Arts ISIT Welcome Back Conference Aug 15-16 2023

Flexible and interactive modules to create hybrid learning environments in the geosciences

Nina Hewitt, Department of Geography

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Why do it?

- Build on techniques gleaned during rapid online transition; educational technologies available
- **Students**: changing expectations (CHLOE-8-report-2023); satisfaction and engagement; flexibility; accessibility and inclusion
- **Instructors**: efficiency (delivery of background material via editable, asynchronous approaches); Quality and intention in face-to-face moments → meaningful engagement with students

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How I do this

General framework: topically-linked weekly modules; instructional time (3 hr/week*) divided into:

1) **Asynchronous** - background concepts; precedes …
2) **Face to face** - group activities, lessons to expand upon context, case studies, discussion; some guest lectures

*50/50 or 33/66

Nuts and Bolts…

3

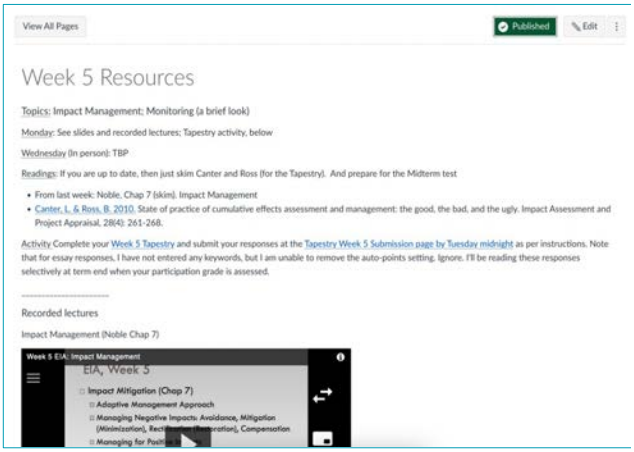
Example 1
GEOG/ENST 319: Impact Assessment

Syllabus excerpt:

A photo showing a portion of the 80 km stretch of the Peace River Valley that is planned for flooding with the construction of the Site C Dam, a project approved in a joint Federal-Provincial Panel Review under the former Impact Assessment Act, CEAA 2012. By Jeffrey Wynne - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=60769404

Course Description
This course provides an introduction to the field of Environmental Impact Assessment or EIA (also referred to as EA, Environmental Assessment or IA, Impact Assessment). EIA concerns one area of the broader topic Environmental Management and Conservation. We will examine the historical and ideological underpinnings of the field, in addition to the applied aspects of EIA activities using a case study approach. EIA is perhaps

Weekly plan (roadmap) in Canvas:



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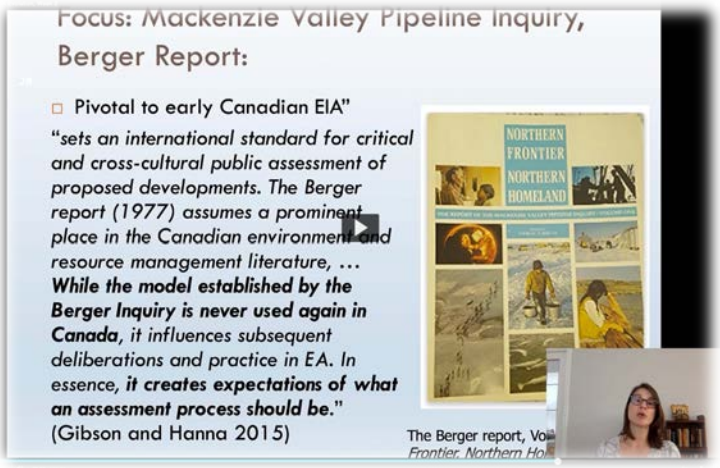
Asynchronous:

Video lesson + Interactive H5P Webpage

via Tapestry-tool ; CTLT H5P



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Example H5P Page

Week 2: IA Introduction and Origins

https://ubc.tapestry-tool.com/geog319-001/wp-admin/admin-ajax.php?action=h5p_embed&id=22

Impact Assessment: Introduction to Basic Elements and Origins

This will be the site of the Transmountain Pipeline X terminal in Burnaby, on the Burrard Inlet. The TMX is a project proposed to increase the amount of oil (in the form of diluted bitumen) that could be transported out of Edmonton, AB via a pipeline to Burnaby, BC. The oil would then head offshore to supply internationial markets via tankers travelling in and out of English Bay. Critics and opponents of this project cite many issues including: increased tanker traffic through the Salish Sea, which is home to the Southern Resident Orca pod, an endangered population; and risks to the traditional lands and waters of the Tsleil-Waututh Nation, who have restored shorelines in the inlet for wild species that they have traditionally stewarded and depended upon (e.g., shellfish).

