The Comedy of the Commons Revisited:
Exposing Hobbes through Experiential Learning

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International Association for Business and Society meeting, Banff, Alberta, Canada, March 2010
Conference Theme: *Business and the Sustainable Commons*
Paper Proposal
Key Words: *sustainability, management education, social contract*

Variations of exercises based on prisoners' dilemmas, or more broadly social dilemmas, are popular in business courses spanning several disciplines and levels of analysis—from organizational behavior to international economics to business and society to environmental management. The exercises are typically used to demonstrate lessons about cooperation and defection in situations of interdependence, when defection results in superior individual gains—at least in the short-term, and in terms of instrumental payouts—but at the expense of collective gains, social harmony, and long-term self-interest.[1]

Multi-person prisoners' dilemma exercises have been popular in business ethics courses as a means for demonstrating the dynamics underlying Thomas Hobbes social contract theory (ref: *Leviathan*, originally published in 1651). Such games are especially pertinent to this topic because they are microcosmic instantiations of the problem laid out by Hobbes, in which self-interested individuals stand to benefit in the long term only from universal cooperation—and importantly in the face of short-term temptations for defection at the individual level.

As traditionally played social dilemma games are very useful in making manifest for students the precise nature of interdependence and the tradeoffs implied in cooperation and defection, as well as the fragility of cooperative social arrangements. By definition, games based on the prisoners' dilemma preclude student communication or collaboration before or during the game, and when communication is allowed, it is typically only after several rounds have been played. Mid-game attempts to establish cooperation (e.g., by allowing communication and collaboration) are usually unsuccessful—and this largely due to the fact that mutual trust has been so eroded by the competitive nature of the game that only Herculean efforts could reverse the drift toward ruin. Moreover, students are rarely allowed a voice in determining or altering the rules of the game.

The result is that cooperation, even if realized early, is rarely sustained throughout the game. In short, the rules of the game *de facto* bar students from establishing a Hobbesian social contract. Thus, students come to learn that cooperation is very difficult to initiate and even more difficult to maintain, but they are frequently so frustrated—or angered—from the experience that they find it difficult to concentrate on 'lessons learned' during the debriefing. Furthermore, because participants have relatively little control over establishing rules that would support cooperative gains, the experiential learnings are frequently restricted to the negative consequences of uncontrolled social dilemmas.

From the perspective of teaching ethical theory, this leaves quite a bit to be desired. Ideally, an experiential exercise used to teach social contract theory would allow students the opportunity to participate in the establishment of the contract, as well as experiencing the consequences of that contract. Toward that end, the authors have developed a version of a social dilemma classroom exercise that encourages students to develop, enact, and renegotiate a social contract. The exercise is based on Hardin's *Tragedy of the Commons* (1968), in which students are presented with a simulated ecosystem (described below) from which they may harvest (or return) a self-regenerating resource.[2]

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[1] We assume that the reader is familiar with basic game theory concepts, particularly those that apply to social dilemmas. For the uninitiated, an excellent review may be found in Kollock, P. (1998).

[2] An earlier version of this game—and its 'learnings'—was submitted to and accepted for a *Discussion Session* at the 2006 meetings of the International Association for Business and Society. The current *Paper Proposal* more fully

As in other commons dilemmas, individual long-term good, as well as the good of the resource, is achieved if the collective harvests an amount equal to or less than that necessary to achieve a sustainable level. Thus, a cooperative choice involves harvesting only one's 'fair share' of this sustainable harvest. There is, however, a persistent individual incentive—at least in the short term—to 'defect' by harvesting more than a mutually sustainable level of the resource. Even small scale defection typically leads to cascading defections, a mass breach of the social contract, with its resulting harm to the collective and the individuals within it.

Before the game, the students are provided with two sets of rules. The first set of rules is unalterable, and deals mostly with the regeneration and carrying capacities of the simulated ecosystem and the basic protocols for the game (e.g. played in rounds with simultaneous harvests). The second set of ground rules—dealing with issues such as anonymity, allowable harvests, etc.—are negotiable. Before the game begins and while it is being played, the students are free to collectively determine what the rules of the game are to be. This may include decisions as simple as waiving the right to anonymity, but may include more elaborate variations, including the addition of rules sanctioning defection. Beyond making it known that the rules are negotiable, little guidance is provided to the students in how they can or should go about doing so. It is in the collective sensemaking, social structuring, persuasion, and enforcement where the deepest learning occurs.

