Using Diplomacy Lab to Teach Interdisciplinary Students About Global Public Health

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Outline

• What is Diplomacy Lab?
• Context – Professional, personal, institutional
• Case studies – best practices and pitfalls
  – Raising awareness of antibiotic stewardship
  – Are prisons epicenters of community infections?
  – Communicating food security strategies
• Audience participation!
  – Pair-and-share – what would you do back home?
• How to apply for Diplomacy Lab?
The idea for diplomacy lab grew out of a simple question, “What would happen if we could get America’s best universities to help us solve some of the world’s biggest challenges?” The State Department’s diplomatic “to do” list is getting bigger and bigger but our team is not. At the same time, American colleges and universities are eager to reach out and engage beyond the classroom. Diplomacy lab allows offices across the State Department to identify issues that can benefit from additional research and innovation. Then, faculty-led teams at universities across the country focus on those issues over the course of a semester, and work to develop new ideas and solutions. At the end of that process, we take their findings and channel them directly into the policy making work that we do everyday. Diplomacy lab is a great example of how we are reaching out beyond government to bring the American people into the world of foreign policy.
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• **How to apply for Diplomacy Lab?**
Professional context:
National Society of Professional Engineers: Code of Ethics for Engineers

- Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

- See: https://www.nspe.org/resources/ethics/code-ethics
Personal context:
Examples of my projects around the world

- Constructing + monitoring 1,000 biosand filters - Christian mission - Guatemala
- Identifying environmental determinants of stunting – USAID + health service - Guatemala
- Constructing a health clinic + elementary school - Catholic health center - Ghana
- Designing a water system - Christian orphanage + hospital - Damoh
- Monitoring well water quality – Nursing college - Gujarat and Karnataka
- Monitoring 10,000 biosand filters - Christian mission - Brazil
- Identifying environmental determinants of stunting – Health service – South Africa
- Constructing + monitoring 500 biosand filters - Doctors Without Borders - Tanzania
- Constructing a health clinic + elementary school - Doctors Without Borders - Tanzania
- Starting school lunch programs; Promoting malaria prevention - Nurses Without Borders - Tanzania
- Constructing well + water storage - Engineers Without Borders - Kenya
- Identifying environmental determinants of stunting – USAID + health service - Guatemala
- Starting school lunch programs; Promoting malaria prevention - Nurses Without Borders - Tanzania
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- Starting school lunch programs; Promoting malaria prevention - Nurses Without Borders - Tanzania
Institutional Context

- Founded in 1870 as the Missouri School of Mines (MSM)
  - 1964 University of Missouri, Rolla (UMR); Missouri System
  - 2008 Missouri S&T – reflecting identity as Technical Research University (TRU)
- 9,000 students
  - >75% studying engineering and sciences
  - 7,000 undergraduates
  - 98 degree programs: nuclear, petroleum, management, PhD, MBA, humanics
  - 18 design teams: EWB, DoE Solar Decathlon
- Department of Civil, Architectural, and Environmental Engineering
  - ABET: BSCE, BSArcE, BSEnvE
  - On-campus and distance: MSCE, MSEnvE, PhD
  - 600 undergraduate student
  - 100 graduate students
  - 25 full-time faculty
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The Essentials of Baccalaureate Education for Professional Nursing Practice
(American Association for Colleges of Nursing)

• **Liberal education** for baccalaureate generalist nursing practice
• Basic organization and system **leadership** for quality care and patient safety
• Scholarship for **evidence-based practice**
• **Information management and application** of patient care technology
• Healthcare **policy, finance, and regulatory** environments
• **Interprofessional communication** and **collaboration** for improving patient health outcomes
• Clinical prevention and **population** health
• Professionalism and professional **values**
• Baccalaureate generalist nursing **practice**
• See: [http://www.aacnnursing.org/](http://www.aacnnursing.org/)
ABET Student Outcomes
(Accreditation Board of Engineering and Technology)

• Ability to **apply** mathematics, science and engineering principles.
• Ability to design and conduct **experiments**, analyze and **interpret data**.
• Ability to **design** a system, component, or process to meet desired needs.
• Ability to function on multidisciplinary **teams**.
• Ability to identify, formulate and **solve** engineering problems.
• Understanding of **professional** and **ethical** responsibility.
• Ability to **communicate** effectively.
• The **broad education** necessary to understand the impact of engineering solutions in a **global and societal context**.
• Recognition of the need for and an ability to engage in **life-long learning**.
• Knowledge of **contemporary issues**.
• Ability to use the techniques, skills and modern engineering tools necessary for **engineering practice**.
• See: [http://www.abet.org/accreditation/accreditation-criteria/](http://www.abet.org/accreditation/accreditation-criteria/)
Side-by-side comparison