Photo: Wikimedia, CC BY-SA (https://creativecommons.org/licenses/by-sa/4.0) at: https://commons.wikimedia.org/wiki/File:Terminal_Transmountain_Pipeline_2.jpg. Accessed July 30, 2020

Learning Objectives

At the end of this lecture you should be able to:

- Identify the steps of an EIA and be able to describe each one
- Apply basic knowledge of EIA to a project (Example - Transmountain pipeline)

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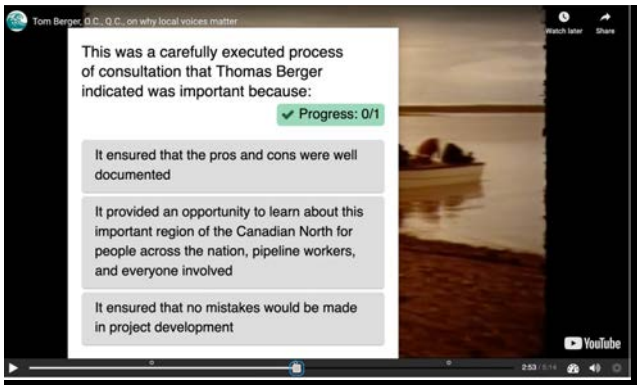

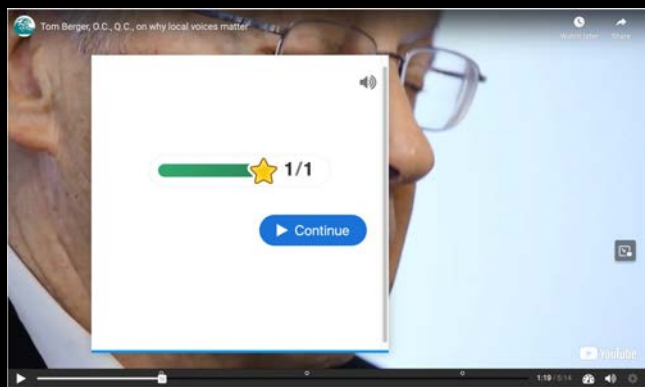

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Instructions: Read the description below; then pull the slider, located on the bar below the image, to the right to view the next image and repeat!

The Mackenzie Valley Pipeline Inquiry:

In 1974, Justice Thomas Berger was asked by Canadian Minister of Indian Affairs and Northern Development Jean Chretien, to evaluate the social, environmental and economic impacts of the proposed Mackenzie Valley Pipeline project that would transport natural gas from the Mackenzie River to Northern Alberta.

According to a UBC First Nations and Indigenous Studies Chretien "*faced a dilemma. Oil and gas exploration in the Canadian north had boomed after the discovery of a large pool of oil at Prudhoe Bay in Alaska. The petroleum industry had served notice that if commercial quantities of oil and gas were discovered, the industry would apply to build a pipeline down the Mackenzie Valley and ship the hydrocarbons to markets in the United States.*" Chretien likely did not expect that Berger's work would produce the results it did (a decades long halt on petroleum development in the region).

For the first time in Canadian history, the voices of Indigenous nations such as the Dene, were prioritized in development planning. Berger often spent several days talking with them and participating in community gatherings. Berger further carefully evaluated environmental concerns associated with gas exploration and piplelines in the sensitive northern environment. These issues were embedded into the decision making process he designed and followed.

Photo at: https://en.wikipedia.org/wiki/Mackenzie_River#/media/File:02_-_Fort_Good_Hope_looking_across_the_Mackenzie_River.jpg

The Mackenzie Valley Pipeline was a proposed pipeline to transport natural gas from the Beaufort Sea in the Northwest Territories, to Northern Alberta where it would be processed.

Importance of the project: It was one of the first proposed projects that would develop oil resources in the Canadian north, and was designed to supply southern Canadian and foreign markets.

Photo at: https://en.wikipedia.org/wiki/Mackenzie_River#/media/File:Mackenzie_River_basin_map.png

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Article: How a Canadian judge helped preserve the Arctic

In the article, "How a Canadian judge helped preserve the Arctic", Justice Thomas Berger emphasized public participation in the form of Indigenous Consultation. As a result, he discovered many issues that would affect the area that the Mackenzie Valley Pipeline would run though.
What was the take home message of this article? What are your thoughts on Berger's efforts to include diverse groups of people in consultation, and especially Indigenous peoples?

Check

Tom Berger, O.C., Q.C., on why local voices matter

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Impact Assessment Process: Screening and Scoping Stages

This week we will be covering the **Screening** and **Scoping** steps in the EA process.

Screening is the step in the EIA process in which it is decided whether a particulur development project needs to be subject to an IA. The Scoping stage considers what information needs to be included in the project's EIA, if it is triggered (scoped in). You will read more about these in the Noble (2020) chapters scheduled for this week and hear a short recorded lesson, available in Canvas, prior to our class meeting. On Wednesday, we will be fortunate to hear from a legal perspective on "triggers" (screening) and scoping in the EIA process, past and present with our Guest Speaker, Dr. Stepan Wood from UBC's Allard Law School.

This photo shows a water pipeline flowing through a valley. Oil pipelines look very similar, and may be above or below ground, depending on the terrain.

Photo at: https://www.pikist.com/free-photo-vpaep

Learning Objectives: By the end of this lesson you should be able to:

- Examine the new (IA Act 2019) "Pre-planning" phase, and explain whether and what it adds to the EIA process
- Understand the major elements of the "Scoping" (Trigger) and "Screening" phases in EIA/IA
- Define and provide examples of VCs (also called VECs) in the impact assessment scoping process
- Explain Justice Thomas Berger's role in Canadian EIA and the history of the Mackenzie Valley Pipeline

See the recorded video lesson in Canvas, Week 3 which describes that elements of the Pre-planning phase in Impact Assessment Act 2019 and refer to the accompanying textbook reading, Noble (2020) Chapter 3.

