

Project Plan: **Living with Nuclear Weapons?**

Large TLEF Project – Final Report

Report Completion Date: (YYYY/MM/DD)

1. PROJECT OVERVIEW

1.1. General Information

Project Title:	Living with Nuclear Weapons?		
Principal Investigator:	Allen Sens (Department of Political Science)		
Report Submitted By:	Allen Sens		
Project Initiation Date:	July 2013	Project Completion Date:	December 2016

1.2. Project Summary

Develop a 3rd year, fully “flipped” interdisciplinary course that enrolls EECE and POLI SCI students together to work in collaborative peer learning projects, applying their respective disciplinary methods and knowledge to problem solving assignments related to nuclear weapons and arms control in general and the Comprehensive Test Ban Treaty (CTBT) in particular. Create synergy between active classroom participation, flipped online instructional videos and learning materials, and CTBT Organization learning materials. Engage students in an interdisciplinary capstone project. Develop ‘remediation’ resources. Create and manage an open access public space. Integrate CBTO resources with learning activities. Training on software applications for teaching assistants and faculty.

1.3. Team Members – (Please fill in the following table and include students, undergraduate or graduate, who participated in your project).

Name	Title/Affiliation	Responsibilities/Roles
Allen Sens	Professor of Teaching POLI	Principal Investigator
Matt Yedlin	Associate Professor EECE	Co-investigator
Justin Alger	Graduate Teaching Assistant	Teaching and Learning Support
Kate Stewart	Graduate Teaching Assistant	Teaching and Learning Support

1.4. Student Impact – Please fill in the following table with past, current, and future courses and sections (e.g. HIST 101, 002, 2017/2018, Sep) that have been/will be impacted by your project, including any courses not included in your original proposal (you may adapt this section to the context of your project as necessary).

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Course	Section	Academic Year	Term (Summer/Fall/Winter)
POLI 369T	001	2013-2014	Winter
POLI 369T	001	2014-2015	Winter
POLI 377	001	2015-2016	Winter
POLI 377	001	2016-2017	Winter
POLI 377	001	2017-2018	Winter

2. PRODUCTS & ACHIEVEMENTS

2.1. Products and Achievements – Please **update** project products and achievements as necessary. Indicate the current location of such products and provide an URL if applicable.

Product(s)/Achievement(s):	Location:
Creation of new course on nuclear weapons and arms control, now assigned the cross-listed course code POLI/APSC 377.	
Extensive audio/video instructional video series, over 70 original videos produced including approximately 12 on the UBC Lightboard	https://studio.edge.edx.org/course/course-v1:UBC+POLI377APSC377+2016W1
Creation of 21 in-class active participation collaborative peer learning lesson plans	
Among first to use EDX Edge learning platform	https://studio.edge.edx.org/course/course-v1:UBC+POLI377APSC377+2016W1
The integration of historical/social science learning materials with math/physical and life sciences learning material to create an interdisciplinary/ trans-disciplinary course experience. Vital physical and life sciences and politics/history contextual material embedded in instructional videos	
Integration of Comprehensive Test Ban Treaty Organization (CTBTO) learning materials and activities into the course (student projects are designed to provide recommendations for strengthening the CTBTO). Three students were accepted to attend and present at the CTBTO bi-annual Science and Technology Conference Academic Forum in Vienna in 2015, and five more were selected to be part of the Youth Forum at the Science and Technology Conference in 2017.	

2.2. Item(s) Not Met – Please list intended project products and achievements that were not attained and the reason(s) for this.

Item(s) Not Met:	Reason:
Creation and management of open access	Time availability of instructors was constrained

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public space for dialogue on nuclear weapons and arms control.	and the challenges of managing the privacy firewall between a UBC credit course and a public space was not resolved.
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3. PROJECT EVALUATION

3.1. Project Outcomes – Please list the intended outcomes or benefits of the project for students, TAs and/or instructors.

