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More Than a Game: Learning About Climate Change Through Role-Play

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Abstract

Educating management students on the connections between business and climate change is essential both to their careers and to society's ability to solve the climate challenge. To impart deep and lasting learning on this topic, the authors developed a multischool negotiation simulation that is unique in its intensiveness, cross-sector design, and transdisciplinary nature. This article explains their objectives, connects the choice of a role-play format to past literature, describes the curriculum they designed, and evaluates the results of its first and second teachings. Evaluation is based on the extent to which the course met their specific objectives, how individual elements contributed to overall learning, and the overlap between this curriculum and established precepts of good sustainability teaching. In addition, they draw lessons from their experience to guide others wishing to teach on this or on related topics.

Keywords

climate change, negotiation skills, role-play, multistakeholder, transdisciplinarity, active learning, environmental issues

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Motivation for the Course

Climate change has the potential to affect businesses in many ways: by changing the regulatory environment, reducing or shifting natural resources, catalyzing severe weather events, influencing customer preferences, and even displacing customers and employees. Businesses, in turn, can affect climate change by either continuing to emit unsustainable levels of greenhouse gases or finding ways to deliver customer value in an environmentally sustainable manner—and by lobbying for regulations that support their preferred strategies.

Because today's management students are tomorrow's business leaders, we recognize the importance of preparing them to lead well in a carbon-constrained world. To this end, during the spring of 2008 we began designing a new course for masters' students in business, with the goal of creating deep learning around the topic of climate change—and fostering the ability to act on that knowledge in a decision-making context. Our objective was to educate students about the scientific and political dimensions of the subject and to help them see connections to management practice.

In particular, we sought to teach students not only what actions might successfully address climate change but also why such actions are not easy to accomplish—that is, to help them understand the political and economic hurdles involved. Our hope is that a deeper understanding of these hurdles will better enable the students to overcome them in their future careers. Based on our own experience, we believed simulations would be a more powerful way to communicate these nuances than a lecture format alone. We have found that a multilateral negotiation can quickly bring a room full of idealistic people into a quagmire of bureaucracy and gridlock. This problem applies to the real climate negotiators, and we felt certain it would apply equally to our students and would help them understand the challenges that the world faces in the real practice of combating climate change.

Our semester-long course combines classroom elements with an extensive role-play exercise. To educate as many students as possible, and also to have a larger, more diverse, and therefore more realistic negotiation, we opened the course up to the Community of European Management Schools (CEMS) network. The classroom modules were taught separately but in parallel, and the role-play was a combined 2-day exercise held in Barcelona during the first teaching in 2009 and in Berlin during the second teaching in 2010. In designing that exercise, we sought to incorporate the multisector influences that exist in the real world—including governments, industry, nongovernmental organizations (NGOs), and the media.

In addition to educating students, we hoped that the students would educate us. Their fresh perspectives on climate change have the potential

to break through entrenched views, and we hoped they would invent new and creative solutions that might lead to real breakthroughs on the international stage—at a time when such solutions are badly needed.

Overview of Relevant Literature

In designing and evaluating our course, we consulted the existing literature on sustainability education. A common theme was the importance of transdisciplinarity, which can be defined as an approach that both incorporates multiple disciplines and seeks to infuse a practical perspective toward problem solving (Jaeger & Scheringer, 1998; Mittelstrass, 1992). The United Nations Educational, Scientific and Cultural Organization (UNESCO) explicitly calls for a transdisciplinary approach to sustainability education and sets out a list of broad components that should be included (UNESCO, 2006). We describe the ways in which our approach embraces transdisciplinarity in the section on "Role-Play Design" and in our "Overview of the Curriculum."

Our initial idea of incorporating a multiday role-play into the curriculum was based on our own positive past experiences with educational role-plays and an intuitive feeling that such an experience would be valuable to our students. Although not explicitly motivated by a theoretical point of view, our course closely fits the ideas expressed in L. Dee Fink's book, *Creating Significant Learning Experiences* (2003). Fink presents the case for what he terms *integrated course design*—that is, the use of student engagement to foster significant and lasting learning that will add value to students' lives after a course is over. He encourages curriculum design that accounts for situational factors, learning goals, learning activities, feedback and assessment, and the cohesive integration of these elements. We consider our role-play to be a significant learning experience according to Fink's definition and refer educators to his work for a more thorough description of the benefits that can be derived from such experiences.

We did consult literature specific to role-plays at an early stage. This educational format has become popular of late in international relations classrooms (see Asal, 2005; Chasek, 2005; Cunningham, 1984; Lantis, Kuzma, & Boehreret, 2000; Shaw, 2004; Smith & Boyer, 1996) and is expanding into a variety of other disciplines, such as comparative politics, psychology, and engineering (Pettenger & Young, 2006). It has also been used in management education, as evidenced by examples published in the *Journal of Management Education* (Doh, 2004; Egri, 1999; Moore, Shetzer, & Stackman, 1992; Tucker & Tromley, 2005) but is still not a standard curriculum element. A keyword search for *Journal of Management Education* articles on "role-play" reveals that role-plays have been used to educate students on topics that are primarily environmental or social in nature and that require agreement among either sovereign states or multiple sectors.

Role-plays are a form of active learning, a type of teaching method in which students "learn by doing" and by reflecting on what they are doing. Such methods tend to be preferred by students over traditional lectures and can have a powerful impact on student learning and on the development of thinking and writing skills (Bonwell & Eison, 1991). Active learning in general and role-plays in particular are often credited with having a more lasting impact on students than traditional lectures (Monahan, 2002). Specifically, they can encourage students to move beyond simply storing information and can develop their abilities to put that information to use (Cunningham, 1984). Role-plays can also be more engaging than the typical lecture format because students tend to take ownership of their role, to be motivated by each other, and in many cases to have fun (Pettenger & Young, 2006).

One of the commonly cited challenges of active learning in general and of role-plays in particular is the relatively intensive time commitment when compared with a standard lecture format, in terms of both faculty preparation time and student preparation time (McIntosh, 2001). Another is the risk that students can "get it wrong"—that they can negotiate based on misunderstood facts or false assumptions. We describe the ways in which we addressed these challenges in the section "Evaluation Based on the Role-Play Literature."

Course Objectives

Our primary goal was to instill deep and memorable learning among future business leaders about the scientific, political, and economic ramifications of climate change—and to equip them with the ability to apply this knowledge in their future careers. We saw this as not only benefiting the students themselves in terms of their own career success but also contributing to society's ability to combat climate change—as successful climate action will require awareness and competency among business leaders.

Our specific learning objectives were refined over the course of the teaching experience. By the end of the first teaching, they were defined as the following:

1. To understand climate change and the challenges it presents
2. To provide insight into the processes of international negotiation
3. To build negotiation skills for use in a variety of contexts
4. To understand the impact of climate change on business, and vice versa
5. To invent creative and workable new solutions for climate negotiations

These objectives emphasize a combination of concrete learning (mechanisms, interests) and skillful application (negotiation); they also recognize the need for both a command of the industry perspective (business strategy) and cognizance of the larger picture (international cooperation, connections). We felt this combination of knowledge/application and detail/breadth would be helpful in guiding the students as they made real decisions related to climate change in their future careers.

