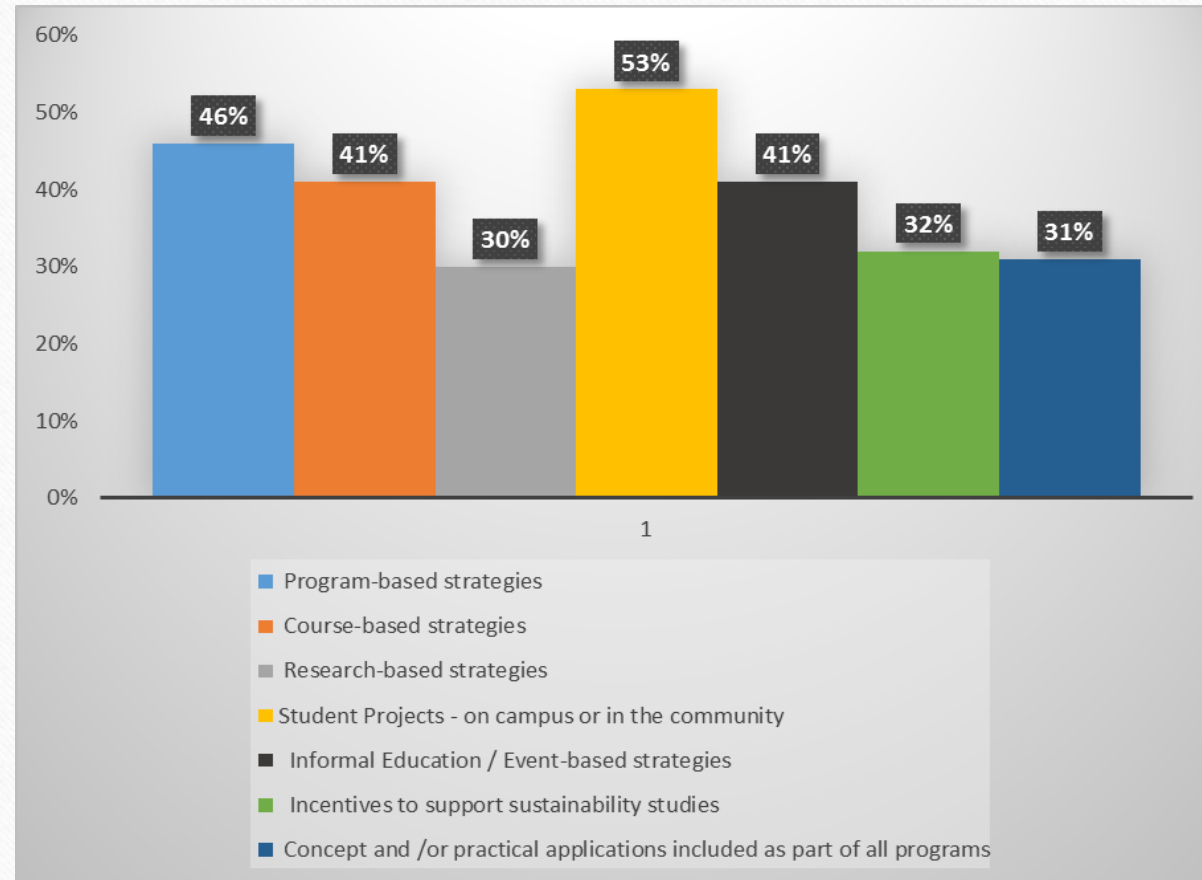
Collecting Benchmarks: What do Students think?

Student Survey

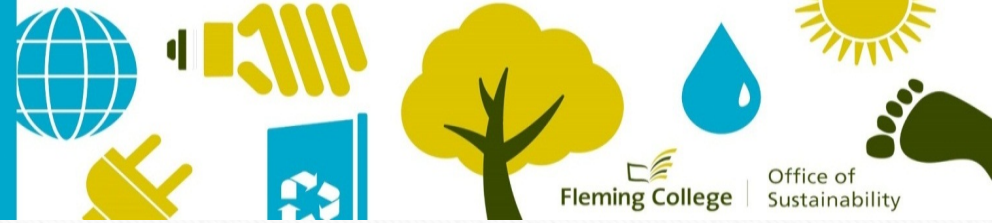
N=636

*67% said it's
“important
or extremely
Important”-*

(REB Approval #20141020)



How Did We Do It?



- ✓ **Academic Task Force-** Champions / Best Practices- Workshops, Professional Development, Videos
- ✓ **Sustainability in Curriculum** – Credit bearing and Co-Curricular Record

- ✓ **Built Relevant Resources:**

On-Line Library for all programs

“Step-by-Step” Guide for faculty

<http://flemingcollege.ca/sustainability>

- ✓ **Indigenous Partnerships**



(UNESCO, 1997)

Infusion? Implementing a Learning Outcome



Explain the interconnections between the broad principles of sustainability-which include human health and well-being, ecological health, social issues, and secure livelihoods-in order to support a better world for all generations.

