SnT 2025
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE
8 SEPTEMBER
ONLINE DAY
9 TO 12 SEPTEMBER
AT HOFBURG PALACE, VIENNA & ONLINE

05.3-484

A Decade of Teaching Nuclear Weapons and Arms Control: Lessons for the Future
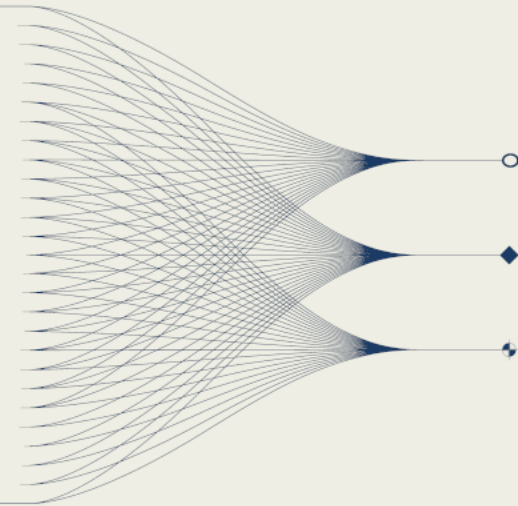
Dr. Matthew Yedlin, Dr. Allen Sens, Jason Myers

Departments of Electrical and Computer Engineering, and Political Science, The University of British Columbia

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Presentation Date: 11 September 2025

A Decade of Teaching Nuclear Weapons and Arms Control: Lessons for the Future

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Presentation Authors

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Course History and Design

History

Jointly Taught by Allen Sens and Matt Yedlin (2014-2025)

900 students are alumni, class size ~ 100

Course Structure

Cohort = 50 Engineering and 50 Political Science Students

Fully-flipped model – full set of online course materials: lecture videos, demonstrations, and self-check questions preparing students for transdisciplinary activities involving the real-world challenges

No lecturing.

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Course Structure

- Quiz at beginning of class
- Simulation activities following
  1. prisoner's dilemma,
  2. treaty analyses
  3. targeted briefs
  4. applied science exercises – seismological 3-circle method for location of DPRK test site
- Exams
- Group project "Improving the CTBT"
- Outreach – Student Presentations and Interactive Demos
  1. SnT 2015 – Ban the Bomb Campaign;
  2. SnT 2017 – Countdown Challenge
  3. SnT 2023 – 5 Poster Presentations