Discussion of Role-Play Design

At the outset, we sought existing role-plays that we might use or adapt for our purposes, rather than starting from scratch. Many classroom simulations exist and are available to educators. We narrowed our search to role-plays that would specifically focus on climate change, because the content of the exercise, not just the process, was important to our course objectives—as indicated in Course Objectives 1, 4, and 5. We also looked for existing models that were transdisciplinary (drawing on science, economics, and politics) and that took a multisector approach to the negotiation (involving government, industry, and civil society). We saw multisector roles as essential both to achieving a realistic approximation of the actual climate negotiations and to creating greater understanding of the true roles that management students are likely to play in the future—as business leaders who must interact across these spheres of influence.[1]

The simulation that most closely fit our needs was a post-Kyoto climate change role-play presented within a theoretical paper by Pettenger and Young (2006). This simulation, however, did not meet our goal of presenting a role-play that was content focused and that also incorporated multisector roles. The lack of a strong focus on content was evident in the relatively small amount of time devoted to the role-play—just more than 10 hours total, including both in-class sessions and external preparation. This amount of time would be sufficient to gain insight into the processes at work but insufficient for imparting true expertise in the subject matter. In addition, the Pettenger and Young model assigned roles for government entities only—an appropriate simplification for an international relations course, which theirs was. Failing to find a clear fit between our objectives and this or other existing role-plays, we decided to develop our own.

Our methodology for designing the structure of the role-play drew on many sources of expertise. First, we reviewed existing role-play models to gain a better understanding of the possible structures and the trade-offs across those structures. We then interviewed experienced faculty and professional facilitators to gain their insights as to the best strategies and potential pitfalls in designing

and implementing a simulated negotiation; from these discussions arose the idea of incorporating a "media team" in the simulation. In keeping with a transdisciplinary approach, we also consulted expert practitioners, including corporate managers charged with climate strategy development and official delegates to the United Nations Framework Convention on Climate Change negotiations. We studied the positions and interests of various countries, industries, and civil society groups through an extensive review of relevant media coverage. Finally, the role-play was trialed on a smaller scale, and adjustments were made based our own observations and on feedback from the trial run participants. In all aspects, we sought both realism and opportunities for learning.

After the first teaching of the course in 2009, several members of our teaching team attended the actual climate negotiations in Copenhagen to better understand the processes and procedures at work, allowing us to refine the role-play based on firsthand experience.

Overview of the Curriculum

In February 2009, the Climate Change Policy course was rolled out at two universities within the CEMS network: the University of St. Gallen (Switzerland) and ESADE Business School in Barcelona (Spain). It was classified in such a way as to attract students who did not necessarily have a prior interest in environmental issues. We felt this approach could increase the course's impact by providing an education on climate change to students who might otherwise have limited awareness of this issue. This approach did lead to an initial imbalance of knowledge among the students, which evened out within a few weeks.

The course was taught separately and in parallel at each school for 8 weeks, after which all students gathered in Barcelona for the 2-day negotiation simulation. During the first 8 weeks, which we refer to as the "lecture phase," class was held in one 4-hour block each week. Outside of the classroom, students were expected to spend approximately 2 hours per week on preparatory readings, and a significant amount of time on each of the three major assignments: (a) background paper and presentation, (b) position paper, and (c) reflection paper. Each of these assignments is described in more detail later in this article.

Both universities contributed to curriculum development, which built up knowledge of the science, economics, and politics of climate change. This outcome was accomplished through a variety of both traditional and innovative teaching methods, including assigned readings, current events discussions, lectures, talks by guest speakers from government and industry, interactive exercises, and negotiation skills training. In choosing each method, we remained focused on our learning objectives and selected activities that seemed likely to accomplish them.

Table 1. Course Outline: Modules 1 and 2

Module 1: Introduction to climate change and climate policy	
Week 1	*Fundamentals of climate change*
	1.1. The science of climate change and its environmental impacts
	1.2. Effects and consequences of climate change
Week 2	*Climate Policy and the UNFCCC*
	2.1. History and context of the UNFCCC
	2.2. Description of the UNFCCC
	2.3. Description of the Kyoto Protocol and its flexible mechanisms
Week 3	*Options for climate change mitigation and adaptation*
	3.1. Socioeconomic implications of climate change
	3.1. Putting adaptation and mitigation into perspective
	3.2. Worldwide and regional scenarios
Module 2: Climate change and business	
Week 4	*The role of business in global climate policy*
	4.1. The various effects of climate change on business
	4.2. Guest speaker on the role of business
Week 5	5. 1. Live case study with guest speaker
	5.2. Role assignments

Note: UNFCCC = United Nations Framework Convention on Climate Change.

Modules 1 and 2: Imparting Knowledge

The course comprised four modules, with the first two focused on general knowledge about climate change in the fields of science, economics, and politics (see Tables 1 and 2). These perspectives were represented by readings from each discipline, as well as by guest lecturers from the sciences, from industry, and from government.

From the beginning, we encouraged students to bring their own knowledge and opinions into the course and to start paying attention to relevant issues in the news. At first, some students were critical of this instruction; one complained that he did not sign up for the course to hear the (nonexpert) opinions of his peers. Over time, however, the skeptical students warmed to the active learning techniques, and final evaluations were extremely positive about this aspect of the course.

Modules 3 and 4: Student-Led Learning

Modules 3 and 4 focused on preparation for the role-play (including negotiation skills development) and the 2-day role-play itself.

Table 2. Course Outline: Modules 3 and 4

Module 3: Preparation of the negotiation session	
Week 6	*Skill training: Negotiation*
	6.1. Principled negotiation
	6.2. Bilateral negotiation exercise
	6.3. Interests of the parties to the UNFCCC
	6.4. Multilateral negotiation exercise
Week 7	*Student presentations (background of parties)*
Week 8	*Final preparation: Feedback and confidential instructions*
Module 4: Interactive Session	
	Two-day "Model UNFCCC"

Note: UNFCCC = United Nations Framework Convention on Climate Change

Preparation for the Role-Play

In Week 5, at the end of Module 2, roles were assigned. The European Union was heavily represented, with three-person delegations from Germany, France, and the United Kingdom. Also at the table was the United States, under the new Obama administration. There were the BRIC countries: Brazil, Russia, India, and China, as well as less developed countries (Uganda) and low-lying island states (Maldives, Haiti). Saudi Arabia and Sudan formed the Organization of Petroleum Exporting Countries (OPEC) team. Roles were assigned randomly, then adjusted to ensure that students were assigned to a country other than their own; feedback from the trial run had confirmed our initial instinct that a change in perspective helped maximize the learning experience.

In keeping with our goal of bringing a multisector perspective to the negotiation, not all delegates were government representatives—many were industry lobbyists or NGO observers, each attached to a particular delegation. For instance, the Chinese delegation included a government representative, a coal lobbyist, and a solar lobbyist. The full list of roles from 2009 is included in the appendix. Role assignments in 2010 were very similar.

Many students were curious to know their roles before the fifth week, but we wanted them to absorb many viewpoints before focusing on one in particular. We were concerned that too early a focus on individual roles would lead students to filter information in a biased way and would make them less open to understanding multiple viewpoints. On the other hand, they needed time to research their positions and interests before the role-play began, so this information had to be shared with sufficient lead time.

In Week 6, at the start of Module 3, students were trained in negotiation skills so that they would be able to engage effectively and realistically during the simulation. We followed the framework of the mutual gains approach, of which *Getting to Yes* is a well-known text (Fisher & Ury, 1983). Through a full-day seminar, students learned concepts such as BATNA, that is, the "best alternative to negotiated agreement" and the skill of looking beyond positions to the underlying interests of a party. They practiced these skills in bilateral and small-group settings and later reported the negotiation training to be a highlight of the course.

In Week 7, the students made group "background presentations." Each delegation presented for 20 minutes and was asked to cover the following essential components:

1. *Geography*, including how the country/countries would be affected by climate change
2. *Economy*, including key sectors that could help or hinder efforts to address climate change and the availability of funding for climate-related projects
3. *Politics*, including past stances in climate negotiations and current opinion polls

To help steer our students in the right direction, we set up a website that allowed us to share resource links and to cross-list them according to multiple keywords. Students could select a particular country or issue and immediately view a list of relevant articles and websites, and they could easily add their own resources to the site.

