Do simulations improve higher-order learning outcomes?
Evaluating student learning through a simulated regional trade agreement negotiation[1]

Margaret Edwards, Truman State University
Yann Kerevel, Louisiana State University
Philip Hultquist, School of Advanced Military Studies, Army University[2]

Abstract. Most instructors, even in introductory classes, intend to achieve learning beyond simple understanding to higher-order skills like critical thinking. This is most difficult when the subject matter is so new and difficult that many students have trouble accomplishing understanding. For international relations students, trade is this difficult subject. We developed a regional trade agreement simulation (RTA) to help solve student learning difficulties. In the simulation, students attempt to negotiate a regional trade agreement (RTA) in small groups over two weeks. We then use this RTA simulation to evaluate whether it contributes to student knowledge, motivation, and critical thinking ability. Most previous studies have been limited to investigating student knowledge retention and motivation, but it remains an open question whether active learning techniques (like simulations) help achieve higher-order, critical thinking learning objectives. We have conducted surveys and pre-/post-tests in three courses at different universities. From multiple-choice questions and essay responses, we evaluate the simulation's contributions to student knowledge attainment, motivation about the subject, and improvements in critical thinking ability.

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[2] The views expressed herein are the authors' and do not reflect those of the School of Advanced Military Studies, Army University, the Department of Defense, or the U.S. Government.

Introduction

Political science instructors employ a variety of different techniques to increase student knowledge attainment. In many cases, conventional wisdom supports the use of traditional lecture teaching styles to build student knowledge. However, proponents of alternative techniques have supported the implementation of flipped classrooms, in-class simulations, and other active learning tools. Oftentimes, instructors must weigh the costs and benefits, such as class time and student motivation, of utilizing these active techniques when including them in a syllabus. Yet, many professors do not have a solid understanding of the education benefits of these types of activities.

In order to identify the learning benefits of in-class simulations, this study assesses student gains from participation in a regional trade agreement negotiation. Three classes at three different universities participated in an established simulation of negotiations over a regional trade agreement (Kerevel, Hultquist, and Edwards 2017). Through a series of pre and post tests, we attempt to identify the distinct benefits of using simulations in international relations and comparative politics courses. Our goals are to differentiate between student motivation, knowledge attainment, and critical thinking skill development. Overall, our results demonstrate simulations enhance student motivation and increase knowledge attainment, although they do not appear to have a measurable effect on critical thinking skills in our study. We discuss the implications and potential explanations for the non-finding below.

Literature Review

Proponents of active learning have often hailed its benefits for student learning, especially when matched thoughtfully to course content and student learning objectives (Asal 2005; Wedig 2010). Although the practice of active learning appears to be more accepted than in the recent past, the question of whether the reality can live up to the promise is still under investigation. Practitioners of active learning have increasingly turned their attention to testing the effects of these techniques on student learning. We focus here on efforts to evaluate simulations in the political science or international relations classroom.

Among the more consistent findings in the literature is that simulations enhance student interest in the subject matter and motivation to learn it. This point may not need quantitative

evidence for those who have successfully run simulations. Nonetheless, the literature backs up this assertion. Shellman and Turan (2006) report the findings of a survey of 82 students after a multi-dimensional simulation that includes international terrorism, globalization, and the future of Iraq.[3] They report 79% of respondents claiming high or very high enhancement of enjoyment and fun (4 or 5 on a 5-point scale). Over 82% recommend the simulation in the future. Giovanello, Kirk, and Kromer (2013) used a pre and post simulation survey of over one hundred students who participated in a 2-day Model United Nations Crisis Simulation to assess student perceptions. They found students' enthusiasm for the subject increased around 8% after the simulation—a change from 61.5% to 69.2% in students responding that they were enthusiastic or very enthusiastic (Giovanello, Kirk, and Kromer 2013, 203). In assessing metacognitive knowledge (among other things), Pettenger, West, and Young (2014, 501) found students reported they had a "new motivation" for the subject of climate change after a simulated Kyoto Protocol negotiation. Likewise, Krain and Shadle (2006) reported students' free responses to a world hunger simulation, which included numerous positive adjectives such as "exciting," "compelling," and "enlightening."

The literature on whether simulations improve the acquisition or retention of factual, conceptual, or theoretical knowledge is also promising, but does include some mixed results. Shellman and Turan (2006) report surveys of students perceiving an increase in knowledge in such categories as: international relations theories and concepts, relevant international organizations and assigned countries, and improvement in critical/analytical thinking skills. Given the limits to whether students can accurately gauge, or will accurately report, their learning outcomes, it may be best to consider this evidence of student motivation or approval of the simulation experience rather than direct evidence of knowledge acquisition.