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Data analytics and methods

Student views (Sept. 2024-Dec. 2024)
Analytics from all POLI 377 YouTube videos between Sept. 2, 2024 - Dec. 20, 2024. View data restricted to only the external url category, limiting the data to only views originating from UBC course site.
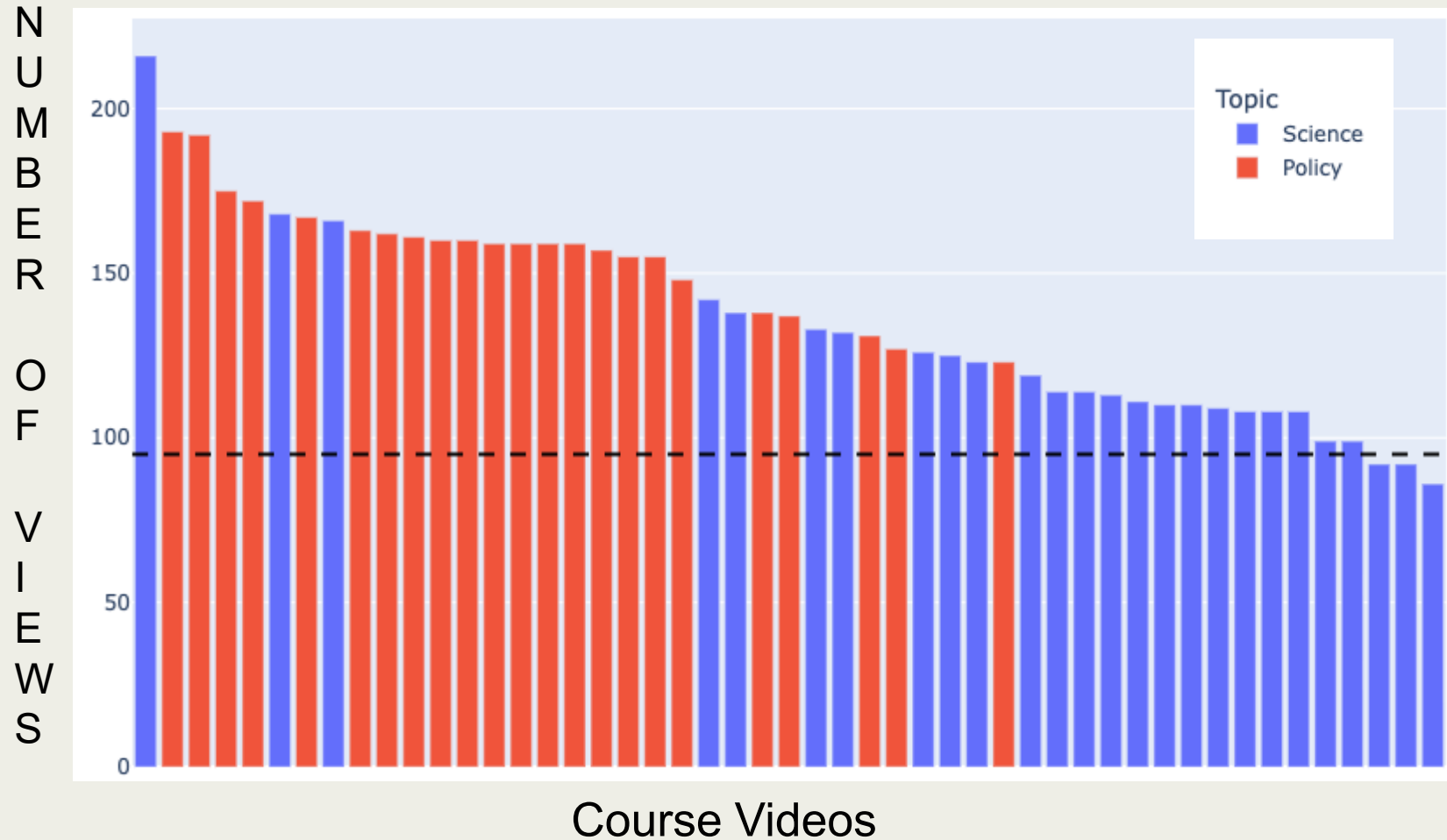
Total views
Analytics gathered from all POLI 377 YouTube videos for all view sources over the life of the video. Earliest videos from 2014.

YouTube view = anytime a user watches a video >10 sec.

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Core advantage of flipped classroom

NUMBER OF VIEWS

Course Videos

Average class size 95

Average of 138 views per video

Students are rewatching videos!

Multiple self-directed iterations of content exposure reinforce student learning.

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Motivation for expanding learning opportunities

From 2014-2025 educated 900 students in Nuclear Weapons and Arms Control.

We have a proven model and instructional course materials that can be repurposed to engage a wider audience:

1. Instructors and students at other academic institutions
2. NGOs, government employees, UN
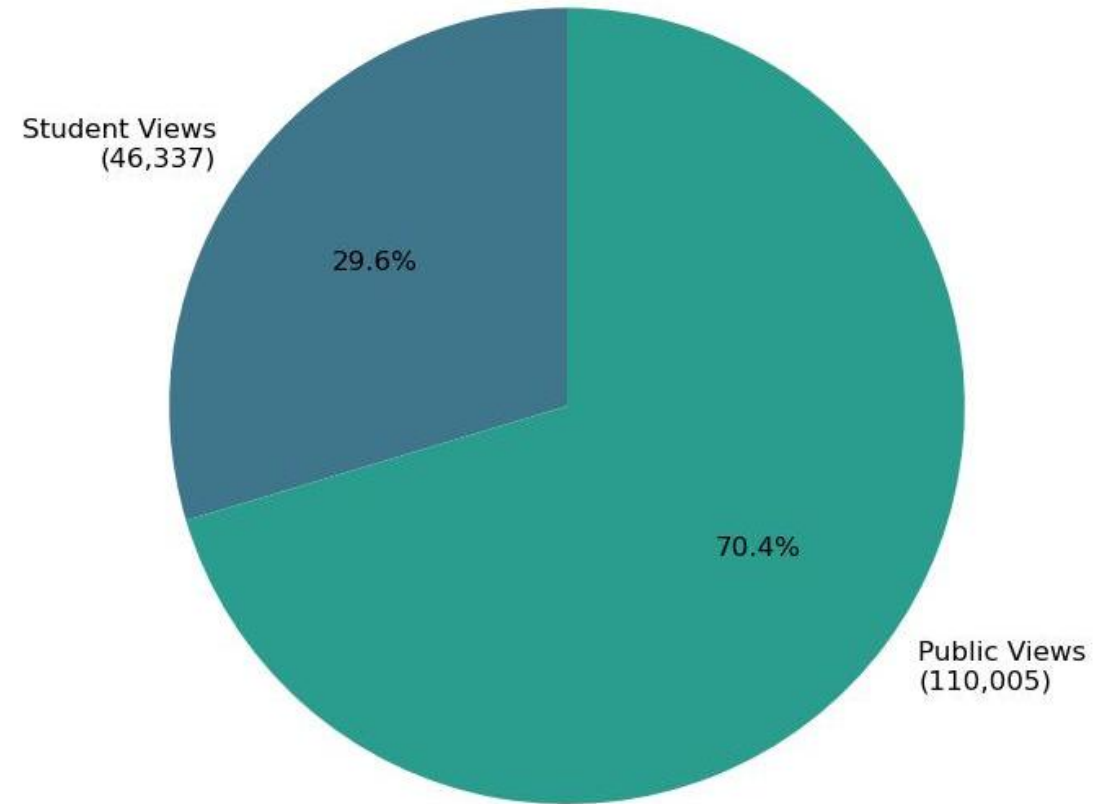3. Unaffiliated members of the general public