- Create a new interdisciplinary, flipped course on nuclear weapons and arms control open to students in Arts and Applied Science, enrolling up to 100 students per year (50 from Arts, 50 from Applied Science)
- Move the course from a “pilot” project through the curriculum process to a full UBC course with its own course code and title, cross listed between Arts and Applied Science
- Creation of an extensive series of approximately 70 instructional videos, with supporting self-quiz content to enhance learning consistent with “blended learning” models
- Development of 15 in-class active participation activities aimed at reinforcing learning from video content, requiring students to apply knowledge to specific goals and assessed deliverables (public statements, analysis, reflection, reports) in each class. Activities included:
 - Prisoners Dilemma
 - The Ethics of Hiroshima and Nagasaki (two-class jigsaw)
 - Locating the 2016 North Korean Nuclear Test
 - Global Test Ban Simulation
 - Deterrence Stability Exercise
 - Nevada Test Site Activism
 - Conference on Disarmament Simulation
 - Iran’s Nuclear Program Inspection
- Among first at UBC to pilot and fully implement the use of the EdX Edge learning management system to enhance student learning
- Integration of CBTO resources into class content, class learning activities, and course assignments to reinforce connection to the test-ban regime and arms control efforts
- Learning resources embedded in instructional videos to accommodate difference knowledge levels of Arts and Applied Science students, integrating science and math material into learning sequences instead of separate sections
- Use of formative and summative SEoT to improve the course, especially with respect to video design, math content, and group learning activities
- Professional development of Graduate Teaching Assistants in the course, especially on the creation and assessment of classroom active participation activities
- UBC student presentation at the CTBTO Science and Technology Conference Academic Forum in 2015. Three students from the class attended and presented on a classroom project initiative, and five more students attended and presented their ideas for a social media campaign in support of the Treaty at the Science and Technology Conference in 2017.

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3.2. Findings – Please describe the findings of your project evaluation effort: to what extent were intended project outcomes achieved or not achieved? You are encouraged to include both graphical representations of data as well as scenarios or quotes to represent key themes.

You Tube Data

General Video Analytics

- Video data - shows large number of videos created that received a high level of use

Total Videos	70
Total Views	30495
Total Watch Time (minutes)	164697

Video Viewership by Country

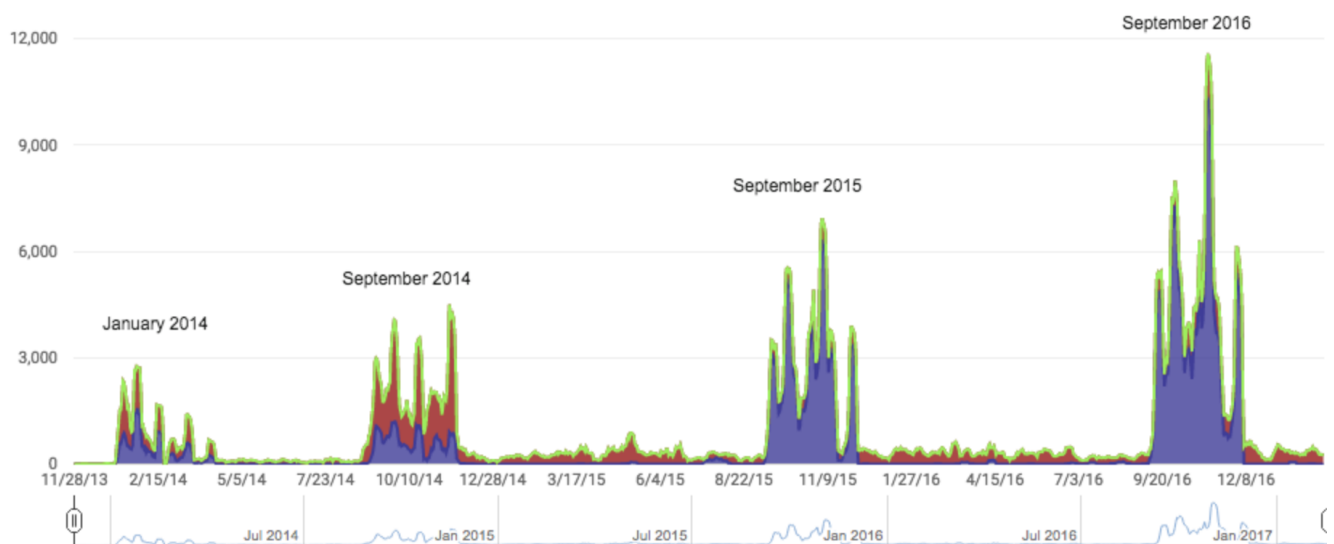
- Most of the video use was by students in the class (in Canada), but videos are being used as a resource by others outside of the course as well.