Some researchers have used pre and post-test designs to evaluate the efficacy of simulations. Krain and Shadle (2006) use this design (among others) to show that those who were exposed to a world hunger simulation increased their knowledge. The results were statistically significant in a paired *t*-test with 44 respondents, but the finding is somewhat limited because only those who self-selected into completing the questionnaire were included (44 of 73 students). Krain and Lantis (2006) found a similar increase in knowledge of world affairs after a

[3] See Shellman and Turan (2006) for a full description.

global problems summit simulation, although the increase in knowledge was not significantly different than the control group, which also experienced improvements in knowledge via traditional lecture and discussion.

Other researchers have used experimental or quasi-experimental designs. McCarthy and Anderson (2000) randomly divide sections into treatment groups (role-playing session) and control groups (discussion session) for activities in political science and history. They show that mean scores on an exam (including multiple choice and essay) were higher in the role-playing sections (0.8 on a 10-point scale higher in political science courses and 1.0 higher in history). Krain and Lantis (2006) also divide sections into role-playing and discussion sections, in addition to pre and post-test for those involved in the simulations (see above). The groups in the simulations did better than lecture, but not significantly different than the control groups where the lecture was supplemented by discussion sessions. Powner and Allendoerfer (2008) divide into three types: lecture, discussion, and role-playing. They find that role-playing improves knowledge measured by multiple choice compared to lecture, but no difference between role-playing and discussion groups.

Fewer researchers have attempted to test whether simulations improve critical thinking skills. Shellman and Turan (2006) measure student perceptions of improved critical thinking skills, but this design suffers from the limits of self-reported perception. Powner and Allendoerfer (2008) include an open-ended question in their evaluation to measure critical thinking skills. They found students who were in discussion sections did better on these questions, but no better on multiple choice and that students in a role-playing section did better on multiple choice, but not on short answer questions. These findings ran counter to their expectations. We present the following analysis to help fill this gap in the literature.

Student Learning Objectives

The student learning objectives (SLOs) for our simulation follow from the learning objectives of our international relations courses. Since these are similar to many in the field and others in the simulation literature, they will likely be familiar to many interested in classroom

simulations. We present them here in three categories: lower-order learning, higher-order learning, and motivation.[4]

As a foundation for any course in higher education, student learning should include remembering, retaining, and understanding the factual, conceptual, and theoretical components of the course material. For the purpose of international trade, students should learn fundamental concepts like free trade, protectionism, and comparative advantage, as well as some factual or descriptive material, including trends in trade over time or the basics of specific trade agreements. Our simulation promotes these objectives by combining strong incentives for completing the course reading, by providing a mechanism for students to apply the course material (thus reinforcing learning), and by providing the simulation as a memorable event to help retention. By conducting the simulation, we expect students will be better able to do the following, compared to traditional lecture delivery of the material:

1) retain course material – facts, concepts, theories
2) demonstrate a deeper conceptual understanding

Our SLOs for the simulation also include motivators for learning. International political economy, especially the politics of trade, can be difficult material for undergraduates in introductory courses. Since trade is less intuitive than other aspects of international relations (such as power politics), students may need more motivation than the promise of extrinsic rewards and punishments through the typical grading structure. Experiential learning can be of particular use here since students will have added incentives to grasp the material through course readings to be prepared for the simulation. Furthermore, the actual experience of succeeding (or failing) in the simulation should increase motivation for learning how to understand international bargaining problems. In the process of representing various interests within different countries, we also expect students to be better able to understand the perspectives of different countries/interests than their own. The simulation structures incentives based on a variety domestic and national interests, thus showing students directly how behavior will follow from

[4] The concepts of lower-order and higher-order learning come from the revised version of Bloom's taxonomy (Anderson, et al. 2001). Lower-order learning includes aspects of learning such as remembering and understanding, while higher-order learning includes aspects of learning such as analytical thinking, problem-solving skills, and critical thinking.

the varying incentive structures of different actors. In all, the combined experience of the simulation should be more enjoyable for students than typical classes, which we expect should serve as a motivator for further learning and thinking about the subject. Compared to traditional lecture, the simulation experience should:

3) increase motivation for learning about international bargaining processes
4) increase enjoyment of the learning process
5) help students empathize with the perspectives of others

In addition to lower-order learning skills and motivation, we want our students to practice and develop higher-order learning skills, such as problem solving and critical thinking. We expect our simulation to promote these skills by asking students to present solutions to complex trade problems that require managing various domestic interests. After the simulation they are tasked with analyzing their experience and applying it to other trade agreements (in the abstract or in reality). After the whole of the simulation and assessment experience, we expect students will be better able to do the following, compared to traditional lecture:

6) demonstrate problem solving skills
7) demonstrate the ability to apply material to new situations
8) demonstrate critical thinking skills

We recognize that the quality of the traditional lecture delivery varies greatly, but it is difficult for the traditional lecture to move beyond developing lower-order skills like remembering and understanding course material. These skills are an important foundation for other skills and should not be degraded. Still, most programs in political science, international studies, or other social sciences claim to provide students with higher-order skills like critical thinking and problem solving. We believe in-class simulations give students the ability to practice and develop these skills while increasing their motivation for the course material, which should also reinforce and improve lower-order learning in the process.