What are Valued Components, VCs (or Valued Environmental Components/VECs)? (Select all that apply)

- ☐ Part of the Screening process
- ☐ All the components of the environment
- ☐ Physical and Human elements of environments that may be affected by a project and are in need of attention in IA
- ☐ Part of the Scoping process

Check

Article: How a Canadian judge helped preserve the Arctic

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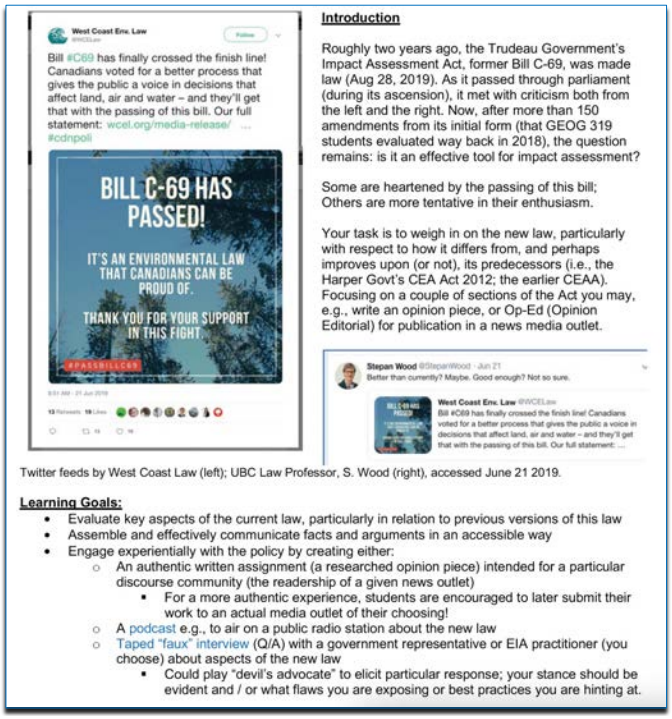
Asynchronous material

↓

Assessments, Term tests:

Assignment 1, GEOG 319, W 2021
Evaluating the New Law, *Impact Assessment Act* (IAA) 2019 (former Bill C-69)



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Face to Face

- Interactivity, discussion, active learning
- Social connections – peer-to-peer, group work

Discussion Guide* (Ministers will guide the discussion as follows:
The Minister(s) will act as Discussion Guide(s) on this activity. Their main task is to facilitate the discussion (45 minutes) that occurs after the opening statements. There are a series of tasks that you must complete as a group in an open discussion format. The structure of the discussion will follow these steps:
1. Define the objectives and performance measures
2. Estimate consequences of options using consequence table
3. Discuss and evaluate trade-offs

See Details of Each (next 3 slides). Remember that the Minister must ensure each occurs and guide discussion.

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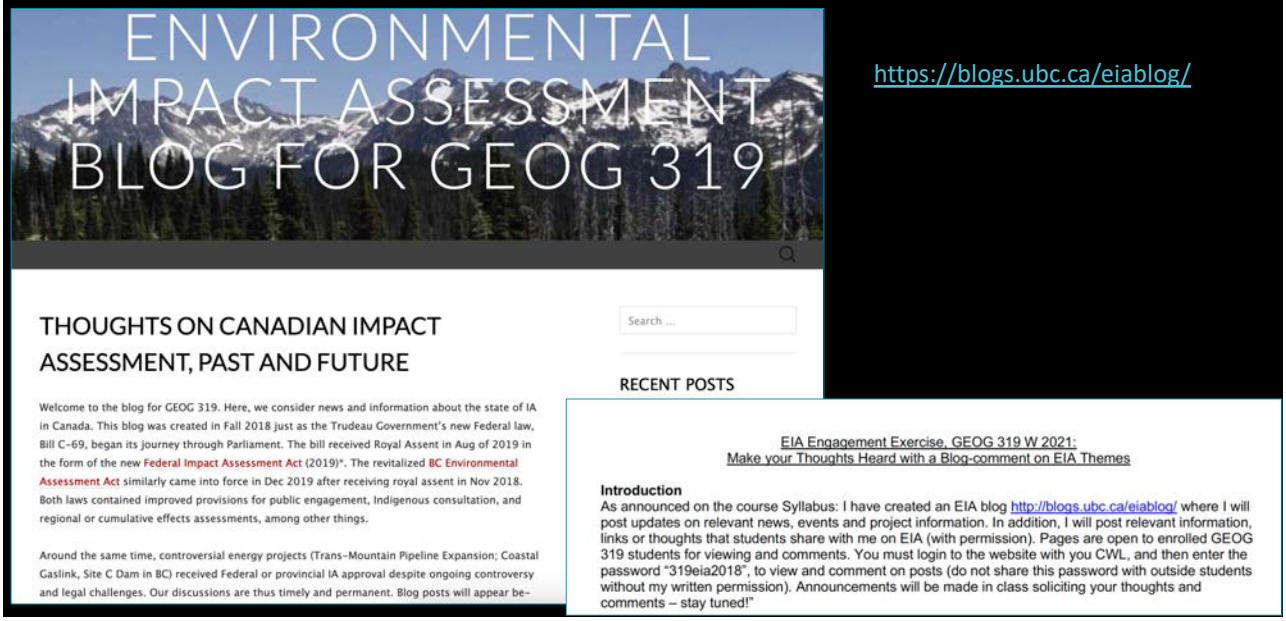
Alternative modes for asynchronous engagement:



https://blogs.ubc.ca/eiablog/

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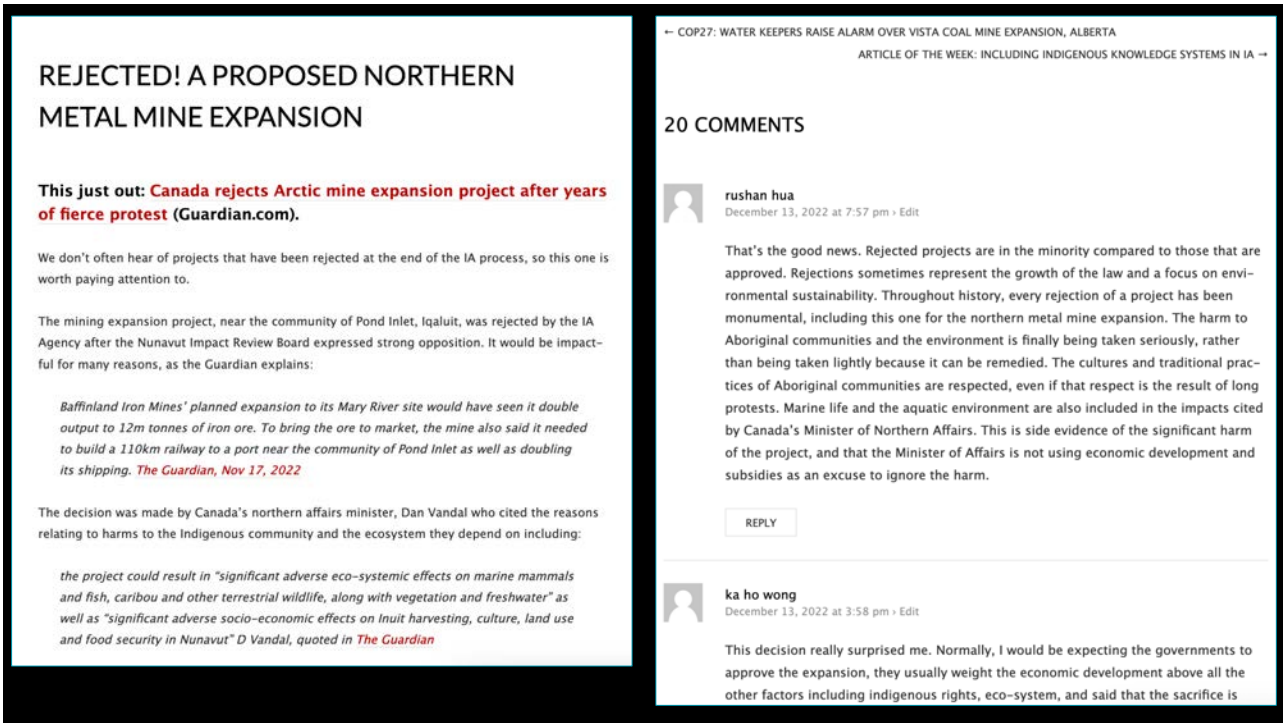

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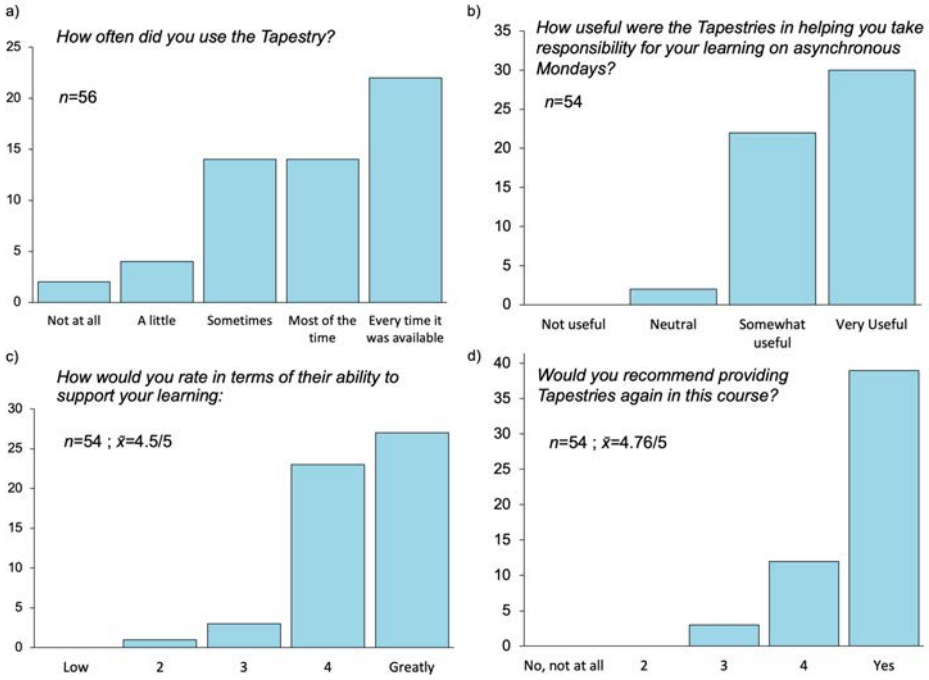
Response metrics