Geography	Watch time (minutes)	Views
Canada	125,746 (76%)	21,201 (70%)
United States	9,185 (5.6%)	2,294 (7.5%)
United Kingdom	4,508 (2.7%)	991 (3.2%)
India	3,384 (2.1%)	930 (3.0%)
Pakistan	2,627 (1.6%)	591 (1.9%)
Australia	2,306 (1.4%)	482 (1.6%)
South Korea	796 (0.5%)	145 (0.5%)

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YouTube Video Watch Time Over Time

This graph shows the total watch time of course YouTube videos by date. The peaks indicate each of the terms where the course was taught. Red indicates watch time on the YouTube site and purple indicates watch time for videos embedded within the course site.



EdX Data

Student course activity over time

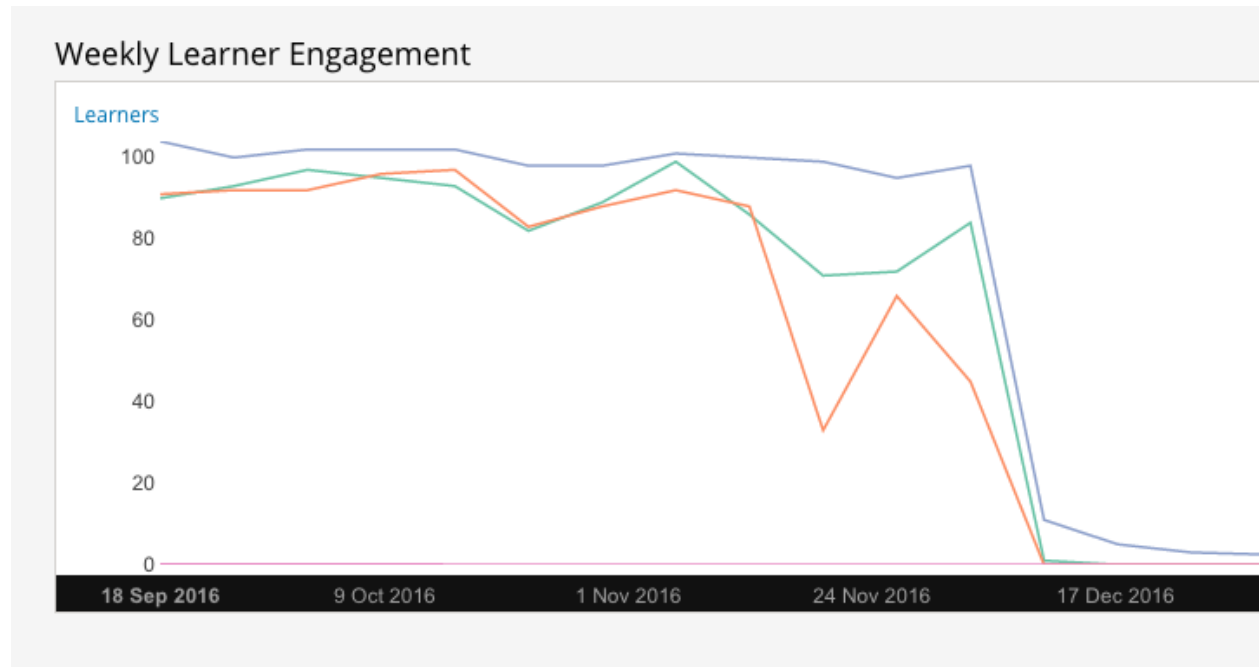
Blue=total activity

Green=watched a video

Orange=tried a problem

- Activity data shows a high level of engagement with course materials, both problems and videos, over the course.

