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A Game Of Negotiation: The "Deliberation Engine"

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Editors' Note: *This chapter envisions a negotiation game which can promote learning, as well as fact-finding on any hot-button issue. The authors outline a particular form of online game, in variants separately designed to work with formal education, working professionals, and the general public. The game, as conceived here, is designed to address a mounting problem in negotiations of the largest scale, public issues: an apparently increasing tendency of people and parties to make up their own facts. Global climate change is considered as a test case. A*

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related chapter in this volume, The Education of Non-Students, *assesses the prospects for a related new strategy, using theater, film and games to begin to provide informal negotiation education for the vast majority of the public who will never take any kind of course on negotiation.*

Introduction

There is currently no readily usable online mechanism that enables groups to compare their assumptions while setting aside, for the moment, the positions emanating from these assumptions. Such a system, if it were robust enough, might be able to reveal a great deal about what is really powering a public dispute, showing where the main conflicts of opinion are stemming from.

We believe such a tool could be designed so as to invite what-if experimentation and augment other conflict management techniques. The web-based "deliberation engine" tool we will outline here, by itself, would enable users to explicate a particular problem more fully, and encourage them to explore more options than are currently practicable. Such a device, we think, would also become an informal teaching tool of particular value in an emerging effort to address the public need for more "informal" education in our field (see Blanchot et al., *Education of Non-Students*, in this volume).

Our team may, in fact, go on to develop such a tool ourselves. (Our current design is discussed in this chapter's Appendix.) But recognizing the odds against any one version of any new technological idea actually coming to fruition, we prefer to set forth the concept in detail here, and avoid the risk of playing the "dog in the manger." To put it another way, it is more valuable to us to work toward an increased chance of such an idea being successfully executed by *someone* than to treat it as intellectual property.

This is, in turn, partly because we believe this tool can also become the central and most public element in a larger collaborative toolbox, some parts of which have already been developed. In conjunction with other tools, we think a "deliberation engine" will improve the odds that well-reasoned solutions to public controversies will prevail.

This chapter, in a nutshell, outlines the possibilities of at least one version of an emerging interactive technology tool. The "deliberation engine" is designed to enable multiple users to offer, review, change, or model the different factual assumptions that are brought to bear on a complex or contentious issue.[1] Given the context of this book, we will detail its pedagogical advantages as a tool for teachers to utilize in teaching negotiation and conflict engagement, in addition to its real-problem applications.

Background

We know that different parties use widely varying factual assumptions, especially when they are engaged in an active conflict. By the time an issue is joined in public, these assumptions are often buried under mounds of rhetoric. It is a central tenet of democracy that everyone is entitled to hold and express their own opinion. But for people to believe that they are entitled to their own *facts* is a pernicious and apparently growing trend.

When issues move beyond personal experience, everyone makes tacit assumptions about the "facts"; and it is well demonstrated that "facts" are subject to cognitive bias, especially in contexts laden with emotional controversy (see, e.g., Guthrie and Sally 2006; Shapiro 2006; Korobkin and Guthrie 2006). Compounded by the sheer complexity of the underlying issues in many of today's policy disputes (e.g., in the United States, national health care reform, immigration, Social Security, tax policy, or tort reform, to name a few), this makes it virtually impossible to understand everything that is powering an opposing opinion, even for those significantly interested in, and knowledgeable about, what is going on in a particular area. This inability to see clearly what assumptions another person or group is relying on degrades the ability to conduct civilized and fruitful conversations. And that, in turn, fuels the periodic rise of extreme and unproductive political discourse.