Regional Trade Agreement Simulation

This study analyzes student responses from an in-class simulation, which we have created and used in international relations and comparative politics courses (Kerevel, Hultquist and Edwards 2017). The simulation asks students to draw upon their knowledge of international trade and negotiate a regional trade agreement (RTA) between several countries. Students have completed basic reading and received a lecture on the topic before beginning the simulation. The class is divided into three countries, which are further divided into three groups within each country. Students represent the interests of government, labor, and business for each country, as they negotiate the trade agreement. Various background materials are provided to each group, so that they have the knowledge to represent their groups effectively. The simulation uses hypothetical countries, in an attempt to draw upon student knowledge of international trade theory, not the historical facts of a specific trade agreement.

Once students have been placed in their groups, they receive a list of possible bargaining positions, and they must choose whether to open up trade in a commodity, or maintain the status quo of protection. Each country should spend a 50-80 minute class period negotiating together to reach their preferred bargaining position. Once agreement has been reached within each country, the second stage of bargaining begins, which is usually in a subsequent class period. In that period, the government representatives from each country will meet together and negotiate the final trade agreement. Representatives from labor and business may serve to help or heed the negotiation process. If negotiations begin to slow, the instructor may introduce a "shock" created with the role of a 20-sided die. When the end of the interstate negotiation ends, the final agreement must be voted upon by each country, and it must receive a majority vote to be passed.[5]

The instructor will lead a discussion session after the completion of the simulation, which provides an opportunity to revisit the main lessons from the simulation. We hope that students gain understanding of how different groups within a country may have unique perspectives on entering into free trade. The simulation should problematize the process of negotiating a trade

[5] For additional information and to download forms for this simulation, please visit the website https://phultquist.wordpress.com/research/publications-and-data/.

agreement by showing the internal and external processes. Winners and losers should emerge in the process, and students should become more aware of the costs and benefits of free trade.

Research Design[6]

In order to evaluate the simulation, we employed a variety of instruments after the instructors each taught their regular class about trade, focusing on traditional reading. Before students began the simulation, students were provided with two pre-tests, a multiple choice quiz and a paragraph assessment about international trade agreements. Upon completion of the simulation, they were given two post-tests, a multiple choice quiz and a paragraph assessment, and they were given a motivation survey for them to rate the simulation experience.[7]

An important component to our research design was that students were not graded for their responses to the multiple choice quizzes or the essay responses used to assess critical thinking.[8] Students were notified prior the beginning of the simulation and taking the pre-tests that their participation in the simulation was voluntary. Students did receive credit for participating in the simulation as part of normal class participation and attendance. If they chose not to participate in the simulation, they were given an alternative written assignment to make up for missing class during the simulation. Nearly all students opted to participate in the simulation.[9] However, since performance on the pre- or post-test did not influence a student's grade, this component of our research design may have affected our results. We return this issue below when discussing our findings.

We created a student evaluation that asks a variety of questions about the student's background and his/her perception of the simulation. This should help us identify if our simulation was enjoyable to students. Proponents of simulations (Giovanello, Kirk and Kromer 2013; Wedig 2010) argue that simulations increase student motivation, and this instrument should allow us to test this hypothesis for our simulation.

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[6] The Institutional Review Boards (IRB) at each university have approved the research for human (student) subjects.
[7] All forms are located in the Appendix.
[8] This part of our research design was required to gain IRB approval.
[9] One student at LSU did opt for the alternative assignment.

Next, we used 5-question multiple choice pre and post-tests to evaluate student knowledge attainment and our lower-order learning objectives. Students already had knowledge, from assigned reading and lecture, about international trade, and the multiple choice questions should allow us to assess student knowledge growth through the simulation. Past studies have had mixed support in showing how simulations improve student knowledge attainment (Frederking 2005; Krain and Lantis 2006; Shellman and Turan 2006), and we evaluate our simulation's success.