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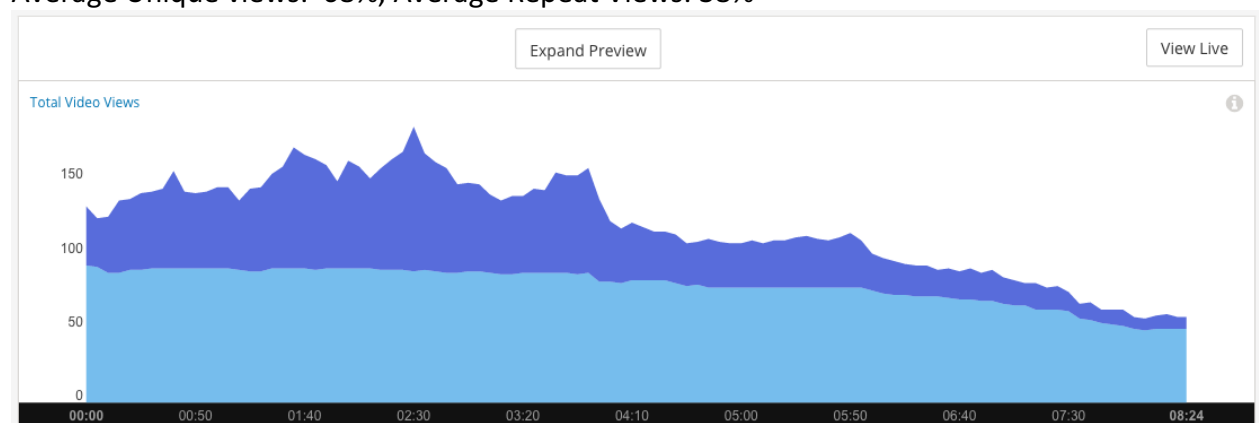
EdX – Individual Lecture Video Viewing Analytics

Light Blue indicates unique views and dark blue indicates total views

The charts below are samples from four lecture videos. In general, over 25% of views were repeat views with some videos having over 40% repeat views. This affirms the objective that videos would be used as resources for students. The data shows that students were rewatching portions of the video either to review something they didn't understand or as study aids for review.

Part 1, Strategic Bombardment

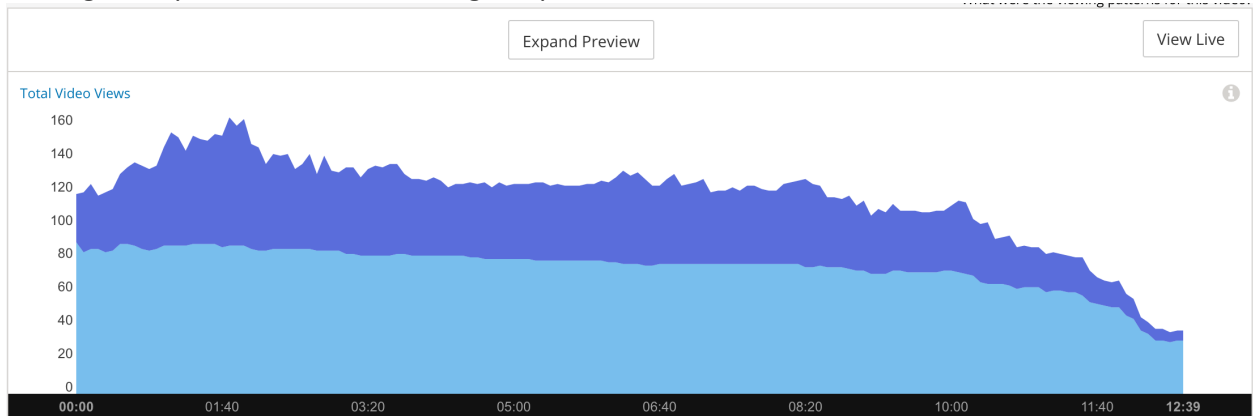
Average Unique views: 68%, Average Repeat Views: 38%