Administering the Game

The commons in the social dilemma exercise here considered consists of a simulated self-regenerating public good—e.g., a marketable fish from international waters (though the exact good is not specified). The resource pool regenerates at a peak rate averaging 15%; mirroring a biologically system, however, at low resource levels the regenerative rate is half the peak rate, and there is a maximum carrying capacity above which no further growth is possible. At all resource levels a random factor has been introduced such that the actual rate varies between 5% below and 5% above the set rate—a concession to the variation found in natural systems. Students are allowed to harvest (or return) a proportion of the population in each of a set number of rounds, with the beginning population for each round being the population at the end of the previous round, increased by the regenerative coefficient (and adjusted with the random factor referenced above). The beginning population level is set within the limits for peak regeneration, yet well below carrying capacity. Resource pool dynamics are demonstrated over a few rounds with randomly selected harvest amounts to familiarize students with the nature of the game and to give them some insights into the parameters involved. Students are not provided with an explicitly stated objective, but are rather encouraged to include this in their discussion.[3]

The state of the population and amounts harvested and returned in each round is tracked in a spreadsheet that is projected for all students to see. Figure 1 presents an example of a spreadsheet for a game played by graduate business students this past summer; Figure 2 an

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elaborates the requirements for a 'successful' outcome in this experiential exercise, and is being drafted for publication.

[3] Exogenous incentives are occasionally provided, such as making participation grades for the day contingent on their total harvest for the game. In such cases, the provision is added that the final population balance will be divided equally among the teams.

example played by undergraduate students this same summer. Each numbered column represents a player team, while each row represents a single round of the game.[4]

Figure 1: Graduate Business Class—Summer 2009

Begin	Max	1	2	3	4	5	6	7	8	9	10	11	12	End	harvest
440	**37**	1	37	4	37	11	0	19	14	5	0	0	0	**312**	**128**
324	**27**	5	27	4	27	6	1	19	-12	5	0	0	0	**242**	**82**
250	**21**	21	21	15	21	21	-1	5	21	21	0	0	0	**105**	**145**
109	**9**	-10	9	-15	9	-9	0	5	-20	-21	0	0	0	**161**	**-52**
166	**14**	1	14	0	14	0	1	14	0	14	0	0	0	**108**	**58**
127	**11**	0	0	0	0	0	0	0	0	0	0	0	0	**127**	**0**
156	**13**	0	0	0	0	0	0	0	0	0	0	0	0	**156**	**0**
Sum		18	108	8	108	29	1	62	3	24	0	0	0		
														hrvst	361
														end	156
															517

Figure 2: Undergraduate Business Class—Summer 2009

Begin	Max	1	2	3	4	5	6	7	8	9	10	11	12	End	harvest
440	**37**	0	2	4	1	4	1	2	5	0	4	0	0	**417**	**23**
475	**40**	0	6	4	4	4	3	3	7	0	6	0	2	**436**	**39**
494	**41**	0	11	-3	8	4	5	5	10	0	4	0	8	**442**	**52**
503	**42**	0	1	0	12	0	0	13	15	0	0	0	8	**454**	**49**
514	**43**	0	18	0	15	15	5	16	24	0	10	0	5	**406**	**108**
463	**39**	0	32	15	8	-15	-5	8	19	0	4	0	-5	**402**	**61**
468	**39**	0	0	0	0	0	0	0	0	0	0	0	0	**468**	**0**
Sum		0	70	20	48	12	9	47	80	0	28	0	18		
														hrvst	332
														end	468
															800

In both cases, the beginning population is 440 units, the average regenerative coefficient is .15, and the maximum carrying capacity is 1,500 units. These 'mechanics' are elements of the game that cannot be negotiated by the students. The precise carrying capacity and rate of regeneration may or may not be provided by the instructor before the game is played, or the instructor may choose to have the students deduce the algorithm on their own through observing sample spreadsheets before the game commences (though the introduction of the random factor referenced above makes precision of estimation impossible—true to the real world).

[4] In both sample spreadsheets, the shaded cells represent 'shill' players who take no units throughout the playing of the game.