It is human nature to suspect or at least question the motives of anyone who disagrees with you. Over hundreds of years, society has developed tools, for purposes of public debate – the press and formal research are merely the most obvious – that purport to answer the need for reliable facts. Yet in the United States, at least, our most common mechanisms for sifting and winnowing the facts – the press and media generally – have become perceived as increasingly partisan, even as newspaper and TV network budgets for addressing and explaining complex factual situations have shriveled. The rise in viewership of viewpoint-oriented Fox and MSNBC, at the expense of more sober outlets like CNN or PBS, is merely part of a broader trend. Another part of this trend is reflected in the general public becoming more aware that "facts" introduced in controversial debates are often premised on research funded or sponsored by stakeholders, rendering them suspect. Moreover, the same stakeholders who vigorously "spin" facts are often not shy about questioning the impartiality of public institutions historically deemed to be above the fray of partisan purposes, such as the National Academy of Sciences or the Congressional Budget Office.

We believe that, at least in the United States (and perhaps more broadly) it should be possible to improve on this situation significantly, using new technologies and smarter social processes. The formats we envision require relatively economical organizational innovation; many of the key technological elements are available off-the-shelf. We are interested in helping to develop a suite of new mechanisms (some of which are already under way) that will encourage people who believe vastly different things on important topics of concern to understand something of each other's factual assumptions, and to become more inclined to grapple with those differences in a respectful and productive way.[2] We are also eager to engage those in the large but often non-assertive political "center," and to harness their greater proclivity than the more opinionated to seek reasonable compromise resolutions. We will focus here on the central element in the suite: a public, transparency-generating tool that can help turbo-charge dialogue, deliberation and negotiation. We call this tool the "deliberation engine."

Existing Analogues

Several progenitors of the "deliberation engine" exist, and suggest that this should be a do-able enterprise. One category is "fact-checking" systems such as www.factcheck.org and www.snopes.com. These demonstrate both that there is an audience for accuracy and that the business of checking assumptions and representations is neither impossibly laborious nor impracticably expensive. The drawback of the existing kinds of tools is that they focus on a single question or sub-issue at a time, and usually on an accusation that someone is stretching the truth or lying outright. This focus leads them to function more like arbiters of truth or "fact police" than as facilitators of good discourse and well-designed problem solving.

A second mechanism consists of repositories of information whose aim is to present both sides of a controversy, without deciding it, in order to provide decision-makers with resources for critical thinking and to provide the general public with the background for making more informed choices. One example of this is www.procon.org.

Detailed background articles in newspapers of record, and the less frequent detailed documentaries on public television, form a third set of important fact-sorting mechanisms. These remain valuable, and can help iron out misconceptions. But they also suffer from increasingly severe time, space and cost constraints. The inability of any one team of writers/producers/editors to easily identify all pertinent sources of information on a particular topic may lead, meanwhile, to accusations of bias. These mechanisms are also passive, one-way

communication experiences (with some promising but rare exceptions, such as "balance the budget" tools,[3] or the "choose the best neighborhood" tool discussed below). Most important, they do not allow for Boolean what-if experimentation by interested experts, let alone by "civilian" users or readers.

A fourth mechanism is the "wiki," best known through www.wikipedia.com. This continually growing encyclopedic reference demonstrates that it is possible to allow mass participation, such that persons with limited individual knowledge (but many opinions) can collaborate with relative goodwill to produce a usable article. It is encouraging for our purposes that only a tiny fraction of the topics treated on Wikipedia have generated such heat that a moderator is even necessary (for more on dispute resolution on Wikipedia, see Hoffman and Mehra 2009).

What we suggest draws from all four of these precedents, but would itself be quite different in structure, application and value.

The Deliberation Engine: Components

The deliberation engine as we conceive it consists of several main components. Most obvious is a website, structured to allow one or more users to examine an issue from the perspective of any of the main identified parties to that issue, and also to *modify* that perspective by changing the assumptions behind any element. In some ways, the engine can be seen as a distant relative of the well-known "SimCity" (a city-building simulation video game[4]) and its various progeny, but with real issues and real counterparts. The website is structured so as to make all assumptions and facts easily retrievable, transparent, and visually attractive. SimCity is an excellent demonstration that a manipulable database need not look hideous.