Fleming College

LEARN | BELONG | BECOME

More Benchmarks: Faculty Survey (2013 & 2016)



Valuable Quantitative Data (2016)

- 243 responses- 221 unique courses
- 73% said courses contained elements of sustainability.
- When added to 2015 review of *all* courses
 - **422 courses contain elements of sustainability**
 - = **25% of all courses in 2015/16**—on track to 5 Year Plan Target

Rich Qualitative Data

- 65% said they use personal examples (walking the talk)
- 43% use projects, 31% use case studies & 31% use readings (REB Approval #20151215)

Examples from Across the Curriculum

Program Areas	Sustainability Aspect
School of Justice and Community Development	Early Childhood Education –emphasis on nature education, reducing plastic toys, Children’s Health and the Environment a required course
School of Trades and Technology	All students take <i>Environmental issues for Industry</i> course, sustainability embedded in Carpentry Programs practices and engineering (technical projects_
Haliburton School of Art + Design	Sustainable Building & Design program – sustainable building of community projects- from design to construction & Integrated Design Program
Tourism Programs	Students learn the impacts of commercial tourism; participate in community service in an international context
School of Business	Corporate Social Responsibility Courses, Sustainability Applied Projects; Culinary programs focus on sustainable food & food security - connecting with Aquaculture/Sustainable Agriculture programs
General Arts & Sciences – Communications	Sustainability issues used for skills development; Management Essentials
Indigenous Perspectives	Traditional sustainable concepts being introduced across schools. Natural complement to sustainability outcome.

The Future is Now at Fleming (the “Living Lab”)

- 200 International Business and Project Management Students work on sustainability projects with the Office of Sustainability (Farmers Market, Local Food Box, Waste Reduction, Water Event, LEED Assessments, Surveys, Awareness Tables)
- Applied Sustainability Projects – Engineering Students & project grants (water reclamation, green roof, solar projects)
- Applied Sustainability continues to be part of most programs at the College and joint programs with Trent (SENRS) (campus wetland)



Future State (“Greening the Mind While Greening the Campus”)



Learning Outcome in 100% of diploma programs by 2018 (assessment tools)

“Sustainability Innovators” Community of Practice

“Sustainability Designation” upon Graduation - Fall, 2016

Continue to showcase campus & community Applied Learning projects

Formalize the Office of Sustainability as a partner in supporting learning through the Living Lab

What Is Important for this Future State?



1. Continued High Level Commitments- Strategic, Academic and Business Plans **are important to connect curriculum to campus**
2. Recognizing that sustainability across the curriculum (easily) **builds on existing strengths** – “curriculum currency”
3. **Faculty talking to Faculty** (interdisciplinarity - connecting the dots)
4. Relevant resources that **enhance what faculty are already doing**
5. Relatable - Apply sustainability to specific **programs of study, current issues, life inside & outside of campus (+community!)**
6. **Tell your story** – we learn so much from each other

The Fleming Community telling their story...

<https://youtu.be/ci1pP8Am8D0>

Sustainability Lives Here- Fleming College Video



Incorporating Sustainability Across the Curriculum

Interview

Fleming College is a community college with four locations in Ontario, Canada. The college has infused a definitive concept of sustainability across departments and into curricula in addition to including sustainability goals in its strategic plan. Fleming College's Trish O'Connor and Jane Gray speak to Sustainability: The Journal of Record editor Jamie Deveraux about their progress and the processes that have allowed them to further the mission of sustainability education.

Sustainability: The Journal of Record (SJoR): How is Fleming College's commitment to sustainability incorporated into the institution's strategic plan?

Trish O'Connor: In 2010, we made sustainability a key strategy within our strategic plan. The plan committed to "infuse sustainability across the curriculum and across the student experience so that graduates understand and address sustainability issues" by 2015. From there, we developed a Five Year Sustainability Plan (2013-2018) which is implemented through annual action plans. Today, we have sustainability embedded in our most recent Strategic Plan, Business Plan, and Academic Plan (2015-2020). These high-level commitments have given us the mandate to act.

SJoR: Many institutions are interested in incorporating sustainability as a core component to their goals and missions. Could you discuss that process for Fleming College and how you decided on the actual language to use in the plan?

TO: We were looking for a description

of sustainability that went beyond simply the three pillars—environment, economy, society. Faculty need more description than that. We incorporated the AASHE description, as embedded within that description are principles and values of sustainability. AASHE defines sustainability in a pluralistic and inclusive way: "encompassing human and ecological health, social justice, secure livelihoods, and a better world for all generations." Those are specific values that our faculty can relate to as they are teaching their students. So we adopted it as our definition of sustainability and the learning outcome at the college, and when we talk about it in our presentations, that is the definition that we use.

Jane Gray: For our learning outcome language—defining sustainability goals into curriculum goals across departments—we found the three pillars definition of sustainability is just too abstract for people. We got a lot of input from faculty, leadership, and curriculum experts. They said, "be descriptive about what sustainability means" and everyone agreed the AASHE definition worked well.

We also wanted to make it achievable, so we are starting by making sure students can explain sustainability. The key for us is for students to be able to make interconnections. Too often, the focus can be on one single element of sustainability such as just the environmental aspect or just the economic aspect. So we also utilize the UNESCO graphic, (see Figure 1) within our sustainability references and we em-

Participants

Trish O'Connor
Special Project Leader
Lead, Office of Sustainability
Fleming College

Jane Gray
Coordinator, Faculty Liaison
Office of Sustainability
Fleming College

AASHE defines sustainability in a pluralistic and inclusive way: "encompassing human and ecological health, social justice, secure livelihoods, and a better world for all generations."

Fleming College

LEARN | BELONG | BECOME

The PAST is where you
learned the lesson
The FUTURE is where you
apply the lesson,

Contemplating the Future

- What will environment and sustainability programs look like 20 years from now?
- What tools do we need to give our students now in environmental and sustainability programs in order to prepare them for the future?
- What are the barriers/challenges environment and sustainability programs in Canadian post secondary institutions face?
- What are the opportunities for environment and sustainability programs?