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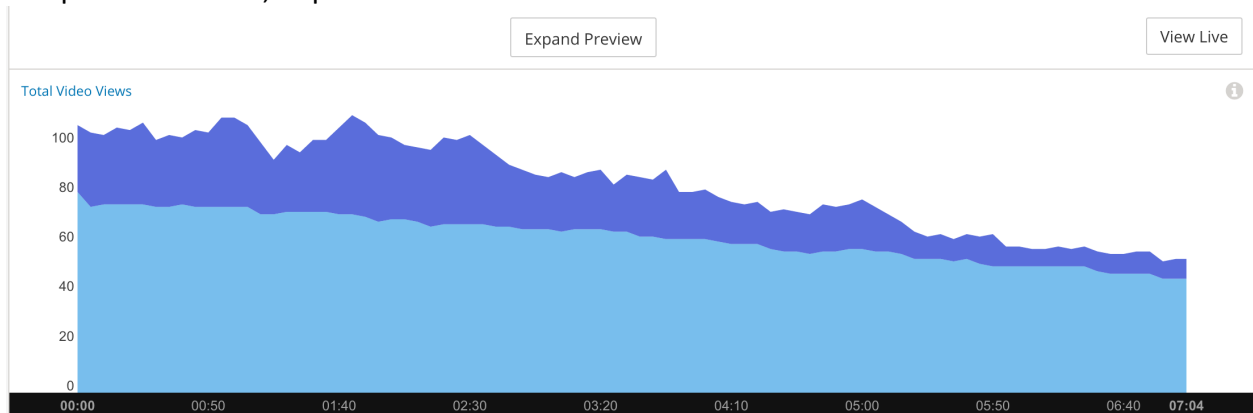
Part 3, Arms Control and Disarmament

Average Unique Views: 64%, Average Repeat Views: 36%



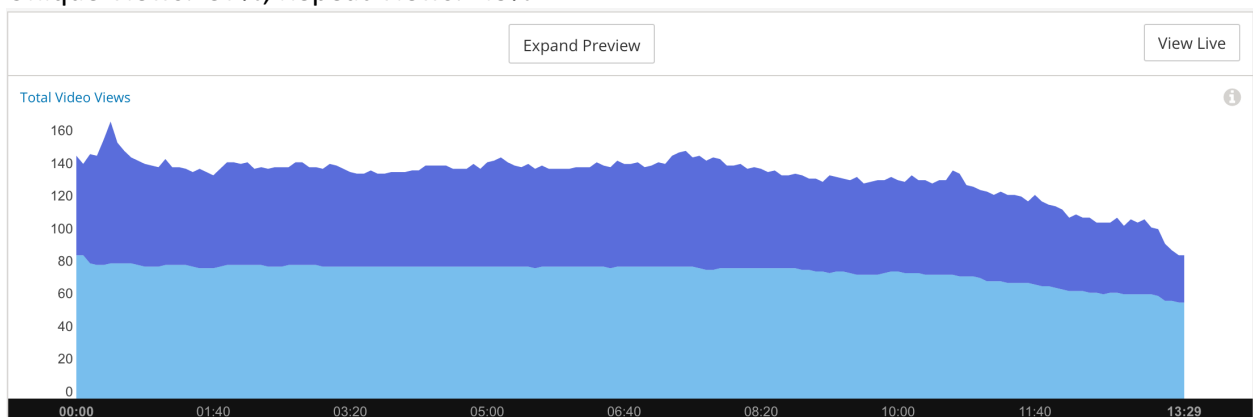
Part 1, Comparing Nuclear Bombs to Conventional Bombs

Unique Views: 75%, Repeat Views: 25%



Part 3, Seismic Detection

Unique Views: 57%, Repeat Views: 43%



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September 2016 – problem report

Total problems = 123

- The majority of students were using the problems even though they were ungraded. This indicates that the students found them useful as preparation for in class activities and assessments.