Last, our study pushes past previous investigations by evaluating student critical thinking ability and achieving higher-order learning objectives. Students are asked to answer a short essay question in a pre and post test format, which prompts them to discuss the costs and benefits of trade agreements for different domestic groups. We created two rubrics (see Appendix), one that evaluates critical thinking and the other assesses answer accuracy to score the responses. The critical thinking rubric is based in the Truman State University critical thinking rubric, which was adapted to this short essay question.

In order to analyze critical thinking, we tried to identify a nuanced scenario in which students would have to assess their previous knowledge of trade agreements, integrate the complexity of real-world negotiations into their discussion, and reflect on how different actors may behave in these situations. This process of assessing, synthesizing, and reflecting is necessary in evaluating students' ability to think critically. Our prompt is limited to a simple essay answer, but we attempt to identify students' thinking process regarding international trade agreement negotiations. More than that, we evaluate if their thinking process becomes clearer, yet more nuanced, after completing the in-class simulation.

Findings

In conducting this investigation, each professor conducted the experiment in one of their classes. This involved 29 students at Truman State University and 27 students at Roosevelt University in Introductory International Relations courses, and 17 students in an Introductory Latin American Politics course at Louisiana State University. We examined students at different levels and in different courses to identify trends that might emerge. In a few instances, students only attended one or the other day of the class in which pre and post tests were conducted.

Overall, we have 63 complete sets of assessments which we use for our analysis.[10] In our assessment, we gathered basic information about students, including their class rank, major, and self-reported GPA, which is provided in Table 1. About half of the students are political science majors, and slightly more than half are juniors and seniors. We do not have any freshmen undergraduates in our sample. The median self-reported GPA of our sample ranges from 3.0 – 3.49.

Table 1. Major, Rank, and GPA of Student Participants

% Major		% GPA		% Rank	
Political Science	50.8%	3.7-4.0	20.6%	Freshman	0.0%
Intl. Studies	12.7%	3.5-3.69	14.3%	Sophomore	41.3%
Other social science	9.5%	3.0-3.49	41.3%	Junior	20.6%
Other	25.4%	2.5-2.99	22.2%	Senior	27.0%
Undecided	1.6%	2.0-2.5	1.6%	Graduating Senior	11.1%

N=63 students.

The most easily visible finding of this study is that students found the simulation to be enjoyable and that may be a benefit to learning in itself. In the motivation assessment, 84.1% of students said that they would recommend or strongly recommend simulations for future use. Only 6.4% of students would recommend against or strongly recommend against simulation use in future classes. The overwhelming majority of students recommend simulations and their use in classes, as proponents of simulations argue. In regards to enjoying the simulation, 88.9% of the students rated it a 4 or 5 on a 5-point scale. Slightly fewer students, 65.1%, noted that it enhanced their motivation to learn about international trade. Despite this difference, these descriptive statistics show that students enjoy simulations and find them to be useful as course content.

[10] 15 for LSU, 22 for Roosevelt, and 26 for Truman State.

Table 2. Student's subjective assessment of simulation

	Enhanced Enjoyment of Class Session	Enhanced Motivation to Learn about Intl. Trade
1. Very Little	0.0%	0.0%
2	3.2%	3.2%
3	7.9%	20.6%
4	28.6%	36.5%
5. Very Much	60.3%	39.7%
	Recommend Simulation as Future Teaching Tool	
Strongly Against	4.8%	
Against	1.6%	
Neutral	9.5%	
Recommend	27.0%	
Strongly Recommend	57.1%	

N=63 students.

To look at the pre and post-test results from the multiple choice quizzes, we identified there was considerable change in how students performed from the first to the second quiz. Both tests had five questions, and the median score rose from a 3 out 5 on the pre-test to a 4 out of 5 on the post-test. In the pre-test, 20.6% of the students correctly answered all questions. That number rose to 34.9% in the post-test. No students in the post-test earned zero or only one correct answer. We conducted a paired *t*-test to evaluate the statistical significance of these findings. We found that the positive change from pre to post test was significant at the $p<0.0001$ level. Overall, we see that students improved their scores in this multiple choice assessment after the international trade agreement simulation.

Table 3. Multiple choice scores before and after the simulation

	Pre-test	Post-test
0 correct	3.2%	0.0%
1 correct	7.9%	0.0%
2 correct	20.6%	11.1%
3 correct	19.1%	22.2%
4 correct	28.6%	31.8%
5 correct	20.6%	34.9%
Mean score	3.24*	3.9*
Median score	3	4

Note: N=63. *paired t-test, two-tailed, p<.0001.