The game begins as students discuss the game first within their teams (if used), and then opening class-wide discussion for a set period of time, typically from three to five minutes. In the discussion, the instructor may provide facilitation, but the negotiation of rules is entirely up to the students. After the initial rules (if any) are established, the individuals or teams of students submit their initial harvests to the instructor, who enters them into the spreadsheet. Students are then allowed to discuss the results as well as future decisions, and to alter rules regulating the balance of the game. Iterations of submissions, entries and discussion are repeated until the game has ended—almost always with the inevitable collapse of the system.

In the graduate game, the class was never able to maintain the balance above 400 units—which had been disclosed as the minimum needed in order to achieve maximum regeneration. While three groups extracted fewer than ten units total, this was not enough 'restraint' to offset the huge extractions of other groups. The game was terminated after five rounds as the system went into collapse. In the undergraduate game, the class maintained the balance above 400 units for the entire game, even though there were radically different levels of extraction across groups. Total extractions were virtually identical between the two classes, but the ending balances were dramatically dissimilar—with one commons left in crisis and the other left healthy. Why?

Debriefing the Game

The commons game is introduced into the course immediately prior to a discussion of social contract theory. Directly following the game, those groups that have either maximized or minimized their extractions from the commons are asked to 'report out' to the class their rationale used in playing the game. Those students choosing to minimize extractions come to realize that their strategy to save the common resource is ineffective absent similar behavior on the part of their classmates. Those students choosing to maximize extractions only reluctantly come to realize that in the long-term their self-interest can only be maximized through cooperating with others. All students understand that in order to create a sustainable system that nets benefits for each over time there must be mechanisms in place that ensure coordination for the good of all. It is at this point that social contract theory comes to be seen as the 'solution' to the tragedy they have faced—providing the ideal opportunity to introduce Hobbes, Hardin (1968), and lastly Rachels (2002): "Morality consists in the set of rules, governing how people are to treat one another, that rationale people will agree to accept, for their mutual benefit, on the condition that others follow those rules as well." Students are challenged to craft a social contract that would serve all their interests were the game to be replayed over a longer time horizon, affording a unique opportunity to then provide a link between abstract ethical theory and real-world praxis.

Students are asked to catalogue what it would take to play the game in a sustainable manner. These lessons, deduced from their experiential learning, include the following:

1) Systems are fragile.
2) Individual extractions can make a dramatic difference in system sustainability.
3) Restraint on the part of any individual is not sufficient to preserve the commons.
4) Agreement on a common goal is critical to 'success.'
5) To sustain the commons requires communication with others.

6) To sustain the commons requires cooperation with others.
7) To maximize individual extraction over the long term requires communication with others.
8) To maximize individual extraction over the long term requires cooperation with others.
9) Enlightened self-interest—rather than a focus on preservation of the resource itself—is the most reliable route to preservation of the resource.
10) Regulatory mechanisms are necessary to ensure 'success'—either long-term individual or for the resource.
11) Trust can mitigate the need for regulation.
12) Leadership is critical to crafting consensus—and it only takes one effective leader to guide the class to 'success.'

These lessons, deduced from their experiential learning, do *not* include the following:

1) To sustain the commons requires altogether abandoning individual self-interest in favor of an exclusive focus on the collective good.

The authors currently have almost twenty years experience with the development, adaptation and administration of the commons game. In this practice they have found several factors don't 'matter' in terms of the outcome of the game:

1) The amount of information provided to students as to the 'mechanics' of the game makes no difference to the outcome.
2) Specificity of resource definition (e.g., as marketable fish from international waters *v* a generic resource which has value but which is not needed) makes no difference to the outcome.
3) The amount of time the students have had to form social relationships over time makes no difference to the outcome.
4) Whether students are undergraduates or graduate students or executives makes no difference to the outcome.
5) The theme of the business course, whether general management or ethics or environmental management, makes no difference to the outcome.

And there you have it: an inductive approach moving from the experiential and specific to uncovering the principles necessary to overcome the tragedy of the commons. Moving from the classroom to the 'real' world—with students linking principles of social contract theory to the use of the commons of copy machines, break-room refrigerators, and coffee machines…to health care, unemployment insurance, and the natural environment. Channeling visceral feelings and emotion into rational, generalizable and pragmatic conclusions—perhaps the only hope we have for securing positive change within what is arguably a rapidly devolving world.

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