GEOS 102 2022

- 334 students
- Optional
- Bi-weekly

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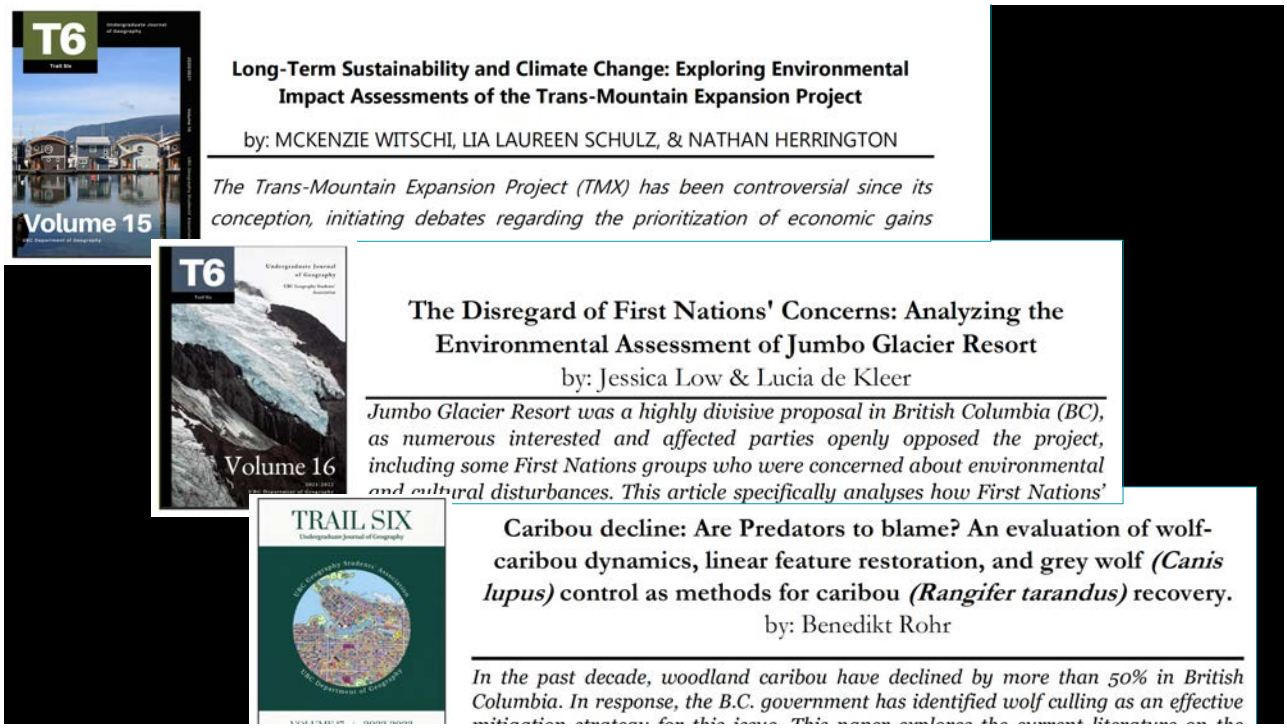

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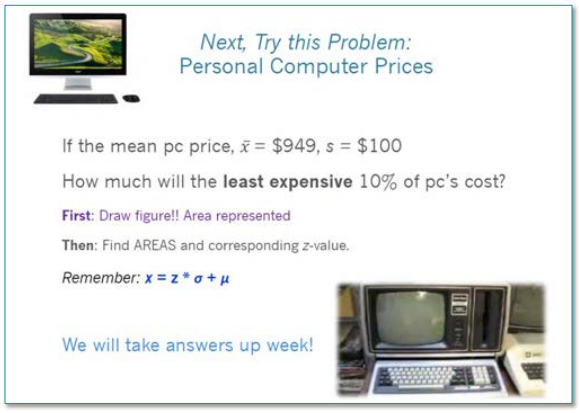
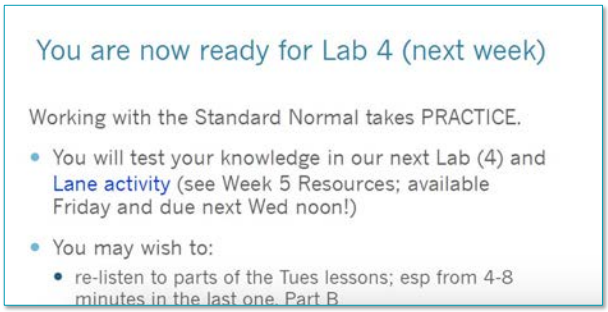
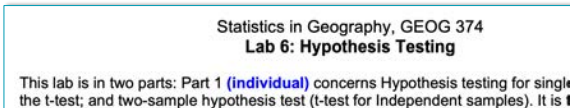
Example 2

GEOG 374: Statistics in Geography

- Similar setup; 1 term synch is in person class; 1 term synch is on zoom
- *in lieu* of H5P pages:
  - 8 bi-weekly lab assignments → closely linked to asynch., videos