Preparing the background presentations was intended to help students understand the underlying interests and likely negotiating strategies of the parties they represented; listening to their peers we hoped would give them insight into the interests and positions of the other parties. Slides and a corresponding text were posted on a shared website (Google Docs) so that students from both schools could view each others' presentations.

Several days later, "position papers" were due to the teaching team. Essentially, this assignment asked each team or "delegation" to submit planned stances with regard to the three main issues being negotiated. At a simplified level, these issues were as follows:

1. *Mitigation* targets, which are formal goals for reducing greenhouse gas emissions. The negotiation would aim at commitments for both developed and developing countries, including agreement on when emissions should peak, the percentage reductions by 2020 and 2050,

and any financial or technical support to be provided to under-resourced nations.

2. The future of the *clean development mechanism* (CDM), which allows countries to meet reduction targets through cost-effective projects in developing nations. The negotiations would consider whether controversial projects such as nuclear energy and carbon capture and storage (sequestering carbon dioxide below ground, a technology still in development) should be counted as reduction credits.
3. *Adaptation* funding and technology transfer, to help poor nations cope with unavoidable impacts of climate change. These include the plight of "climate refugees" displaced by floods, droughts, and increased storm activity.

These agenda items paralleled real-world negotiations at that time. The first teaching of the course took place during the preparations for the 15th Conference of the Parties (COP-15) held in Copenhagen in late 2009. The second teaching took place after the COP-15 and mirrored discussions leading up to the COP-16 held in Mexico in late 2010. Each of these conferences was focused on negotiating a successor agreement to the Kyoto Protocol; future editions of our course may have a different goal, depending on how world events evolve. We expect some form of international climate talks to continue for decades to come and will continue to adapt our agenda items as needed.

During Week 8 of the course, we consulted each delegation individually. We were very pleased with the submissions, which generally showed a fluency in the history and interests of each party's stance toward international climate agreements. Where students had proposed realistic stances, we encouraged them to move ahead. In a few cases, we guided them toward greater realism or made suggestions that we hoped might guide the negotiation toward new and interesting solutions.

While traveling to the site of the role-play, we emphasized the real-life importance of reducing or offsetting carbon emissions. During the first teaching, traveling students were encouraged to offset flight emissions on their own and were rewarded with a small celebration in Barcelona. The vast majority of students did purchase carbon offset certificates, and some expressed shock that the purchases were not unanimous; much speculation went into the question of who had failed to offset. During the second teaching, we were able to secure travel sponsorship via a night train, which greatly reduced our carbon footprint; several students later commented that they would not have thought to travel in this way but found it surprisingly convenient.

Table 3. Timetable for the Role-Play

Day 1	
9:00-10:00	Opening plenary (organizer remarks and opening statements)
10:00-10:30	Coffee break
10:30-11:30	Working groups meet
11:30-12:30	Coalitions meet (developed, developing, BRIC, oil producing)
12:30-13:00	Stop-action facilitation
13:00-14:00	Lunch
14:00-15:30	Committees revise proposals as needed
15:30-16:00	Coalition meetings: (groupings to be determined)
16:30-18:30	Plenary: Committee recommendations presented and discussed
18:30-18:45	"Live broadcast" by oikos media
18:45-19:00	Stop-action facilitation
19:00-19:30	Remarks by organizers
Day 2	
9:00-9:30	Plenary and breaking news
9:30-11:00	Working groups meet
11:00-11:30	Plenary (10 minutes per group to solicit feedback)
11:30-13:00	Working groups finalize resolutions, senior advisors available
13:00-14:00	Lunch, resolutions due at 13:30
14:00-16:30	Plenary and final vote
16:30-16:45	Coffee break
16:45-18:15	Debriefing exercises conducted by teaching team
18:30-19:30	Informal gathering over appetizers

Note: BRIC = Brazil, Russia, India, and China.

The Role-Play Exercise

Informal negotiations took place over a group dinner at a local restaurant. Students were able to get to know their peers from the other school and to engage in coalition building before the game formally began. Listening in on several conversations, it seemed to us that the students did indeed spend much of dinner seeking out shared interests. It was a common topic on which to easily strike a conversation, and the students also appeared to be genuinely enthusiastic about the event ahead.

On the morning of the next day, students arrived "in role" at the host campus to begin formal negotiations, which proceeded according to the timetable described in Table 3. They collected name badges and national flags and took their seats in the auditorium. During the first teaching, government

officials were assigned seats in the first several rows, and "observers" from industry and civil society sat behind them. The following year we modified the seating arrangement by having each country delegation (including its observers) sit together; we found the "observers" were able to increase their involvement and their learning through this closer connection to the country delegation.

The Opening Plenary

The teaching assistant who led the development of the role-play served as the president of the negotiation, as the role seemed too intensive to assign to just one student—and too risky, should that student misinterpret it and thus misdirect the simulation. We did not, however, want to overly influence the negotiation; for that reason the president remained as hands-off as possible while in this role. She facilitated the discussion in a procedural sense, but she did not comment on the content of the discussion or suggest paths to agreement.

After a welcome and a review of the negotiation rules by the organizers, each delegation had an opportunity to make a public statement. The instructions for this statement were fairly open-ended, with a time limit of 1 minute and guidance to highlight issues and stances of particular importance to one's own party. Although each team's position papers had been previously available online, this exercise was intended to provide a review of key stances and an opportunity for any last-minute modifications.

The opening plenary also allowed students to connect a face and a personality with each stance, which we hoped would not only help them recognize each other more easily but also provide a more nuanced view of how each team was approaching the negotiation. The Russian delegation, for instance, made an effort to "act Russian" in both its stance and demeanor (interestingly, this was the case during both teaching years).

Opposing views became apparent immediately. Some delegates, particularly those from Africa and the low-lying islands, called for strong measures to fight climate change. Others, such as the Russian Federation and OPEC nations, expressed concern for national economic interests. Observers from industry and civil society did not make opening statements because of the formal nature of the session.

This plenary session and other plenaries held throughout the 2-day simulation were very formal in terms of protocol, with students required to seek recognition from the president before speaking and encouraged to address each other as "the distinguished delegate from [Country X]." We considered using a speakers list but found it unnecessary for the number of students involved.

In the future, should we involve a larger group of schools, we would incorporate this device. An assigned secretary recorded the official minutes.

Working Groups

After hearing the opening statements, delegates broke into preassigned working groups to draft resolutions on the three agenda items of mitigation, CDM, and adaptation. Each student was assigned to a group in advance, but there was some freedom to move around as the situation warranted. Government representatives were able to coordinate with the "observers" on their delegation if interests were largely shared—for example, by allowing an observer to speak on the government's behalf within a working group. In some cases, coordination was difficult or impossible because of a divergence in interests, but we felt this was a realistic and manageable level of complexity.

One student from each of the working groups was assigned in advance to serve as its chair. These students received special coaching from organizers who had participated in multilateral negotiation simulations in the past, and they had the opportunity to meet each other in advance and share ideas. They were encouraged to assign a vice chair who would serve as secretary, and to begin drafting the language of a formal resolution as soon as possible. Projection equipment was provided in each venue to allow the working groups to draft and edit their resolutions together.

The official agenda called for a fairly large portion of the 2 days to be spent in working groups, and during the simulation itself this time had to be extended more than once. Students expressed that there was not enough time for their working groups to come to a common understanding and to draft clear resolutions, which was interesting in light of the relatively extensive time devoted to this simulation compared with others and compared with our earlier trial run. We speculate that students were experiencing the real-life phenomenon that there never seems to be sufficient time for discussion and agreement on such complex topics.