The results in Table 3 only examine aggregate changes over the two tests. In order to examine individual change in test scores, we subtracted each student's pre-test score from their post-test score. These results are in Table 4. We see that 55.6% of students improved their score by 1 or more points and 25.4% improved their scores by 2 or more points. While some students did worse, and 27% of students did not see any change, a majority of students did improve their scores over time. These findings lend support to the idea that simulations help students gain knowledge regarding complex real-world topics, like regional trade agreements.

Table 4. Level of improvement in multiple choice scores pre- vs. post-test

Decreased by 2 points	4.8%
Decreased by 1 point	12.7%
No change in score	27.0%
Increased by 1 point	30.2%
Increased by 2 points	17.5%
Increased by 3 points	7.9%

Note: N=63. Scores generated by subtracting a student's pre-test score from their post-test score.

We are confident that it is the simulation itself, and not some other reason, as to why students are improving their performance on the multiple choice quizzes for two primary reasons. First, while the pre and post test gauge knowledge on a similar set of issues, they each use different sets of questions of similar difficulty. The use of different sets of questions suggests that students are not just performing better on the post test because of repetition. Second, we performed a series of OLS regressions predicting a individual student's change in score, controlling for their university, their major, their GPA, their academic rank, and even their level of interest and motivation in the simulation, and found none of these factors were significantly related to variation in student performance (see Appendix Table A1).[11]

Initially, we were hopeful that we would see an increase in critical thinking stemming from the use of the simulation in the classroom. However, as seen in Table 5, we do not find

[11] We also examined the effect of each individual variable on a student's change in score through a series of t-tests and found no significant relationships.

support for our expectations. We delivered a pre- and post-simulation essay prompt describing a situation where two countries differed on an aspect of a trade deal and asked students to evaluate why different constituents in each country might support or oppose the proposal. Students were scored for accuracy, ranging from 0-4 as well as critical thinking, ranging from 1-4. Each co-author graded each anonymized essay and the averages are reported below. Looking at the median change in score across both rubrics, we find a median change in score of zero. Counter to expectations, we also find a slight negative effect comparing the mean pre- and post-assessment scores. While roughly 20-30% of students did see improvement between the pre- and post-essay assessment tests, the median student saw no improvement and a plurality of students did worse.

Table 5. Mean level of improvement in accuracy and critical thinking rubrics, pre- vs. post-assessment

	Accuracy Rubric	Critical Thinking Rubric
Decreased by more than 1 point	15.9%	7.9%
Decreased by 1 point or less	22.2%	36.5%
No change in score	20.6%	23.8%
Increased by 1 point or less	25.4%	27.0%
Increased by more than 1 point	15.9%	4.8%
Median change in score	0	0
Mean pre-assessment score	2.59	2.59
Mean post-assessment score	2.53	2.47

Note: N=63. *p<.05, two-tailed paired t-test. Scores generated by subtracting a student's pre-assessment score from their post-assessment score. Score changes reflect averages across three coders.

We have several ideas for why we did not see improvements in critical thinking. First, our study may identify a larger issue; students may not have noticeable increases in critical thinking from a single simulation. Instead, building critical thinking skills may require larger projects across a deliberate curriculum. It is also possible that our research design may have faced some unforeseen hurdles. In designing the pre and post critical thinking assessment, we did not randomize the essay questions posed to students. This could create potential grading bias. We, as evaluators, may have been more critical of students in the post test, as we were aware that they had completed the simulation. It is also possible the post-test question was slightly more difficult than the pre-test essay question posed. Although we attempted to create equally difficult questions, we may have inadvertently used examples or countries that were less familiar to our

students. Notably, we used quotas, rather than more intuitive tariffs, as our hypothetical protection in the post-simulation essay.

Another potential problem with our evaluation of critical thinking may have simply been that students were ready to leave class and had few real incentives to perform well on the essay component of the assessment. The post-test assessment would have been the last piece in the simulation and of all of these assessment measures, and students may have hastily completed their essays in order to leave and go on with their day. All of these potential problems may have limited our ability to identify changes in critical thinking.[12]

Conclusion

Overall, our study provides some evidence in support of the literature on this topic. Simulations increase student knowledge attainment. Our students were able to successfully build their understanding of international trade through the completion of an in-class regional trade agreement simulation. Also, students find the experience enjoyable. The simulation served to motivate students and increase their enjoyment of class. Students were more involved and enthusiastic, and they increased their knowledge of a complex topic in international relations.

Our investigation did not demonstrate increases in student critical thinking skills. Yet, it allows us to build our knowledge about the role of simulations in the classroom. A single simulation may not provide an observable positive effect on student critical thinking ability, but our investigation asks us as instructors to evaluate how we might make stronger courses, focused on these higher-order skills. Although this study was unable to demonstrate that simulations influence critical thinking, this project has pushed us to reconsider not only how students improve higher-order learning skills, but our assumptions about simulations in general.