Engineering - ABET

• apply math, sci, eng
• conduct experiments, analyze and interpret data
• function on multidisciplinary teams
• communicate effectively
• life-long learning
• professional and ethical responsibility
• broad education to understand global and societal context.
• contemporary issues

Design
• solve engineering problems
• engineering practice

Nursing - AACN

• Liberal education generalist nursing practice
• population health
• Information management and application of technology
• Interprofessional communication and collaboration
• organization and system leadership
• professional values
• policy, finance, and regulatory

• Scholarship for evidence-based practice
• generalist nursing practice

Case 1: Promoting Social Sciences: a Tool to Combat Antimicrobial Resistance

• Antibiotics are foundational to modern medicine and agricultural productivity. Improper use of antibiotics contribute to rapid emergence and spread of bacteria strains resistant to existing antibiotics. The conservation of current antibiotics is particularly important for combatting antibiotic resistance. While the development of new therapeutics is critical, these developments will be a temporary fix if the global community does not practice measures to conserve antibiotics. Effective antibiotic stewardship is challenging because it hinges on a variety of social and behavioral phenomena.

• The team would spend one (or if desired, two) semesters developing a set of critical areas for further investigation, culminating in an article suitable for a peer-reviewed journal.
Missouri S&T Proposal

• Prof Dan Oerther (2014/5 Jefferson Science Fellow in S/GFS) will oversee through a grad-level environmental microbiology course. Assoc Prof of Microbiology, Dave Westenberg will participate using pathogenic microbiology undergrads as part of public service learning. Both faculty have reviewed the U.S. National Action Plan for Combating Antibiotic-Resistant Bacteria (2015), both faculty have published with the government, and project implementation will include social science collaborators.
Approach

- Day 1: share DipLab concept during syllabus discussion
- Week 1: elaborate and clarify
- Week 3: sign paperwork
- Week 4: conference call with DoS
- Week 7: submit draft 1 / receive feedback
- Week 10: submit draft 2 / receive feedback
- Week 15: present final product to DoS
Courses

• 5 students in graduate microbiology
• 20 students in dual-level environmental health
• 5 students in graduate microbiology
Table 1. Results of anonymous survey questions electronically available to all students via an online tool at the end of each semester. Students scored their agreement (5) or disagree (1) on a Likert-scale to each of a series of statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course was valuable (independent of the instructor’s effectiveness)</td>
<td>5</td>
<td>3.7</td>
<td>5</td>
</tr>
<tr>
<td>The instructor was concerned that I learned the material</td>
<td>5</td>
<td>3.7</td>
<td>4.5</td>
</tr>
<tr>
<td>The instructor stimulated and motivated me</td>
<td>5</td>
<td>3.3</td>
<td>4.5</td>
</tr>
<tr>
<td>The instructor was an effective teacher</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>I would recommend this instructor to other students</td>
<td>4.3</td>
<td>3.7</td>
<td>4.5</td>
</tr>
</tbody>
</table>

a 6601: Biological Principles of Environmental Engineering Systems, Autumn 2015
b 5650: Public Health Engineering, Spring 2016
c 6601: Biological Principles of Environmental Engineering Systems, Autumn 2016

**Table 2.** Representative student comments on an anonymous, end-of-term survey to the open-ended question, “what are strengths/weakness/opportunities for improvement for the instructor,” or “for the course?”