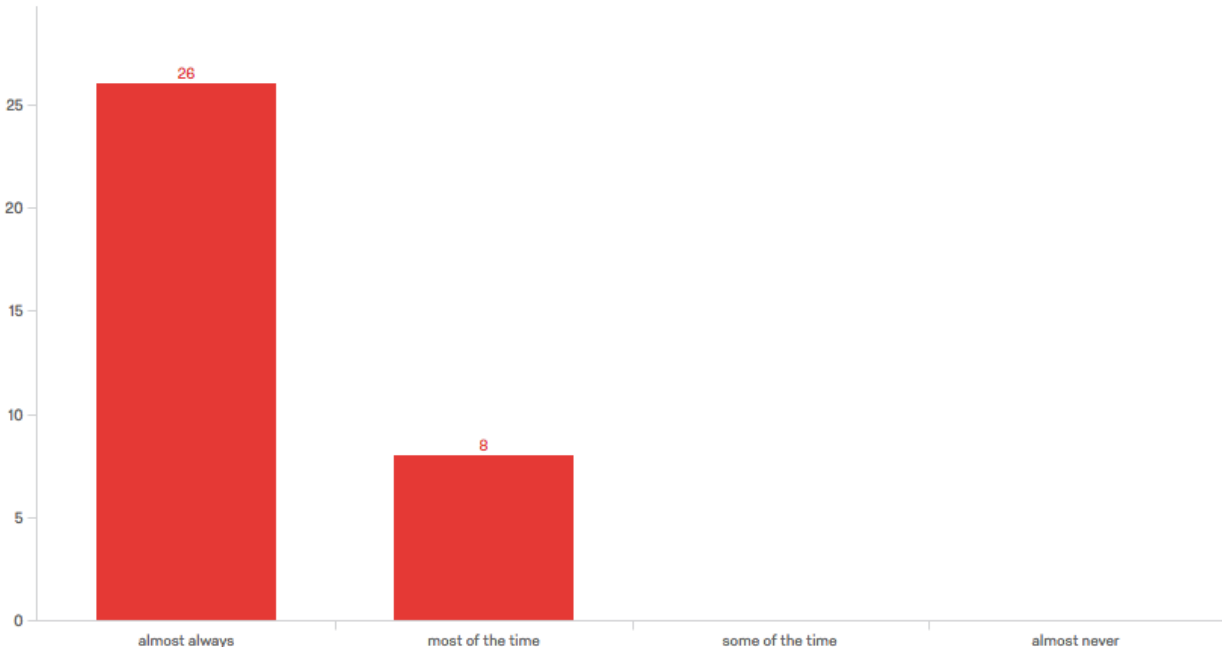
	Total Grade	Part 1	Part 2	Part 3	Part 4
Average grade	81%	83%	79%	81%	81%
% of students who attempted	95%	94%	94%	93%	89%
% of students who scored > 60%	87%	86%	85%	83%	81%

Student Survey data

These results are from the course survey given during the 2016W1 term. The survey was distributed on November 29, 2016.

Question 3 – Did you watch the online videos before coming to class?

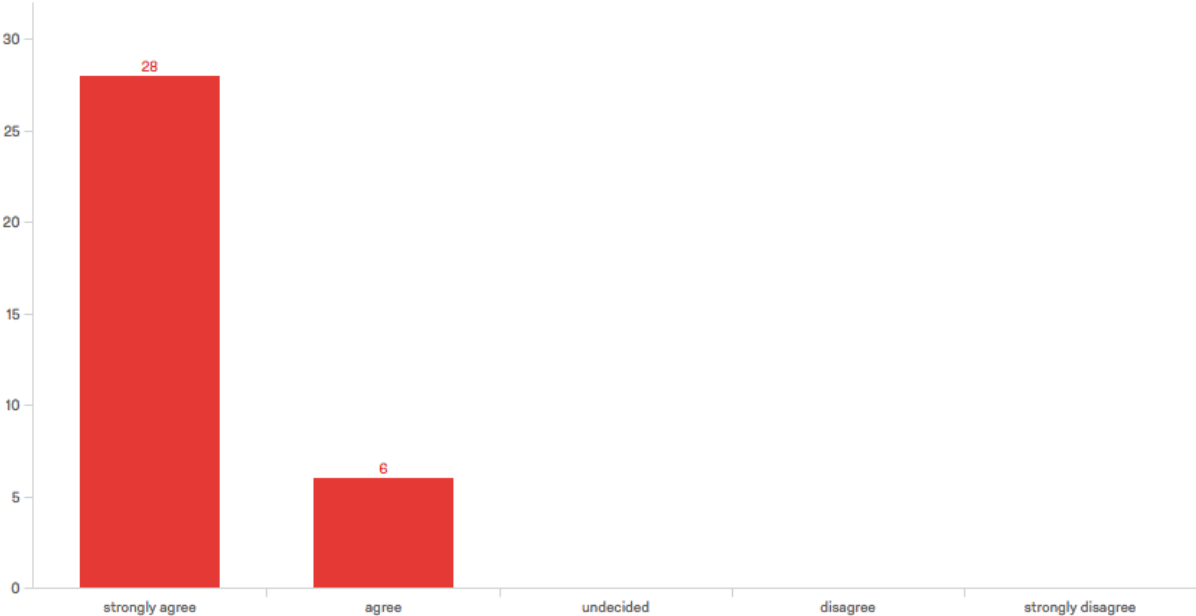
Q3. Did you watch the online videos before coming to class?