[12] We also examined whether or not the negative findings were related to a student's university, rank, GPA and major. We did not find any significant predictors of changes in scores related to the essay responses.

References

Asal, Victor. 2005. “Playing Games with International Relations.” *International Studies Perspectives* 6 (3): 359–73.

Frederking, Brian. 2005. “Simulations and Student Learning.” *Journal of Political Science Education* 1 (3): 385–93. https://doi.org/10.1080/15512160500261236.

Giovanello, Sean P., Jason A. Kirk, and Mileah K. Kromer. 2013. “Student Perceptions of a Role-Playing Simulation in an Introductory International Relations Course.” *Journal of Political Science Education* 9 (2): 197–208. https://doi.org/10.1080/15512169.2013.770989.

Kerevel, Yann P., Philip Hultquist, and Margaret E. Edwards. 2017. “Multilevel Bargaining and the Negotiation of a Regional Trade Agreement: A Classroom Simulation.” *PS: Political Science & Politics* 50 (2): 576–80. https://doi.org/10.1017/S104909651600322X.

Krain, Matthew, and Jeffrey S. Lantis. 2006. “Building Knowledge? Evaluating the Effectiveness of the Global Problems Summit Simulation.” *International Studies Perspectives* 7 (4): 395–407.

Krain, Matthew, and Christina J. Shadle. 2006. “Starving for Knowledge: An Active Learning Approach to Teaching About World Hunger.” *International Studies Perspectives* 7 (1): 51–66.

McCarthy, J. Patrick, and Liam Anderson. 2000. “Active Learning Techniques Versus Traditional Teaching Styles: Two Experiments from History and Political Science.” *Innovative Higher Education* 24 (4): 279–94. https://doi.org/10.1023/B:IHIE.0000047415.48495.05.

Pettenger, Mary, Douglas West, and Niki Young. 2014. “Assessing the Impact of Role Play Simulations on Learning in Canadian and US Classrooms.” *International Studies Perspectives* 15 (4): 491–508.

Powner, Leanne C., and Michelle G. Allendoerfer. 2008. “Evaluating Hypotheses about Active Learning.” *International Studies Perspectives* 9 (1): 75–89.

Shellman, Stephen M., and Kürşad Turan. 2006. “Do Simulations Enhance Student Learning? An Empirical Evaluation of an IR Simulation.” *Journal of Political Science Education* 2 (1): 19–32. https://doi.org/10.1080/15512160500484168.

Wedig, Timothy. 2010. “Getting the Most from Classroom Simulations: Strategies for Maximizing Learning Outcomes.” *PS: Political Science and Politics* 43 (3): 547–55.

Appendix

Pre-simulation quiz
Thank you for agreeing to participate in this study! Please answer the following questions regarding trade.

1) The general consensus among economists is that free trade:
   a. Provides equal gains for all countries involved
   b. Provides gains to all countries involved, but they are not distributed equally
   c. Provides gains only to the more developed country, at the expense of the less developed countries
   d. Provides gains only to the less developed country, at the expense of the more developed countries
   e. Provides no tangible benefit to any party involved

2) Governments often use trade barriers in order to:
   a. Protect domestic industries from the competition of foreign products
   b. Appease rich capitalists of domestic industries
   c. Appease the workers of domestic industries
   d. All of the above
   e. None of the above

3) Why are free trade agreements relatively rare?
   a. Free trade agreements benefit only some domestic interests at the expense of other, perhaps more powerful, interests who can block the agreement
   b. Some countries are better at producing everything (absolute advantage) and have nothing to gain from trading with less efficient countries
   c. It is better to produce everything yourself, so that everyone in your country has a job
   d. All of the above
   e. None of the above

4) A government in a developed country might use or maintain trade barriers (like tariffs, subsidies, or quotas) in the *automobile* manufacturing sector because:
   a. It wants to keep workers happy by creating new manufacturing jobs in neighboring countries.
   b. It wants to keep the prices of domestically produced cars lower than foreign imported cars.
   c. It wants the owners of big automobile corporations to pursue manufacturing operations in countries with low wages.
   d. It wants the governments of foreign automobile manufacturers that sell in the country to open their markets.
   e. All of the above

5) Which type of domestic lobby group is likely to *oppose* a free trade agreement?
   a. Domestic producers of goods looking for new markets for export.
   b. Consumers of imported products.
   c. Domestic producers of goods that compete with foreign imported products.
   d. All of the above
   e. None of the above

Post-simulation quiz

Thank you for agreeing to participate in this study! Please answer the following questions regarding trade.