<table>
<thead>
<tr>
<th>Comment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I loved the diplomacy lab project! It made learning biology much more</td>
<td></td>
</tr>
<tr>
<td>real, and I was excited to read about antibiotic resistance in the</td>
<td></td>
</tr>
<tr>
<td>newspaper while we were still working on the project in class! Super</td>
<td></td>
</tr>
<tr>
<td>timely!</td>
<td></td>
</tr>
<tr>
<td>Didn’t take much effort to still earn a B or an A. I don’t want you to</td>
<td></td>
</tr>
<tr>
<td>give us more work, but it seemed too easy to earn a high grade (</td>
<td></td>
</tr>
<tr>
<td>compared to other courses).</td>
<td></td>
</tr>
<tr>
<td>Complete abuse of power! Its great that you do work for the State</td>
<td></td>
</tr>
<tr>
<td>Department and partnered with them for the diplomacy, but educationally</td>
<td></td>
</tr>
<tr>
<td>I think it is unacceptable for force student participation in the</td>
<td></td>
</tr>
<tr>
<td>diplomacy lab as the only possible way to get an A in the class.</td>
<td></td>
</tr>
<tr>
<td>Spend more time on going over the course material and less time on the</td>
<td></td>
</tr>
<tr>
<td>optional project discussion.</td>
<td></td>
</tr>
<tr>
<td>I loved the open ended nature of discussion, but please use ‘yes and’</td>
<td></td>
</tr>
<tr>
<td>rather than ‘but’ when correcting statements in class. We’re just</td>
<td></td>
</tr>
<tr>
<td>students and we should get more credit when we try to answer questions!</td>
<td></td>
</tr>
</tbody>
</table>

Case 2: Corrections Systems and Local Community Public Health Implications

- The Bureau of International Narcotics and Law Enforcement works in over 30 different countries around the world guided by the tenets of supporting safe, secure, humane, and transparent corrections systems. In most countries where INL operates, prisons and detection facilities are often co-located within communities, and anecdotally a facility that is not safe, secure, humane, and transparent can have negative effects in the local community. However, there is almost no research focusing on the public health effect or relationships between corrections systems and endemic disease and outbreaks in local host communities.

- The team would spend one (or if desired, two) semesters developing a detailed map of the epicenter of disease outbreaks, and co-locating detention facilities and communities to determine if detection facilities could be the origination point of an outbreak. Ideally, the analysis would link the occurrence of outbreaks with potential policy recommendations that INL could share with detection facilities to prevent or reduce the spread of an outbreak.
Case 3: Effective Intercultural Communication: Cultural Trend Analysis and Developing Strategies for Information Sharing on Agricultural Biotechnology

• The Office of Agricultural Policy is recruiting teams to research cultural attitudes toward agriculture and biotechnology in European, African, and South Asian countries. The purpose is to gain understanding of how to most effectively distribute information to people in these countries (i.e. best medium for communication, language, tone, source of information) to inform them of the benefits of agricultural biotechnology to address hunger and malnutrition. We want to ensure that the people in these countries are receiving information through the clearest and most understandable methods. By conducting analyses of cultural trends and the current climate surrounding agricultural biotechnology, each team will develop a clear understanding of the preferred communication methods for different cultures.

• The final product will be a 10 page report addressing cultural features – such as Hofstede’s cultural dimensions – current national policies on agriculture, current national policies on biotechnology, and the general opinions on agricultural biotech within each country.
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Are you already a member of DipLab network? See: http://diplomacylab.org/university-partners/

- College of William and Mary
- Florida International University
- Georgetown University
- Georgia Institute of Technology
- Gettysburg College
- Hunter College
- Indiana University Bloomington
- Indiana University – Purdue University Indianapolis
- John Jay College of Criminal Justice
- Miami University
- Missouri University of Science and Technology
- Montana State University
- Stevens Institute of Technology
- Stockton University
- Syracuse University
- Tufts University
- University of California San Diego
- University of Oklahoma
- University of Kansas
- University of New Mexico
- University of Notre Dame
- University of Pittsburgh
- University of Tennessee
- University of Virginia
- University of Washington
- Virginia Tech
- Wilbur Wright College
- Yale University
Follow the online instructions...
DipLab Steps

- Identify faculty POC
- Speak with administration
- Get buy-in on the required memo of understanding between institution and Department of State
- Application tips – bottom line up front (BLUF)
- Identify best practices to integrate DipLab into existing (or create new) courses
- Bid on projects; win the bid process; deliver
Useful links for Americans

• http://www.cies.org/fulbright-scholar-program-science-technology-and-innovation
• https://www.aaas.org/program/science-technology-policy-fellowships
• http://sites.nationalacademies.org/pga/jefferson/
• https://www.state.gov/s/partnerships/ppp/diplab/
• https://www.state.gov/e/oes/stc/index.htm
• https://www.peacecorps.gov/
• https://www.usaid.gov/careers
• https://www.state.gov/careers/
• https://www.state.gov/p/io/
But what if I’m not American?

• AAAS Center for Science Diplomacy
  – https://www.aaas.org/program/center-science-diplomacy

• The World Academy of Science
  – https://twas.org/

• World Health Organization – health diplomacy
  – http://www.who.int/trade/diplomacy/en/