Students tended to get to know each other and to establish ground rules the morning of Day 1, to debate and seek common ground during the afternoon of Day 1, and to transition from debate to drafting mode during the morning of Day 2.

The Media Team

Throughout the negotiation, two representatives of oikos, an international student organization for environmental economics and management, played

the role of media—covering the debates, attending press conferences, interviewing delegates, and sometimes throwing a wildcard news story into the mix. Their reporting was done via live news presentations and also on a news blog (Spring 2009: http://barcelonaprotocol.blogspot.com; Spring 2010: http://berlinprotocol.blogspot.com).

The media team operated without explicit instructions for the most part. However, we did occasionally ask them to report on a specific issue that we wanted brought to the foreground in the negotiation in order to make the game more realistic, to improve the learning experience, or to engage any roles that had trouble finding a place in the talks.

The media team was brought into the negotiation for several reasons:

- *Realism:* The actual international negotiations on climate change include a large cohort of media representatives, who are addressed extensively by groups wishing to influence the direction of the talks and are used by interested parties to keep track of progress (or lack thereof) on various issues.
- *Disseminating knowledge:* Press conferences or submit press releases gave all participants a platform for sharing their views on key issues. This feature was especially useful for those in "observer" roles, who could not formally vote and who might have felt frustrated at their inability to directly influence discussions.
- *Integrating knowledge:* The media kept delegates abreast of developments outside their own working group meetings. This feature was particularly valuable given the interdependent nature of the agenda items. For example, developing nations could protect their economic interests by arguing for lax mitigation targets, by requesting generous CDM programs, or by seeking direct adaptation assistance—but it would be difficult to know where to compromise without knowing the status of other working group discussions.
- *Engagement and fun:* Students were able to interact with the media in several ways: giving interviews, submitting press releases, reading the blog, watching video footage, and witnessing the occasional "live broadcast." During the second teaching of the course, the Greenpeace representative staged several dramatic (and hilarious) protests. These elements helped reenergize students during two long and tiring days.
- *Changing the game:* Although the students may not have realized it at the time, the media served as a conduit for us, as organizers, to adjust the game midstream. If delegates appeared to be reaching a conclusion too quickly or too slowly, the media could redirect the conversation.

Where possible, we did this through stories that arose from the students themselves. For example, we encouraged a live interview of a delegate whose calculations showed that at the end of Day 1 the targets being discussed were woefully insufficient to address climate change.

Drafting Resolutions

Although students had been given guidance on points to include in the resolution to be drafted by each working group, they were also granted the freedom to add or delete items. Faculty from both schools circulated through the working groups to observe the negotiation process and to offer advice or expertise as needed, although whenever possible the students were left to their own devices. Each group was given an opportunity to make preliminary suggestions in front of the plenary several hours before the final vote in order to test the waters and understand how likely the resolution was to pass in its current form and what changes might give it a better chance of passing during the final vote.

The Final Vote

Final proposals were due to the president by 1:30 p.m. on the second day and were presented, debated, and voted on during an extended plenary session that afternoon. During the first teaching, we encouraged voting by consensus but allowed resolutions to pass by a three-fourths majority if necessary. In the second rendition of the course, we insisted on reaching consensus to better reflect the actual negotiations at this particular point in time. This requirement added certain challenges and frustrations, but overall, it was more realistic and created some extremely valuable learning moments. In both teaching years, despite fatigue and occasional frustration, the student delegates continued debating various aspects of the resolutions well past the allotted time, and we as organizers had to be quite firm in putting an end to extended debates.

In both 2009 and 2010, the final text included an approved resolution on each of the three agenda items (mitigation, CDM, and adaptation). Agreed mitigation targets were significantly more aggressive than those of the Kyoto Protocol but vague in terms of specific commitments by individual countries. In each role-play, the events that unfolded did in some way foreshadow what would happen at the next real-life negotiation. We found this similarity encouraging because it showed that our simulation was realistic enough to generate plausible outcomes, and it also gave us some hope that such role-plays might contribute to real solutions if the experience can be shared with real negotiators.

Debriefings

To help students see beyond the frenzy of activity—that is, to help them extract meaning and generalizable lessons from their experience—we devoted significant time to reflection and discussion in the form of facilitated debriefings. These debriefings were held halfway through the first day, at the end of the first day, and in the mid-afternoon following the final vote on the second day.

During the first year, these sessions were mostly led by an external facilitator with experience leading creative problem-solving sessions for business managers and government officials; she brought with her a professional illustrator who constructed chalkboard-sized "mind maps" of many discussions. An hour of the final debrief was devoted to a session led by our team and walked the students back through their experience while asking for their thoughts and insights.

In the second year of teaching, having already benefited from observing the professional facilitators, we chose to have members of our own teaching team lead each facilitation session. This modification provided the additional benefit of ensuring that the discussion was closely tied to experiences and readings from earlier in the semester.

Reflection Papers

As their final requirement for the course, students were asked to write individual reflection papers of four to five pages in length. Their instructions stated, "This is a very flexible assignment, basically describing what you learned and what insights you gained during the 2-day negotiation." These guidelines were purposefully open-ended, as we did not want to constrain the students' thinking or to prompt them toward certain types of responses.

This open-endedness resulted in a wide variety of approaches to the reflection paper, with the vast majority being extremely thoughtful and insightful. One student wrote about how different political philosophies and negotiation strategies played out at the simulation; another reflected on how it felt to represent a government very different from his own; the chair of a working group described how she developed her own leadership style; an engineer took the opportunity to show his calculations and to consider why they had been ignored. Nearly all the students assessed the overall learning experience, and one commented on the extent to which individual elements contributed to it.

One purpose of assigning reflection papers was to give voice to students who may have been sidelined during the negotiation because of either their personalities or their roles, allowing observant individuals to demonstrate that

they have understood the dynamics around them (Egri, Feyerherm, & Rogers, 1997). We also sought to improve our own understanding of dynamics that were not directly observable to us and to receive feedback on learning outcomes.

We have reviewed the reflection papers for the purpose of evaluating the course and engaged in basic coding of student reactions. Sample quotations will be used to illustrate key points in the results and discussion section below. These points are primarily based on the first teaching of the course, though the same results were supported in the second teaching.

Results and Discussion

In assessing the role-play, we considered two types of outcomes to be relevant. First, we looked at whether student learning met the course objectives and how individual teaching elements contributed to this result. Second, we considered how our experience relates to theory, including both the literature on educational role-plays and the UNESCO (2006) guidelines for good teaching on sustainability topics.

Evaluation Against Our Objectives

We defined five course objectives earlier in this article and now revisit them in turn to consider whether they have been met and how the role-play either supported or undermined each one. Evidence is based both on our own recollection and on our analysis of the student reflection papers.

Course Objective 1: Understanding climate change and the challenges it presents. During the classroom modules, students showed a competent command of the information that had been presented during lectures and in readings. This understanding was evident during in-class discussions, which at the beginning of the semester had been relatively uninformed but became increasingly sophisticated as the course went on. During the role-play, however, this level of knowledge went from a solidly acceptable level to a truly impressive one. Students themselves commented on this phenomenon, for example, "After a moderate start, my learning curve really soared to exponential heights after our roles were assigned" (SS).

In the working groups, plenary sessions, and informal discussions, we observed that students had become quite fluent in the terminology and mechanisms of the United Nations Framework Convention on Climate Change. This was notable because many of the concepts being discussed with ease had not even been covered in class. One student offered some insight: "It was during the 2 days of the conference where I finally understood some aspects of Kyoto.