How do we transform and scale the current model and materials to reach this broader audience?
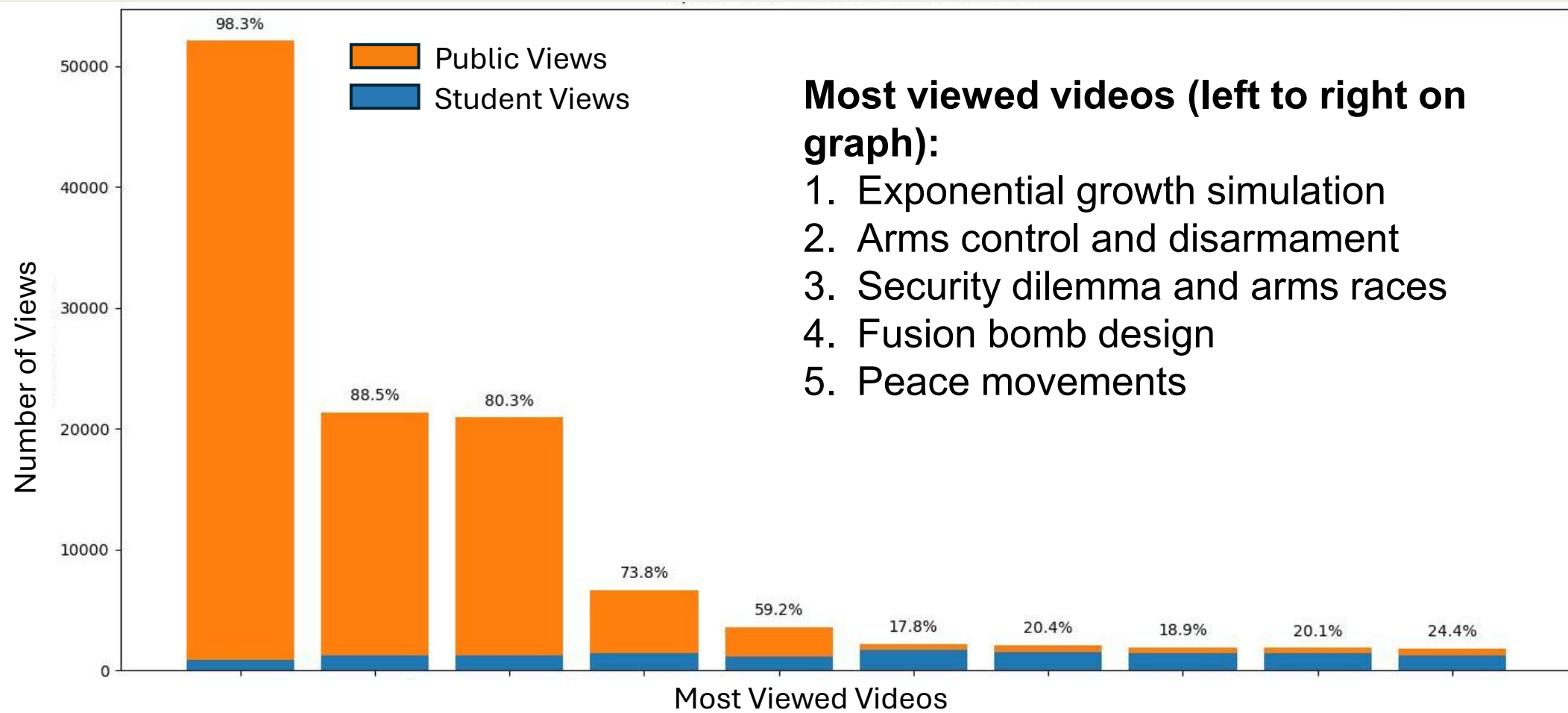
The next step: from university courses to an open, online learning

Having affirmed the value of instructional videos as teaching tools in university settings, how will this translate into the success of an open, online course on nuclear weapons in the public realm?

Student Views (46,337) — 29.6%

Public Views (110,005) — 70.4%

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How are public views different from student views?

Most viewed videos (left to right on graph):
1. Exponential growth simulation
2. Arms control and disarmament
3. Security dilemma and arms races
4. Fusion bomb design
5. Peace movements
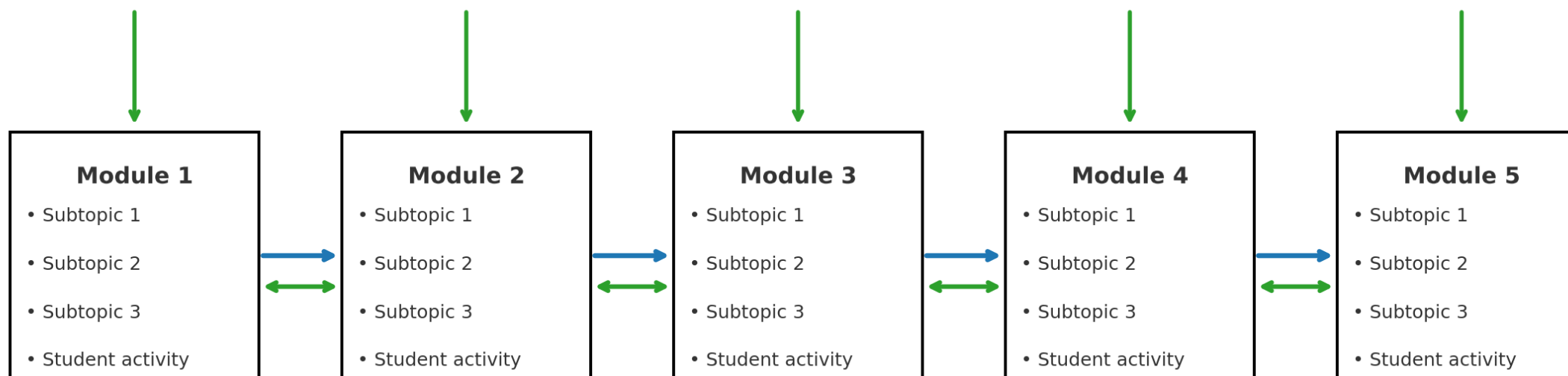
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How do the analytics inform the design of a public course?