An excellent small-scale example of what we mean by a "deliberation engine" has already been published. For a *New York Magazine* article that asked "What's the best neighborhood in New York?", the magazine retained statistician Nate Silver (of www.fivethirtyeight.com) to assess fifty neighborhoods according to cost and quality of housing, quality of schools, access to transportation, restaurants, entertainment and many more criteria that enter into people's judgments of a desirable place to live. His article (Silver 2010) straightforwardly describes the weighting choices he made, and why.

For our purposes, the most interesting application is not the article itself, nor the topic, but the supplementary website. There, Silver organized what amounts to a deliberation engine of the kind we envision – just on a small scale and for a single, not-very-controversial topic.

Silver invites a user to look at a list of desirable neighborhoods, and then to *modify* the list by inserting the user's own weighting of the criteria. The changing ranking can be seen in real time. We can imagine a young family hunting for a home in "the right neighborhood for us" using this tool. The process could go something like this: the family members engage in discussions. They do not have to agree on all of the variables that seem important, though – no variable is excluded if husband, wife *or* children want it included. This avoids unproductive arguments; if one family member thinks another has offered an absurd criterion, she or he can simply weight it at zero in her ratings. They enter their individual ratings and then weight them.[5] They amalgamate their weightings, discuss them, perhaps agree on a smaller, more focused list, change the variables, add new ones, and then do individual and amalgamated scorings. The resulting information is used to help prioritize possible neighborhoods for their family's search. At a minimum, it is easy to imagine the time stuck in traffic, driving around one ultimately unsuitable neighborhood after another, being reduced; with some real-world families, we suspect that without such help, arguments may become so repeated and acrimonious that everyone gives up, and openly or tacitly agrees to stay in their current tiny apartment.

The New York livable-neighborhood example is at the low end of the complexity scale for the issues we have in mind.[6] Toward the high end are matters such as sustainable energy production, decisions about pandemic vaccination policies, military base closures, or American policies on health care reform. The health care example is emblematic. In the raucous debates with dueling fact-sets and highly divisive polemics, it has been far from clear that the public even agrees on what the topic is. Are we talking about "health *care* reform"? Or is it "health *insurance* reform"? Is it the allocation of scarce health care resources, or is it the reform of public health practices and the promotion of healthier lifestyles? Or, is it the reform of malpractice laws? Or, is it something else again (Medicare costs, abortion, pharmaceutical imports, or some combination of all of the above)?

A step beyond even these is global climate change. Both because of its inherent importance and because its scientific and political complexity provides an excellent challenge to "stress-test" a new suite of tools, we are contemplating building a first set of implementations of the "deliberation engine" around this issue, as described below.

Global climate change has many layers and subsets of issues. To name just three, different parties might find themselves contending over:

1) Whether severe and harmful warming will in fact occur unless there is significant curbing of anthropogenic (human produced) "greenhouse gases" ("GHG") such as CO2 emissions, as the vast majority of climate scientists and modelers believe but many other public actors dispute;
2) whether there are enough national security, economic and other reasons for the United States to mount a major effort to accelerate replacement of GHG-producing fossil fuels with alternative, renewable energy sources such as solar and wind, even if the case for doing so on purely environmental grounds is subject to reasonable doubt; and
3) whether, if such acceleration is desired, it makes more sense to increase the cost of fossil fuel generation through a cap-and-trade or carbon tax scheme, or alternatively, to mount a "moon shot" type of research-and-development effort, to reduce the cost of alternative energy through innovation and efficiency improvements.