1) A government in a developed country might use or maintain trade barriers (like tariffs, subsidies, or quotas) in the *agricultural* industry in order to:
    a. Protect small family farmers from competing with cheaper food imports.
    b. Protect the owners of big corporate farms from competition, since they can't move farms abroad.
    c. Protect the workers on farms from losing their jobs.
    d. Ensure a domestic agricultural industry survives, since providing food is necessary for security
    e. All of the above

2) A government in a less-developed country might use or maintain trade barriers (like tariffs, subsidies, or quotas) in the *manufacturing* sector because:
    a. Developing countries do not have anything to gain from freer trade.
    b. Developing countries have no need for goods produced in other countries.
    c. Developing countries may need to use protection to build manufacturing capacity that can compete manufacturing from more developed countries.
    d. All of the above
    e. None of the above

3) On a country-to-country basis, most economists agree that moving to free trade policies should:
    a. Improve the GDP for all countries involved, though one country may gain more than the other(s)
    b. Improve the GDP of wealthy countries, but decrease the GDP of poor countries.
    c. Improve the GDP of poor countries, but decrease the GDP of wealthy countries.
    d. Increase the GDP of each country involved the same amount
    e. Neither increase nor decrease either country's GDP; trade policy isn't related to economic growth

4) Many regional free trade agreements have been attempted but never achieved. Why might this be?
    a. Countries that are good at importing all the goods they need cannot benefit from freer trade.
    b. Some domestic industries may benefit more from protection and are a strong enough lobby to convince their government from signing the trade agreement.
    c. Free trade agreements only benefit countries when they share a geographic border, which prevents multiple countries from joining them.
    d. All of the above
    e. None of the above

5) Which group is likely to be in *favor* of a free trade agreement?
    a. Domestic producers of goods looking for new markets for export.
    b. Consumers of imported products.
    c. Governments seeking to an overall gain from trade and increase the country's GDP.
    d. All of the above
    e. None of the above

Motivation and Subjective Assessment[13]

Thank you for agreeing to participate in this study! Please answer the following questions regarding your views of the simulation.

1) On a scale from 1 (very little) to 5 (very much), how much did the simulation enhance your *enjoyment of the class session* (compared to the traditional lecture)?

   1 2 3 4 5

2) On a scale from 1 (very little) to 5 (very much), how much did the simulation enhance *your motivation* to learn about issues in international trade?

   1 2 3 4 5

3) Do you recommend using the simulation as a teaching tool in future classes?
   a) strongly against
   b) against
   c) neutral
   d) recommend
   e) strongly recommend

4) What is your major?
   a) Political science
   b) International studies
   c) Other social science: _____
   d) Other: _____
   e) Undecided/Undeclared

5) What is your current GPA?
   a) 3.7-4.0
   b) 3.5-3.69
   c) 3.0-3.49
   d) 2.5-2.99
   e) 2.0-2.5
   f) 0-2.49
   g) First semester/not established

6) Following the completion of this semester, what academic rank will you hold?
   a) Freshman
   b) Sophomore
   c) Junior
   d) Senior
   e) Graduating Senior

7) Do you have any other feedback you would like to share about this simulation? (Use the back of the paper if needed.)

[13] from Shellman and Turan, 2006.

Critical Thinking Pre-Assessment

Thank you for agreeing to participate in this study! Please answer the following question to the best of your ability. You may write 1-3 paragraphs to appropriately answer the prompt

In 2003, negotiations continued for the Free Trade Area of the Americas (FTAA) agreement, an extension of NAFTA, as 34 countries attempted to reach an agreement. Key players in Bolivia opposed the implementation of this agreement unless the United States guaranteed a reduction in agricultural subsidies. Bolivia hoped for free trade, especially for agricultureAlthough the United States has been a strong supporter of free trade, please discuss why various constituencies in the United States might oppose this aspect of the agreementWhy would Bolivia pursue this agenda? What benefits exist for different interests in Bolivia?

Critical Thinking Post-Assessment

Thank you for agreeing to participate in this study! Please answer the following question to the best of your abilityYou may write 1-3 paragraphs to appropriately answer the prompt.

In 2005, the United States Congress began considering the Central American Free Trade Agreement (CAFTA), which would increase free trade between the US, Honduras, Nicaragua, El Salvador, Costa Rica, Guatemala, and the Dominican RepublicThe United States has been a strong supporter of free trade, but CAFTA faced strong opposition in the US House of RepresentativesOne of the largest disagreements centered on sugar production in Central America, because the agreement would require the United States to increase quotas on imported Central American sugarWhy would constituencies in the United States oppose this? Why would Central American countries want to pursue this?