- Public viewers are most likely to navigate online learning material through their own specific interests linking them to specific videos.
- A public course should be designed such that a viewer could "start anywhere" in the learning materials and then either choose to be guided along the narrative path or continue to explore content on their own.
- Start anywhere, lead anywhere is a design challenge

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Possible online course structure - challenges

Public entry points — start at any module (each is a self-contained narrative)

Module 1
- Subtopic 1
- Subtopic 2
- Subtopic 3
- Student activity

Module 2
- Subtopic 1
- Subtopic 2
- Subtopic 3
- Student activity

Module 3
- Subtopic 1
- Subtopic 2
- Subtopic 3
- Student activity

Module 4
- Subtopic 1
- Subtopic 2
- Subtopic 3
- Student activity

Module 5
- Subtopic 1
- Subtopic 2
- Subtopic 3
- Student activity

Instructor-led path (linear progression)

— Instructor-led flow
— Public entry
— Public movement (bidirectional)

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Generative AI and the future of nuclear weapons education

Instructor led material is important to establish human connections and build the trust of the viewer in the transdisciplinary expertise of the presenters/instructors. We have 10 years experience!

AI can be a collaborator:
- Support multi-directional navigation and exploration – graph transformers
- Creation of interactive activities that can be scaled

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Example of GenAI activity – Prisoner's Dilemma

Nuclear Diplomacy Simulation

A five-round Prisoner's Dilemma simulation involving nuclear treaty negotiations between three fictional nations.

Game Setup

Your Country Name

> Enter a fictional name for your country

☐ Enable Post-round Scenarios (scenarios influence AI decisions behind the scenes)

☐ Enable Pre-round Scenarios (scenarios visible to players during decision-making)

How the Game Works:

- Each round, choose to **Cooperate** or **Defect**
  Cooperation meaning no nuclear weapons testing and Defection meaning nuclear weapons testing proceeds.
- Your score depends on your decision and your opponents' decisions
- Mutual cooperation: 3 points each
- Mutual defection: 1 point each
- One cooperates, one defects: 0 vs 5 points
- Send diplomatic messages to influence AI decisions

Begin Negotiations

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Example of GenAI activity – Prisoner's Dilemma

⚠️ **Diplomatic Crisis**

All nations have chosen to defect! Would you like to attempt a diplomatic intervention?

Draft Your Diplomatic Proposal

Draft a proposal for renewed cooperation. Reference real treaties like START, JCPOA, or NPT for credibility...

[Submit Diplomatic Proposal]   [Continue Without Diplomacy]

Negotiation History

Country	R1	R2	R3	R4	R5
Country A	Def +2 pts	—	—	—	—
Highland Republic of Skarn	Def +2 pts	—	—	—	—
Republic of Astoria	Def +2 pts	—	—	—	—

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Conclusions

- Over 10 years, our current course has demonstrated its effectiveness for teaching 900 students Nuclear Weapons and Arms Control
- To enlarge our audience and expand the scale of impact we will use our existing approaches and materials and enhance these with GenAI, particularly in online navigation design and simulations
- Looking for collaborators!

Contact Us!

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