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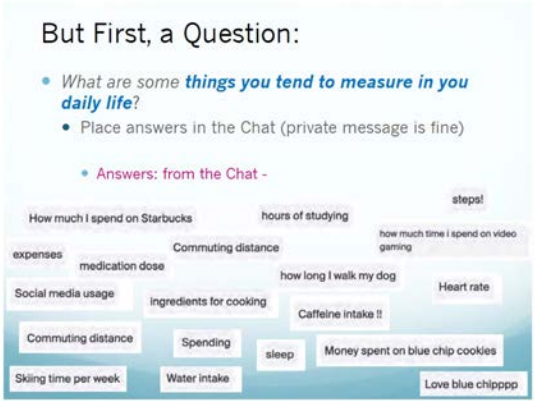
GEOG 374: Statistics in Geography

- Face to Face class time: student response systems; problem solving; group coding …

Class slides:



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GEOG 374: Nesting tree characteristics of the Northern Spotted Owl

- **Authors**: Kevin Peirce, Nina Hewitt and Micheal Jerowsky
- **Last Update**: 10 October 2022

Outline

Prerequisites

- Introduction to Jupyter
- Introduction to R

Outcomes

After completing this notebook, you will be able to:

- Explore data to gain a better understanding of its content and structure.
- Determine unique values of data, common values, and calculate the coefficient of variation.
- Visualize data using a boxplot.
- Conduct an analysis of variance (ANOVA) and post-hoc Tukey test.

References

- ANOVA (https://openstax.org/books/introductory-statistics/pages/13-introduction)
- Log Transformation (https://onlinestatbook.com/2/transformations/log.html)

Introduction

In this lab, you will apply descriptive statistics, analysis of variance (ANOVA), and the Tukey post-hoc test to determine the types of trees Northern Spotted Owls prefer for nesting.

. . .

In Class Jupyter/R coding

The number of owls in Washington, Oregon, and California is much higher than in BC. Here, the owls are considered threatened (as the population is low and decreasing), but not endangered. To identify potential Northern Spotted Owl habitat for protection from harvesting or Barred owl colonization, it is necessary to characterize the features of ideal nesting trees for Northern Spotted Owls.

Data

We will use a dataset that includes characteristics of nearly 2000 Spotted Owl nesting trees in Oregon, Washington, and California.

To begin, let's import our data and save it as a variable called `df`.

In [13]:

```
source("lab_02_tests.r")
library(testthat)
library(digest)

df = read.csv('nestingTrees.csv')
```

This data contains values for:

- **Site**: The location where the nest was observed. "Olympic" -- Olympic Peninsula, "Interior" -- within the rain shadow of the Cascade mountain range, "CoastN" -- Nothern coast of Wa. and

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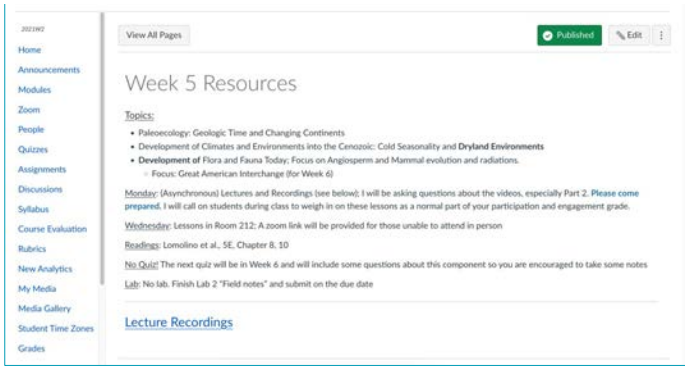
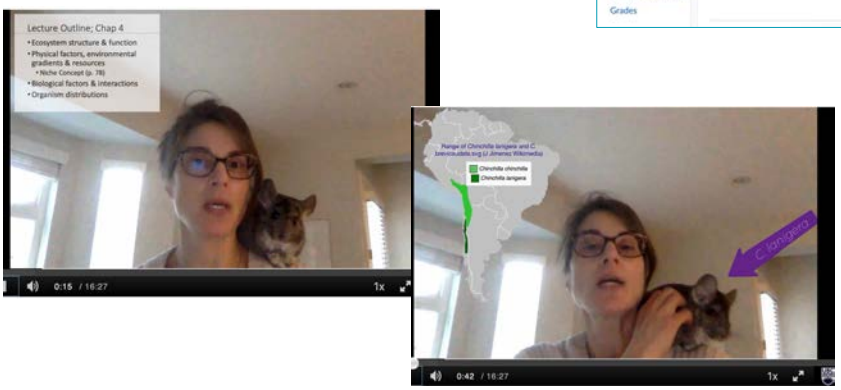
Example 3
GEOS 307: Biogeography and Global Change