Critical Thinking Rubric

Identifies and assesses **conclusions** (e.g. theses, contentions, supported hypotheses, answers, solutions, interpretations) and further **implications or consequences** (e.g. practical applications, policy implications, relevance to other issues or disciplines, discussion, or future research).

Emerging (1)	**Growing (2)**	**Developing (3)**	**Mastering (4)**
Fails to present conclusions; or conclusion is a simplistic summary or unrelated to stated evidence. Presents own assertions without support, as absolute, or as attributed to external or inappropriate authorities. Fails to identify implications or consequences, or mentions purported implications or consequences without linking to conclusions. Sequence or presentation of evidence reflects a jumble of ideas. Does not distinguish among fact, opinion, and values; seems unaware of problems of bias or holds opinions in face of counterevidence.	Presents conclusions as relative or only loosely related to evidence, lacking insight into context or approaches. Presents own conclusions with weak support or support from inappropriate authorities. Identifies some relevant consequences or implications with weak attempt to link to conclusion. Consequences or implications may include only vague references to conclusions. Aware of distinction between cause and correlation, but confused application. Attempts or begins to distinguish fact, opinion, values may mention without developing issues of bias.	Presents conclusions as following from the evidence, shows some insight into context or approaches. Grounds own conclusions with clear and appropriate support, may have occasional inconsistencies or lapses. Consequences or implications show some integration with conclusions. Sequence or presentation reflects clear organization, although some elements maybe flawed. Distinguishes among facts, opinions, and values, may recognize some issues of bias, and opinions are responsive to evidence .	Conclusions are tailored to fit the best available evidence within the context and in relation to relevant approaches. Grounds own conclusions with strong support, qualifies own conclusions with balance and acknowledgement of scope, limitations, or ambiguities. Consequences and implications are nuanced, clearly developed, and integrated with conclusions. Causal relationships are clearly and consistently distinguished from correlations. Demonstrates understanding of complex relationships between facts, opinions, and values in light of available evidence; recognizes bias, including selection bias.

Answer Accuracy Rubric

Pre-Assessment (4 points total)

1. *Why various constituencies in US might oppose free trade w/Bolivia with reduction in agricultural subsidies?*

   1 point – remove subsidies would hurt domestic farmers

   1 point – explains how removing subsidies hurts US farmers (e.g. Bolivian products more competitive)

2. *Why would Bolivia pursue this agenda?*

   1 point – helps economy/subsidies hurt economy

   1 point – explains how it helps/hurts economy (e.g. gives Bolivia access to US markets; increases Bolivian exports; subsidies make Bolivian products less competitive

   Possible Examples:

   Creates jobs/improves economy (but distinct from #2)

   increases foreign capital

   improves US-Bolivian Relations

   Free trade helps Bolivian consumer

Post-Assessment (4 points total)

1. *Why would constituencies w/in US oppose increasing quotas on imported Central American sugar?*

   1 point – hurt US sugar industry
   1 point – explain how it would hurt US sugar industry

2. *Why would Central American countries want to increase US quotas on imported sugar?*

   1 point – help Central American sugar producers/help Central American economy
   1 point – explain how it helps

Table A1. OLS Regression: Explaining changes in scores between pre- and post-tests

	b	*s.e.*	*b*	*s.e.*	*b*	*s.e.*	*b*	*s.e.*	*b*	*s.e.*
Roosevelt University	0.70	0.51	0.79	0.57	0.68	0.54	0.67	0.52	0.78	0.58
Truman State University	0.21	0.57	0.29	0.62	0.19	0.63	0.19	0.59	0.24	0.65
Political Science Major	0.07	0.34	0.05	0.35	0.08	0.35	0.07	0.34	0.06	0.36
GPA	0.09	0.22	0.09	0.22	0.09	0.22	0.09	0.22	0.10	0.22
Academic Rank	0.27	0.25	0.29	0.26	0.27	0.25	0.26	0.26	0.30	0.27
Motivation: Class Session			0.09	0.25					0.21	0.34
Motivation: Learn Trade					-0.02	0.23			-0.12	0.31
Motivation: Teaching Tool							-0.03	0.16	-0.06	0.18
Constant	-0.41	0.99	-0.92	1.71	-0.33	1.46	-0.23	1.34	-0.72	1.79
F	0.90		0.76		0.74		0.75		0.59	
Adjusted R^2	-0.01		-0.02		-0.03		-0.03		-0.06	
N	63		63		63		63		63	

Dependent variable: Change in score between pre- and post-tests. **p<.05, *p<.10, two-tailed test. Louisiana State University is the excluded category for university variables.