This was due to the fact that we were forced to look into some details to really reach an agreement" (GH).

As they gained a better understanding of the intertwining interests of the parties, some students even began to question the realism of the roles played by their peers, for instance, during the first teaching:

> I would argue that the Obama administration might hold a position different from the one at (our) summit, since the U.S. position (in the role-play) seemed to be based to a large extent on the actions implemented by the Bush Administration. (GH)

We ourselves had noticed the same and coached the U.S. representative toward greater realism but were impressed that this student's peers had already come to the same conclusion. Altogether, we agree with the student who said, "I really felt like we discussed on an astonishingly high level" (SS).

On the other hand, some students were frustrated that their learning had not been greater during the classroom phase. They realized at the negotiation that their command of certain concepts and mechanisms was not sufficient, and they had to research them or ask their peers while under time pressure. During the second teaching, we addressed this concern by adding an exam component that tested students on basic concepts that would be important to the negotiation, but students still found that they had to do additional research during the role-play itself. In some ways we were encouraged by this situation, even if it was frustrating for the students: Had there been no role-play, students might never have realized that their knowledge fell short of the level needed for practical application.

Course Objective 2: Insight into the processes of international negotiation. By the end of the lecture modules but before the role-play, students were generally convinced that climate change was a serious issue but baffled as to why the international community had not made more progress in combating it. During the simulation, the students' own difficulties in reaching agreement, and the relatively weak nature of the agreement they reached, gave them firsthand experience in the challenges of international negotiation and a deeper understanding of why the climate change issue has not yet been resolved.

For instance, many students gained new insights into power disparities: "During the conference I then got to experience the downside real Ugandan negotiators must actually be facing: Limited to no bargaining power" (SS) and "After the first morning I had already lost my illusions when I realized that the developing world has absolutely nothing to say on this topic. It is more like a 'take it or leave it' situation" (OS). They also learned firsthand the value of coalitions:

> In the end it was mainly the Algiers' coalition as well as our union with AOSIS [Alliance of Small Island States], which helped raise awareness in all working groups and thus contribute to a more favorable goal on our behalf. (SS)

Some students commented on insights into the less constructive aspects of international negotiation. A Russian delegate, for instance, commented that "It was in the working group that I came to understand the importance of agenda setting and procedural control" (MG). He explained that the "activist chair" of his working group was giving disproportionate speaking time to those who shared her views, and he therefore changed his strategy:

> I started to abstain from voting which made it impossible to reach a conclusion as a 75% majority could never be secured . . . this strategy was effective in bringing [our issue] back to the table but stirred considerable anger among the constructive members of the working group. (MG)

During the classroom phase of the course, several students had commented that the language used by diplomats is overly vague, but during the role-play they began to discover the reasons for it. One student commented that it "became clear that sometimes vague and unclear phrasing were the only possibility to come to a conclusion" (GH).

Course Objective 3: Building negotiation skills. The simulation provided an intense experience in negotiating. Students had the opportunity to practice what they had learned about the mutual gains approach, which encourages negotiators to focus on underlying interests rather than fall into the trap of arguing about positions. Whereas the section above discusses learning specific to international climate negotiations, this section will look at whether students gained generalizable skills that can be applied to many types of negotiation—in policy, business, or elsewhere.

In both teachings of the course, during the first day of the role-play students in general failed to move beyond position-based arguments. According to one student delegate, "most countries saw the negotiations as a mythical fixed pie and were not able to spot opportunities [that] would lead to an outcome where everyone is better off" (GH). By the end of that day, with some coaching during the facilitation sessions, the dynamic shifted noticeably as students realized that position-based negotiation was not working. For example, the same student commented,

> It was interesting to see how in the CDM working group we at some point, when the negotiation seemed to be stuck, talked about underlying

> interest. Understanding the real interests of the Maldives or the Sudan helped to enable issues linkage and thus consensus. (GH)

Issues linkage was in fact a common theme:

> The dominant strategy seemed to be issue linkage; for instance, Russia's agreement to the adaptation fund somewhat stemmed from the inclusion of joint implementation into the CDM working group, and China's effort to actively promote a practical agreement on Climate Change Refugees [was] critically linked to technology transfer. (GH)

Even while harnessing this technique, students were frustrated by it; several commented that it was difficult to know what was going on in one meeting while sitting in another, yet essential meeting, because the issues were linked. They quickly realized that countries with larger or more cooperative delegations had an easier time with this technique and that the formation of coalitions could be helpful in this regard.

The working groups also provided practical lessons in the influence of leadership styles on a negotiation, something noted often in the reflection papers. In the first year, for example, the mitigation group's chair was very formal in terms of protocol, and the group tended to stick to existing patterns in its proposal. The adaptation group was more casual, and its members came up with creative suggestions but ran out of time to fully articulate them. The CDM chair tried to remain impartial but found it necessary to make concrete suggestions in order to move the discussion forward, provoking criticisms that she abused her leadership role.

Course Objective 4: Understanding connections between climate change and business. At a conceptual level, the students learned a great deal about the role of business in both causing and combating climate change. For instance, following a guest lecture by representatives of the aviation industry, students engaged in a spontaneous debate about whether the speakers were underplaying their industry's contribution to greenhouse gas emissions. The more they discussed the issue, however, the more they realized the complexity of reducing emissions in an industry that is by nature international: For example, airlines competing on price may choose to bypass countries that tax their emissions, prompting longer flight paths and paradoxically increasing emissions.

Students also learned about the effect that climate change has on business. This learning was evident in the background and position papers: the need for new technologies encouraged the solar industry in China, and the prospect of warmer temperatures was expected to have both positive and negative impacts on the oil and gas industry in Russia.

By the time the negotiation was under way, however, these industry interests had mainly been integrated into government interests through prenegotiation discussions and lobbying; it then became challenging for students playing industry roles to actively promote their particular agendas, as they did not have voting rights. This situation is realistic, but it seemed unfair to sideline some students in a powerful learning experience—hence our decision in the second edition to encourage heads of delegations to "deputize" their industry representatives. This was a subtle adjustment, but we found it to be effective.

Course Objective 5: Inventing creative and workable new solutions for negotiators. When the resolutions were approved at the final plenary, the students were euphoric. There were smiles, applause, and congratulations. Soon after, however, they realized how many compromises had been made to reach agreement—and began to express disappointment that their "Barcelona Protocol" was not more progressive or that the "Berlin Protocol" was not sufficiently realistic. In the words of one student: "I sincerely hope the real . . . conference reaches a more comprehensive agreement than we did." Another said, "Our simulation has shown that the prospects for [the real negotiation] look rather grim. Although we reached agreement, we did not commit to binding caps for the BRIC, nor did we [succeed in] differentiating among the developing countries."

In retrospect, it makes sense that time did not allow for many breakthrough ideas to take hold. Students needed a day to get used to how negotiations work, and on the second day there was already pressure to draft the resolutions. During the first teaching, it was mainly in the debriefing that they were able to take their new insights about the actual state of affairs and think creatively about what could be changed for the better. During the "future-state" debriefing run by the professional facilitators, students were asked to work in small groups to come up with new ideas along these lines. Despite noticeable fatigue, they warmed to the task and came up with several interesting suggestions, among them the following:

- Create an exercise in which real-world delegates "switch roles" to gain a new perspective (a technique the students had found very insightful).
- Create working committees focused on new solutions, with delegates assigned to issues not too close to their own national interests.
- Avoid the word *negotiation* entirely, because it connotes a zero-sum game.
- Include students in the real negotiations, because they are less entrenched in their views and more concerned with the state of the world 50 years from now.