- Similar format, layout

Videos + readings and interactive media





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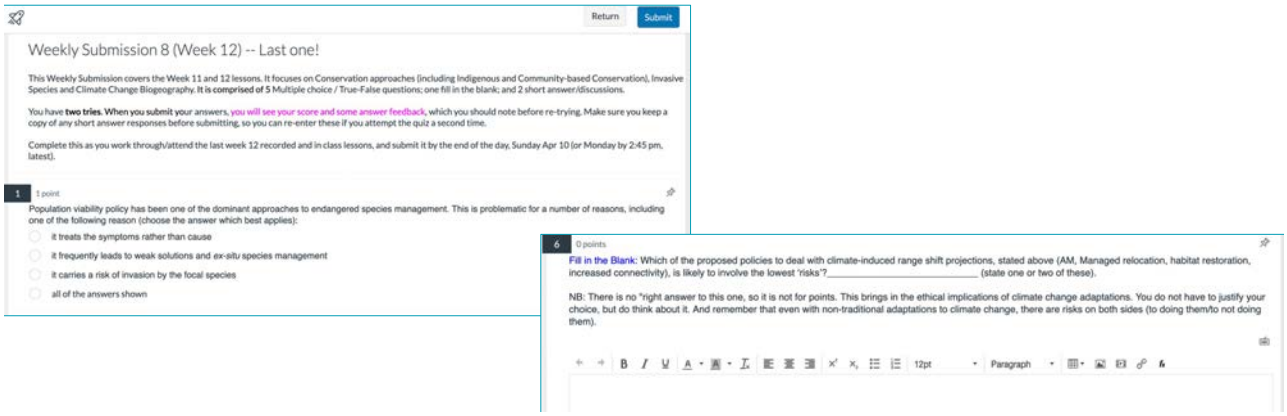
Plus:

- Weekly Canvas quizzes (support asynch material)
- Bi-Weekly Lab reports:
  - Data (warming experiment in arctic tundra); Virtual field trip lab; Species distribution Report
  - Nature Diary – agency; creativity, engagement



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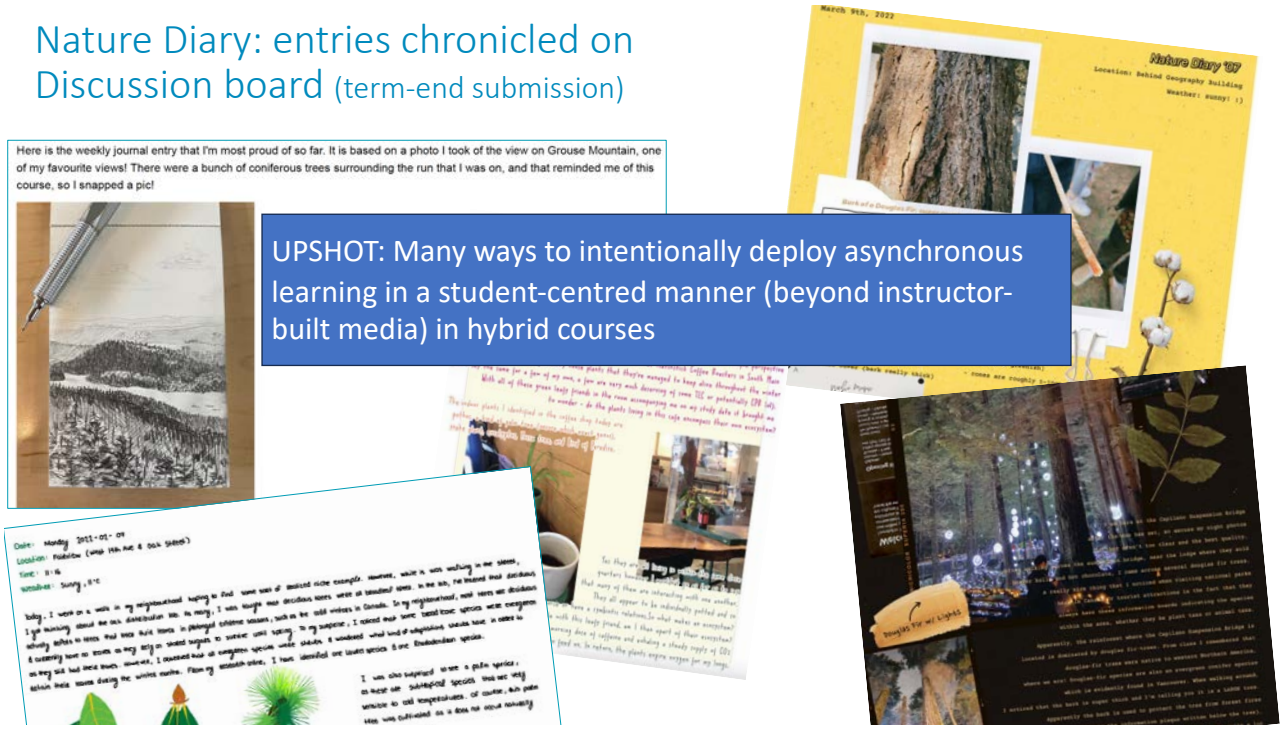
Nature Diary: entries chronicled on Discussion board (term-end submission)



UPSHOT: Many ways to intentionally deploy asynchronous learning in a student-centred manner (beyond instructor-built media) in hybrid courses

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Select Comments from SEI 2021 and 2022

"Lots of different opportunities to communicate and learn, using different methods of delivery, interesting content"

"I especially enjoyed the virtual alpine tour … refreshing way to learn course material and a new experience of that format for me." (SEI comment, GEOS 307 2021)

"…. she supported our learning really well with the nature diary submissions and weekly quizzes…."

"I also liked Tapestry [H5P], interesting videos that were offered as optional material!"