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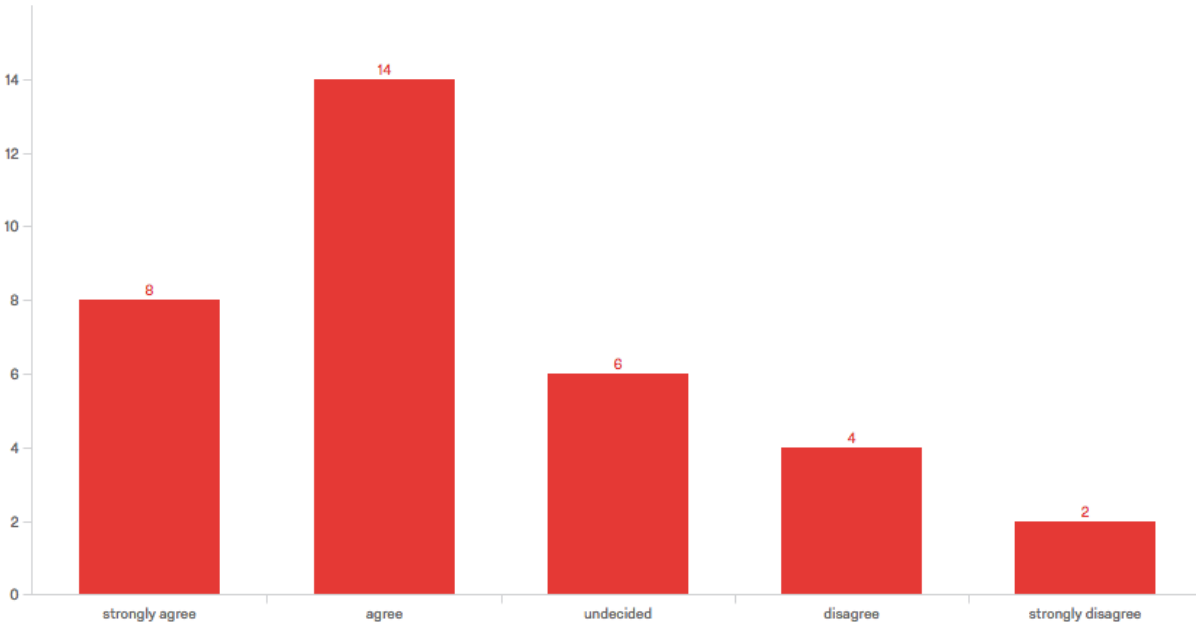
Question 4 - The videos and online resources were helpful in preparation for the classroom activities.

Q4. The videos and online resources were helpful in preparation for the classroom activities.



Question 7 – The in-class activities improved my ability to understand the math concepts and perform the calculations necessary for the course.

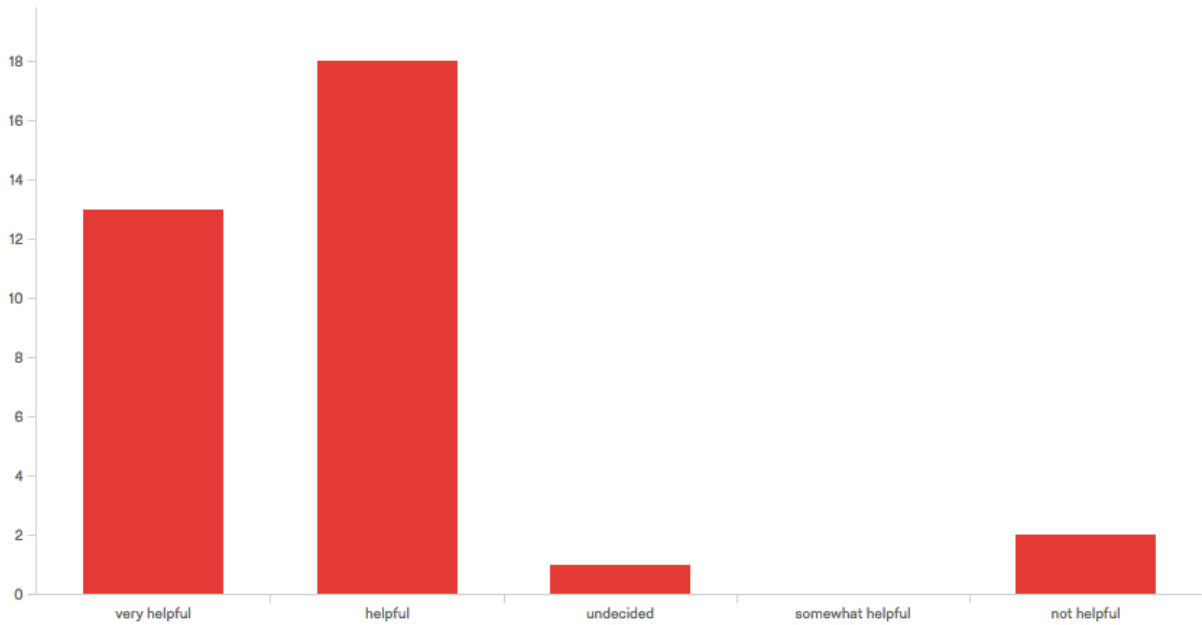
Q7. The in-class activities improved my ability to understand the math concepts and perform the calculations necessary for the course?