During the second teaching, students managed in the final session to pass a far-reaching resolution that included ambitious mitigation commitments. The questions that arose in the final debriefing focused on whether such a result would be possible in the real world—and whether such commitments would result in real action. In our simulation, China and India prompted a breakthrough with an unprecedented proposal, and the United States stepped up to their challenge. These solutions were impressive, but their feasibility was uncertain.

Contribution of individual teaching elements to the overall result. Based on both our own observations and comments from the student reflection papers, we have assessed the contribution of individual teaching elements to overall learning (see Table 4). This analysis will help us continue and further emphasize successful elements, while adjusting or eliminating unsuccessful ones, as we revise and expand the course for future editions.

Evaluation Against Theoretical Criteria

In addition to reflecting on whether the first and second editions of the course met our own objectives, we were interested in whether they made good use of the role-play format and whether they met the precepts of good sustainability teaching in general.

Evaluation based on the role-play literature. According to existing literature on the educational value of role-plays, as covered earlier in this article, this format has the potential advantages of being engaging, motivational and memorable. In addition, its "active learning" approach encourages students to put information to use, and a shift in perspectives can lead to new insights. Disadvantages can include time intensiveness, confusing complexity, and the potential for misguided conclusions. We apply our actual experience to each of these hypothetical qualities of educational role-plays in the paragraphs below.

In terms of being engaging, motivational, and memorable, the course passed with flying colors. Most students were completely new to role-play formats and did not know what to expect—but their unsolicited praise in the reflection papers speaks for itself:

> An unforgettable experience. (AK)

> It was more like an experience that I will remember for a long time, than an ordinary course. (OS)

> I will always remember the Thursday night. We went to a pub and were still talking mainly about the class and the negotiations. (RZ)

Table 4. Contribution of Individual Teaching Elements

Element	Rating	Contribution to Overall Result
Course positioning	+	Effectively drew in a mix of students in terms of preexisting interest in environmental topics and encouraged several students to gain a new enthusiasm for environmental issues
Current events discussion	++	Some students were wary at first, but later warmed to this exercise. By encouraging free expression of ideas, it nurtured a participatory dynamic and became a highlight of the course
Guest lecturers	++	Mixed responses to various speakers. In general, cited as a highlight of the course. Could be improved by tying guest lectures more closely to the stage of learning
Online tools	+	Shared links to resources were not used as much as expected, perhaps because use and contribution were not required. Google Docs was simple, effective, and widely used
Background paper and presentation	++	Useful in helping students take ownership of learning about their own role and in identifying with it. Also useful in understanding the interests of other parties before the role-play
Position paper	++	Extremely useful in encouraging students to be specific about their goals for the negotiation and as a feedback mechanism for those teams that misunderstood any concepts or interests
Multisector roles	++	Enhanced realism, but observers (industry and NGO) tended to feel left out. Much improved in the second edition, where government heads of delegations were encouraged to allow cooperative observers to represent them in other meetings
Media Team	+++	Enormous success: a frequently cited highlight in terms of realism, student learning, observer integration, educator input, and overall enjoyment
Debriefings	++	Simple debriefings that reflected on actions and motivations were highly useful. Creative paradigm-shifting approaches less so, perhaps because students were so new to negotiation. Also, fatigue became factor near the end of the negotiations
Reflection paper	+++	Very high contribution to learning, successfully encouraged students to step back from a frenzy of activity and extract generalizable learning. High quality of insights

Note: NGO = nongovernmental organization.

The value of active learning became evident as students gained and reinforced knowledge about climate change mechanisms and concepts during the role-play. Several students noted that their learning curve showed dramatic acceleration, with the fastest learning taking place during the simulation. Others noted that the exercise forced them to look into details they had not previously researched or retained because those details were needed for actions toward reaching an agreement.

Shifting perspectives was a powerful experience for many students and particularly insightful for those who took on roles with interests opposed to the interests of their home countries. For instance, one student wrote, "There is probably one thing that I will never forget about that seminar: the fact that at a moment I was in a certain way hating my own country (the real one)." Others made similar comments, and some even changed their views about their home countries' stances toward climate change.

In terms of disadvantages, the course did indeed prove to be time intensive on the part of the faculty. We overcame this challenge by securing funding from the Swiss Federal Office for the Environment (FOEN) for the development and implementation of the role-play. This initial investment has given us a fairly flexible model that can be expanded to include more universities in the future and updated to reflect changing real-world events. We expect to reap the rewards of our initial investment in designing and archiving key curriculum elements such as assignments, lecture slides, and faculty instructions—and also to benefit from economies of scale, since more schools can offer the course without greatly increasing the overall time investment needed.

Students also admitted that the time commitment was significant, but there were no suggestions to scale it back. In fact, several students in the first edition made suggestions that would increase the time commitment for future editions—such as the addition of a short exam and more readings. It is possible that these additional time investments were only valued with the benefit of hindsight, but it is still interesting that students finished the course wishing they had done more work rather than less. One explained, "I have to admit that the Climate Change course became a priority to me too late within the semester . . . However, when I did realize the importance of good preparation, I did additional research" (AK).

Complexity was not a major problem, mainly because the final product was open-ended. Students could put more or less detail into their resolutions, depending on the level at which they were able to discuss. The one area in which complex reality seemed to conflict with learning objectives was the incorporation of industry perspectives. In the first year, the role-play design was not conducive to industry engagement. Those students who held industry roles and were highly active during the negotiation tended to do so as quasi-official representatives of their governments. In the second edition, where students

were encouraged to have industry and NGO representatives empowered as true delegates, participation was broader and more fluid. This adjustment was not unrealistic; it is fairly common for countries to include industry and civil society representatives in their official delegations.

Misguided conclusions are always a risk in learner-led education, though we felt it well worth the reward of increased engagement in the learning process. We sought to minimize the risk through frequent feedback loops, including consultations before the negotiation and also our availability as "senior advisors" throughout the 2-day event. We found that students usually guided each other, and when in doubt they were generally able to research necessary information online (wireless internet was available during the simulation). Once or twice in each negotiation, the working groups showed a tendency to misinterpret something (e.g., the CDM group falsely assumed that suppressed-demand projects were not yet counted as emissions reductions), but these occasional instances were easily corrected by the teaching team.

Evaluation based on guidelines for good sustainability teaching. In 2002, the UNESCO was designated by the General Assembly to lead the Decade of Education for Sustainable Development. The decade spans from 2005 through 2014.

To fulfill this role, UNESCO has provided a series of guidelines for Education for Sustainable Development (ESD) curricula. The guideline that we find most relevant applies specifically to transdisciplinary teaching, which is a key part of our course. According to the organization's 2006 tool kit, UNESCO shares our view that transdisciplinarity is inherent to the subject matter: "ESD by nature is holistic and interdisciplinary and depends on concepts and analytical tools from a variety of disciplines" (UNESCO, 2006).

Within the framework of transdisciplinary learning, UNESCO has put forward a list of "skills needed to engage successfully in a sustainable society." These skills are compared with our own teaching experience in Table 5.

Opportunities for Improvement

Based on student comments and official student evaluations, the course was highly successful overall, yet there is certainly room for further improvement.