"I love the Nature diary project because it gave me an amazing opportunity to learn the names and characteristics of flora in BC and actually motivated me to go on hikes every week. I struggled with learning the name of species in English because it is very different from my native language. I tried many ways to systematically learn about species last year, but this one was the best way to remember and enjoy! Thank you for making this opportunity to learn in such a useful and not stressful way!"

"…I am personally thankful for a hybrid format because it was one of the most effective hybrid formats in my experience. First of all, the professor was engaging both online Zoom participants and in–person participants, there was an effective format overall …"

"The overall approach to this course in terms of graded material (particularly nature diary, …is very engaging, and does encourage learning without the stress and information–dump of exams and tests"

(SEI comments, GEOS 307 2022)

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Personalize, humanize; Orient learners early on

Thanks Angela Lam, Arts ISIT

weekly email "what's up"; Introduction and course forums; FAQs, etc.

Introduction Forum, GEOG 319 invites students to share

Published | Edit

Introduction Forum

All Sections

Hi GEOG 319 Students,

Welcome to our 2023 blended classroom.

We will be your instructor (Prof Hewitt) and TA (Max Cohen) for this examination of the workings of envi
Canada and beyond. We will spend the next few weeks together learn about the basic format of Impact A
(Provincial IA), and some of the related issues associated with our federal and provincial environmental p

To get started, we encourage you to use this forum to introduce yourself and get to know other students

Reply to this post and tell us a little bit about yourself: e.g., personal pronounce; maybe a fun fact about
to visit, etc. ; why you are keen to take this course; and, for the brave, you can post a picture of yourself

- Tell us about some movies you recommend. Why did you like them?
- Read any good books lately?
- What's the best game you've played lately? Board games, online; Or a sport or outdoor activity you a
- Pets are always a popular topic, and photos of critters are welcome!

>> Learn how you can update your profile page in Canvas

Let us introduce ourselves first.

TA, Max Cohen: I am working toward a PhD in Dr. Jamie Peck's lab. My PhD research focuses on "just tra
This is my first time TAing GEOG 319, but in addition to TAing other E&S courses, I taught GEOG 410, E
fact: I was a UBC Delegate at COP 26 (Nov 2021), and Dr. Hewitt and the Climate Action Committee cor
site, here: https://geog.ubc.ca/news/on-the-ground-at-cop26-a-qa-with-ubc-delegate-max-cohen/

Prof Nina Hewitt (she, her, hers). I am a biogeographer with research in plant dispersal, migration and dis
ecosystems. I love getting out into the field and have field sites in Ontario, British Columbia and the Kara

EIA: I began teaching this course at UBC in 2017. Since then, our federal and provincial impact assessment acts have undergone major overhauls, and not for the first time! I have found that following EIA policy developments to be interesting as well as, often, disillusioning!

My interest in environmental policy and science began in my childhood and teens, when my fascination with critters (species), natural history and science met with a growing awareness of the challenges facing biodiversity and ecosystems, especially (at that time in my mind) in terms of pollution and habitat destruction. I felt keenly the problem of the Global North's (and now worldwide) dependence on the personal automobile, which I watched transform and consume the landscapes in which animals (including ourselves) live. At age 4, my family had to relocate out of Toronto due to respiratory illness triggered by busy roadways -- so air quality implications of our collective desire to drive has been a personal concern; During a trip to Tasmania, I saw first-hand the impact of road collisions on brilliant creatures (wombats, potaroos, tasmanian devils) that peppered roadways there. It has therefore been eye-opening to explore the role of law and policy in shaping our environment for better or worse. And to consider how ordinary people can influence these decisions. Armed with knowledge about EIA, I hope that you all will become "forces to reckon with" in the decision-making arena!

Books: I recently read Suzanne Simard's Finding for the Mother Tree: Discovering the Wisdom of the Forest, a fascinating biography and tale of science sleuthing to discover the underground world that connects and communicates with above ground forest vegetation in the Pacific NorthWest.

I also recently read **Robert Bilott's "Exposure"**, an eye-opening true story about corporate greed (specifically, Dupont Corp) and environmental contamination from a legal perspective -- and the basis for the movie "Dark Waters"; similar story to "Erin Brokovitch" and "A Civil Action"). See: https://www.nytimes.com/2019/10/14/books/review/exposure-dupont-robert-bilott.html. Very relevant to our dealings in 319 [Related news, PFAS cleanup in The Guardian, Aug 2022.]

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Parting thoughts and *To-do*

- Satisfaction and affective benefits unchallenged; Cognitive benefits?
- Increase inclusivity: Universal Design Principles, UBC Equity and Inclusion tips
- AI/LLM design considerations? Ensure that written assessments encourage student composition, synthesis, creativity and scaffolded learning (student concern about this in media)
  - positives: face-to-face component is focussed on active learning

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Questions?

Email: nina.hewitt@ubc.ca

Thanks to

- UBC Centre for Teaching and Learning, TLEF, OER funds; Arts ISIT; Worklearn; Emerging Media Lab - Brian Wilson; UBC Tapestry-tool - Stephen Barnes; Siobhán Wittig McPhee
- Grad & Undergrad Student assistants, Emily Ballon, Holly Denson-Camp, Olive Wu, Samantha Loo, Angela Liu, Micheal Jerowsky, Kevin Pierce, and more

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