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Question 11 – How would you rate your experience with the in-class group activities?

Q11. How would you rate your experience with the in-class group activities?



Student comments from survey

Enrolment Data

- Show that they filled every year
- Demand for course has steadily risen
- No turning students away

3.3. Data Collection and Evaluation Methods – Please describe the data collection strategies used, how the data was analyzed, and perceived limitations. **Note: Please attach copies of data collection tools (e.g. surveys and interview protocols) and any additional data or other relevant items.**

- Survey issued 2013W2 during the first offering of the course – March 12, 2014
- Survey issued 2016W1 during the most recent offering of the course - November 29, 2016

3.4. Dissemination – Please provide a list of past and future scholarly activities (e.g. publications, presentations, invited talks, etc.) in which you or anyone from your team have or intend to disseminate the outcomes of this project.

In 2014 and 2016 Allen Sens and Matt Yedlin were invited to present an overview, update, and assessment of our new course to the CTBTO Science and Technology (SnT) Conference and Academic Forum in Vienna, Austria. In 2016 Dr. Sens and Dr. Yedlin also participated in the conference poster session. In 2016 three students from the course were also invited to attend and present their class project to the Academic Forum. Dr. Sens and Dr. Yedlin attended the 2017 CTBTO SnT in Vienna and five students from the course attended after being selected for the conference Youth Forum. One of those students secured an internship at the CTBTO offices in Vienna for 2017. The CTBTO bi-annual SnT Conference has an attendance of over 700 experts from around the world and the Academic Forum typically attracts audiences of 75-100.

4. TEACHING PRACTICES – Please indicate if your teaching practices or those of others have changed as a result of your project. If so, in what ways? Do you see these changes as sustainable over time? Why or why not?

For Dr. Sens and Dr. Yedlin (and the TAs assigned to the course) the project has significantly altered our teaching practices. The project required us to create a large number (over 70) new instructional videos through the use of various technologies, including the UBC Lightboard. The project required us to move away from the lecture model of delivery (less than 10% of the content of the course is delivered by lecture) and instead devote time to the development of in-class active participation exercises designed to animate the knowledge in the instructional videos for that class. Significant changes were made to assessment techniques, moving toward quizzes on the “flipped” material and using “two-stage” tests to promote group learning. The integration of science and politics material into a course enrolling both Arts and Applied Science students challenged our previous practices of teaching. Our two TAs experienced a much different learning format, and one has gone on to incorporate their experience into their own teaching practice (this TA has been nominated for a Killam Graduate Teaching Award this year). Looking forward, the ongoing revision of course videos and refinement of learning activities to improve the student experience will be manageable, as the volume of work and effort associated with project start up has been completed.



5. PROJECT SUSTAINMENT – *Please describe the sustainment strategy for the project components. How will this be sustained and potentially expanded (e.g. over the next five years). What challenges do you foresee for achieving the expected long-term impacts listed above?*

The course will be offered every year into the foreseeable future. The next stage of the project will explore the conceptual, partnership, and funding aspects of the possible creation of an online course available to a wider constituency of students and practitioners. The most significant challenges will be funding and instructional support, particularly for emerging educational technologies and platforms.

- VR
- Matlab
- YouTube