One area with room for improvement relates to our fifth and final objective: helping students come up with new and creative solutions to global climate change challenges. Based on student feedback, we have had somewhat limited success on that front; students felt they gained a much better understanding of the challenges at hand and the reasons why real-world negotiations have progressed so slowly, but they did not generally see new ways around these challenges. Of course, as the saying goes, "if it were easy, someone would have done it already." But at the same time, the feeling of overwhelming complexity

Table 5. UNESCO Criteria for Transdisciplinary in Education for Sustainable Development

Criterion	Does Our Curriculum Measure Up?
Critical and creative thinking	Taking on the role of another country required creative thinking, especially because roles were mainly assigned to students with opposing backgrounds. Critical thinking was required to see past the positions of each role and to create new ideas based on interests.
Oral, written, and graphic communication	Students made presentations and wrote papers during the lecture phase. They also presented arguments orally and visually during the simulation.
Collaboration and cooperation	With the goal of collaboratively writing and approving several successor resolutions to the Kyoto Protocol, students had to cooperate at a rather deep level.
Conflict management	Both by design and in real life, the interests of individual roles often conflicted with each other, and students were forced to deal with this constructively.
Decision making, problem solving, and planning	During the role-play, problem solving and decision making were exercised in determining which carbon reduction targets to promise and to accept and in agreeing on a number of adaptation and emissions-trading issues.
Using appropriate technology, media, and communication technology	Technology was used where it was feasible and supported learning objectives. This included videoconferencing, web resources, electronic file sharing, and a media blog (which used photos and video).
Civic participation and action	Students not only simulated a contribution to solving climate change but also took real action. Those traveling by air were incentivized to offset their carbon emissions—and nearly all did so.
Evaluation and reflection.	Both the final debriefing sessions and the reflection paper encouraged evaluation and reflection. We were particularly impressed by the high quality of insights.

Note: UNESCO = United Nations Educational, Scientific and Cultural Organization.

leaves a certain risk for frustration among students and faculty alike. Students may understand better why real negotiations get stuck, but with increased awareness of the magnitude and urgency of the problem, they may feel even more despair about the likelihood of solving the climate change problem.

We believe that part of the reason for this potential frustration is the way the real climate policy process has been framed: as a carbon reduction challenge. This framing leads to a dynamic where nation-states take an attitude of "I will only sacrifice if you will sacrifice—and since you won't, neither will

I." We are exploring ways to increase the focus on solutions to the problem, such as an accelerated deployment of renewable energy sources. Reframing the carbon reduction challenge as an energy transition challenge could engage countries in a more constructive competition. In terms of the psychology of negotiations, we believe this framework might increase the chances of a meaningful agreement. To link this idea to our course, it might be worth discussing the potential and market opportunities of renewable energy in more depth during the first part of the course and then suggesting to some players that they consider the benefits of renewable energy when defining their positions.

Sharing the Curriculum

As with any pilot project, the initial implementations of the course were fairly resource intensive. The first teaching used the efforts of four faculty members at two business schools, two teaching assistants, two student volunteers as media representatives, one facilitator, and one illustrator. Even without counting the half-dozen guest lecturers, the ratio of teaching staff to participating students was about 1:3. Obviously, an expansion or franchising of our model would require a much higher teaching efficiency.

We are actively addressing this concern by increasing the number of participating schools (and hence, students) in the Spring 2011 third edition of the course. For additional participating schools, the faculty workload will be minimal. We are providing a complete set of lecture slides, timetables, readings, assignment templates, and even assistance with travel logistics. In addition, we are keeping ourselves informed about the state of real-world climate negotiations to present accurate and relevant material and to select roles and issues that reflect reality. The fact that students write the details of their own roles minimizes the time burden on us, but it is still necessary to keep up with current developments so as to provide appropriate feedback.

Having invested so much time and energy into this curriculum already, and having plans to maintain it for years to come, we would be delighted to "franchise" our model to other universities who share our belief that tomorrow's leaders will need to learn more about climate change—and will need the ability to apply their knowledge in complex situations. Instructors wishing to learn more about our model and to borrow curriculum elements are invited to contact the authors.

Lessons for Sustainability Education

Some of our experience may be generalized in a way that is helpful to others wishing to teach other climate-related courses and to sustainability education in general. In particular, we believe that role-plays can enhance learning on a

wide range of sustainability topics. The following advice is intended for role-plays in particular, but it may be useful for other teaching formats as well.

Make use of economies of scale for curriculum design and delivery. We were fortunate to find support and funding for a very time-intensive curriculum design process, but schools with fewer resources have been able to benefit from our investment by sharing many curriculum elements. For other sustainability topics, this sort of collaborative approach could also prove useful, especially as many schools are currently seeking to expand their sustainability course offerings—often on constrained budgets.

Face-to-face interaction is essential. While Skype and videoconferencing are certainly making the world smaller, communications technologies cannot fully replace in-person meetings. During the semester, students from both schools were able to interact remotely, but they did not appear to be very engaged. The role-play brought out far more energy, excitement, and true understanding of other perspectives. So although we encourage remote collaboration and the use of new technologies, we would not recommend a "virtual" role-play.

Take a multisector stakeholder perspective. Social and environmental issues of all stripes are characterized by stakeholder dynamics—with activists, policy makers, industry, consumers, investors, and the media playing intersecting roles. It is possible to show these various viewpoints and power dynamics through guest speakers, readings, discussion, and role-play.

Focus on practical solutions and draw on multiple disciplines: In other words, take a transdisciplinary approach. Social and environmental challenges can be viewed through many lenses: science and engineering, politics and diplomacy, industry and economics, psychology and sociology. This breadth may be intimidating for instructors, as it extends beyond their own field of expertise, but we found that collaboration with a range of experts meets this need—and that we as instructors learn a great deal in the process. In keeping with this idea, we would not expect a course like ours to be limited to management programs; it could be housed within a variety of different academic departments.

Allow students to help build course content. Sustainability not only draws on many disciplines, it also evolves rapidly—making it difficult for any one instructor to claim perfect expertise. Fortunately, the Internet revolution has made such expertise largely unnecessary. In our role-play, students were asked to research and define their own roles, with some guidance and feedback from instructors, and this process provided

a much more nuanced understanding of each party than we could have achieved with a top-down approach. Asking students to contribute their own resource links to the online database was another way of using crowd sourcing to build content. In future editions, we may use a similar method to define the agenda items on which students will negotiate.

Encourage interaction and debate. In some parts of the world, interaction and debate may be common in the classroom; in others it may be a new and intimidating dynamic. Regardless, we feel it has great value for teaching on sustainability topics—where debate is central and where both facts and perceptions influence outcomes. A role-play is inherently focused on interaction and debate, but these elements can be used elsewhere as well—for instance, during a weekly recap of relevant news articles or through short in-class exercises.

Encourage creativity. Although creativity may be valued in a wide range of settings, it is particularly relevant here. Climate negotiations are fraught with controversy and burdened with inefficiency; the world needs creative new ideas to make progress. This need applies to other areas of sustainability as well, where the problems are coming into focus but long-term solutions will require new ideas—both technical and behavioral. In fact, the ways in which our students can envision solving these challenges may be more important than the ways in which we envision the solution—because the next generation will largely inherit these problems and will define the ways in which they will be addressed.

Allow it to be fun. An engaging and enjoyable experience such as an extended role-play will inspire greater effort and learning at the time and will create stronger memories. Our students particularly enjoyed the small celebration we held for those who offset their travel emissions; it involved sitting at a sidewalk café/bar in downtown Barcelona on a lovely afternoon and talking spontaneously about climate offsets and the upcoming role-play. Another strong element of fun in both years was the media team; students enjoyed reading the media blog and watching the "live broadcast" segments, and perhaps even more they enjoyed staging press conferences, walkouts, and numerous photo opportunities.

Combine urgency with optimism. Although there are enormous challenges in the world today, including but not limited to climate change, a true appreciation of their urgency can become overwhelming. This possibility is especially likely in an extended role-play, where students realize that a room full of people all seeking to solve the problem can become gridlocked by other interests that they once saw as irrelevant or unimportant.

Conclusion

Overall, students were overwhelmingly pleased with the course experience, despite the fact that many had no preexisting interest in climate change and the admission by several students that their expectations had initially been low or modest. Here are some sample student quotations from the reflection papers:

> This was easily the best course in my CEMS year. It really enhanced my knowledge in the topic, and it provided really good insights into a rather ambiguous process. (GH)

> It was my favorite course at HSG [University of St. Gallen]! (SH)

> Never have I experienced a learning process as effective as the one in this course. (IS)

> One of the best learning experiences during my graduate studies so far. (SP)

Several students also indicated, unprompted, that they had changed their own personal behavior as a result of this growing awareness:

> I must admit I have been finding myself paying much more attention to my own energy consumption patterns ever since. (SS)

> It was remarkable to see that this class really changed my behavior toward the environment: I take all electronic devices off the standby mode when I leave [school] to travel back home, and also I think that I will continue to offset my emissions when traveling by plane. (SP)

> I have learned how important the issue of climate change is and was able to adjust my behavior somewhat. (AK)

This level of enthusiasm and impact is extremely rewarding for us; we always hope that students will enjoy and be influenced by our courses, and in this case we believe the topic to be of particular import. The above comments and others like them are evidence that we have met our overall objective of imparting awareness and knowledge about climate change to future business leaders. We hope to further improve and expand on this contribution in the future.

Appendix

Role Assignments

Team	United Nations Regional Group	Negotiating Group(s)	Other Categories	Countries and Roles	Type	School
1	Western Europe and other	European Union	Annex I	Germany: Government	Government	HSG
				Germany: Auto industry	Business	HSG
				Germany: EuroSolar	NGO	HSG
2	Western Europe and other	European Union	Annex I	France: Government	Government	ESADE
				France: Nuclear industry	Business	ESADE
				France: Greenpeace	NGO	ESADE
3	Western Europe and other	European Union	Annex I	United Kingdom: Government	Government	HSG
				United Kingdom: Oxfam	NGO	HSG
				United Kingdom: Airline industry	Business	HSG
4	Western Europe and other	Umbrella group	Annex I	United States: Government	Government	ESADE
				United States: CEI	Business	ESADE
				(*United States: Red Cross*)	NGO	ESADE
5	Asia	Emerging markets		India: Government	Government	ESADE
				India: Steel industry	Business	ESADE
				India: TERI	NGO	ESADE
6	Asia	Group of 77 and China		China: Government	Government	HSG
				China: Coal industry	Business	HSG
				China: Solar industry	Business	HSG

(continued)

Appendix (continued)

Team	United Nations Regional Group	Negotiating Group(s)	Other Categories	Countries and Roles	Type	School
7	Various	OPEC		Saudi Arabia	Government	HSG
				Venezuela	Government	HSG
				(*Iran*)	Government	HSG
8	Various	AOSIS	LDC	Maldives	Government	ESADE
				Papua New Guinea	Government	ESADE
			LDC	Haiti	government	ESADE
9	Africa	Group of 77 and, Algiers bloc		South Africa	Government	HSG
			LDC	Sudan	Government	HSG
			LDC	Uganda	Government	HSG
10	Latin America and Caribbean	Emerging markets		Brazil: Government	Government	ESADE
				Brazil: Ethanol industry	Business	ESADE
				Brazil: World Wildlife Fund	NGO	ESADE
11	Eastern Europe	Umbrella group	Annex I	Russia: Government	Government	HSG
				Russia: Gazprom lobbyist	Business	HSG
				(*Russia: Rosneft lobbyist*)	Business	HSG
12	Eastern Europe	European Union, Central Group 11	Annex I	Poland	Government	HSG
			Annex I	Czech Republic	Government	HSG

Note: LDC = Least developed country; NGO = nongovernmental organization; HSG = University of St. Gallen (formerly Hochschule St. Gallen); CEI = Climate Extremes Index; TERI = The Energy and Resources Institute. Italicized text indicates roles that were not filled because of decreased enrollment.

Author's Note

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Note

1. Prior research has supported the idea that the incorporation of multiple stakeholder views is important when teaching business students about environmental issues because of the inherent complexity and the differing perspectives involved (Collins & Kearins, 2007).

References

Asal, V. (2005). Playing games with international relations. *International Studies Perspectives, 6*, 359-373.

Bonwell, C., & Eison, J. (1991). *Active learning: Creating excitement in the classroom* (ASHE-ERIC Higher Education Report No. 1). Washington, DC: The George Washington University, School of Education and Human Development.

Chasek, P. (2005). Power politics, diplomacy and role playing: Simulating the UN Security Council's response to terrorism. *International Studies Perspectives, 6*, 1-19.

Collins, E., & Kearins, K. (2007). Exposing students to the potential and risks of stakeholder engagement when teaching sustainability: A classroom exercise. *Journal of Management Education, 31*, 521-540.

Cunningham, J. (1984). Assumptions underlying the use of different types of simulations. *Simulation and Games, 15*, 213-234.

Doh, J. (2004). Reconcilable differences? Incorporating a trade-environment simulation into a management course. *Journal of Management Education, 28*, 806-824.

Egri, C. (1999). The environmental round table role-play exercise: The dynamics of multistakeholder decision-making processes. *Journal of Management Education, 23*, 95-112.

Egri, C., Feyerherm, A., & Rogers, K. (1997). Using active learning techniques to teach multiparty negotiation. In S. Waddock (Ed.), *Research in corporate social performance and policy: Suppl. 2. Special issue on innovation, reflection, and active learning strategies for social issues in management* (pp. 117-148). Greenwich, CT: JAI Press.

Fink, L. D. (2003). *Creating significant learning experiences: An integrated approach to designing college courses*. San Francisco, CA: Jossey-Bass.

Fisher, R., & Ury, W. (1983). *Getting to yes: Negotiating agreement without giving in*. New York, NY: Penguin Books.

Jaeger J., & Scheringer M. (1998). Transdisziplinarität. Problemorientierung ohne Methodenzwang. *GAIA, 7*(1), 10-25.

Lantis, J., Kuzma, L., & Boehreret, J. (2000). *The new international studies classroom: Active teaching, active learning.* Boulder, CO: Lynne Rienner.

McIntosh, D. (2001). The uses and limits of model United Nations in an international relations classroom. *International Studies Perspectives, 2*, 269-280.

Mittelstrass, J. (1992). Auf dem Weg zur Transdisziplinarität. *GAIA, 1*(5), 250.

Monahan, G. (2002). Acting out Nazi Germany: A role play simulation for the history classroom. *Teaching History: A Journal of Methods, 27*, 74-86.

Moore, L., Shetzer, L., & Stackman, R. (1992). Frond Lake: An environmental policy role play. *Journal of Management Education, 16*, 146-162.

Pettenger, M., & Young, N. (2006, March). *Assessing a role playing simulation: Design and assessment model for a post-Kyoto climate change treaty*. Paper presented at the annual meeting of the International Studies Association, San Diego, CA.

Shaw, C. (2004). Using role play scenarios in the IR classroom: An examination of exercises on peacekeeping operations and foreign policy decision making. *International Studies Perspectives, 5*, 1-22.

Smith, E., & Boyer, M. (1996). Designing in-class simulations. *PS: Political Science and Politics, 29*, 690-694.

Tucker, M., & Tromley, C. (2005). Dams and salmon: A Northwest choice. *Journal of Management Education, 29*, 512-525.

United Nations Educational, Scientific and Cultural Organization. (2006). *Education for sustainable development—A transdisciplinary approach to education: An instrument for action*. Retrieved from http://unesdoc.unesco.org/images/0014/001486/148650E .pdf