All engines have multiple moving parts. In the climate change context, the deliberation engine could encourage focusing on common questions, where that is desirable and possible. But as we conceive it, the engine would also be nimble enough to allow different questions to be entered, and/or questions to be put in play with different parameters. Thus one set of users might take up one fact-intensive set of questions, such as the reliability of predicted worst-case adverse effects scenarios. Another might look at the relative efficiencies and costs of "taxing" fossil fuel generation, or of developing lower-cost alternative energy systems in order to achieve more rapid replacement of the former with the latter. Someone else might look at the relative cost-benefit of cap-and-trade versus a carbon tax. With robust hardware and software (which our particular group has available through an existing platform, though we are not alone in this), a large variety of such questions could be accommodated simultaneously. As the effects of asserted answers to one set of questions can be related to the answers given to another set of questions, a more comprehensive understanding of interrelated issues becomes visible.

The "deliberation engine" on its own would be a powerful tool, but it is important to note that it can integrate with other tools to produce an even more effective suite. The development over the last three decades of public policy facilitation, negotiated rulemaking and several other strategies is well known, enough so as not to require discussion here. Another existing related tool is less obvious, however. In some of our work, we use variants of a specialized collaboration process called Joint Fact Finding ("JFF"). The procedure requires that

those who are affected by a decision also be involved in framing the research question(s) and identifying, generating, analyzing and interpreting the scientific and technical information that will be used to inform a decision or action. JFF procedures are flexible but have six critical characteristics (see, Adler et al. 2011 and Schultz 2003):

1) They involve multiple stakeholders who may have very different viewpoints;
2) they are collaborative and require people to work together;
3) they are structured, meaning, JFF processes and meetings are not left to chance but are well designed and highly focused dialogues;
4) they are inquiry based and require a robust exploration to understand the problem from all angles;
5) they are interest-based study processes and not forums for arguing political positions; and
6) they are integrative and multidisciplinary. They bring different types of knowledge, information and data to the table.

Nested into a rigorous social process like collaborative JFF, the deliberation engine has enormous problem-solving possibilities. An algorithm that describes how JFF works in the present context might start to look like this:

1) Bring together a group of potential collaborators/opponents.
2) Frame the issues or problems.
3) Develop a list of all possible factual variables that might be pertinent to the issues or problem. Discard none.
4) Clearly separate questions of "fact" from questions of "values," as far as possible; for example "what level of greenhouse gases ("GHG") will trigger each of various severities of warming effects?", versus "what level of climate change seems reasonably tolerable from an overall cost-benefit standpoint?"
5) Identify the fullest possible set of "data" needs that will help inform the fullest possible set of "fact" questions.
6) Populate the fact questions with the fullest possible data sets in ways that allow everyone to see everyone else's suggested or asserted facts.
7) Ensure open enough sources that the methods and assumptions behind any suggested fact can be checked by others with contending views. Where sources and methods are *not* open, data sets are either disqualified or relegated to a secondary or tertiary status.

In such a structure, any time one set of facts is added or challenged, the impacts on other facts are quickly and transparently visible to everyone. JFF actually embodies other important bits and pieces of

social process. Yet in current practice, Step 1 alone – bringing people together – can be hard to get a commitment to, not to mention expensive, because the conventional practice of a physical meeting with participants, who are often geographically as well as intellectually distant from each other, requires considerable preparation and coordination. An online equivalent could help parties get beyond a crucial stage when few have yet seen the value of committing to bear such expense. This factor alone could greatly expand the range of issues and of parties that can be drawn into our field's existing processes.
To summarize thus far: our concept is fundamentally a new web-based tool by which anyone can modify a chain of reasoning – but not without admitting their chosen fact base, and with an incentive to support that with credible references or evidence.

The further possibility exists that linking multiple databases may reveal relationships between issues now mostly treated as unrelated; for instance, between expenditures to minimize GHG in order to stem sea-level rises and a possible policy to protect or move at-risk seashore facilities (an issue somewhat similar to the long-running questions about allowing versus banning reconstruction of flood-plain structures harmed or destroyed by past floods.) While that level of integration would not be a first-generation goal, even an early generation could allow for multiple kinds of uses. A "macro" climate change version, for example, would allow people to plug in scenarios for any public policy choice and, in effect, see what is likely to happen. It would allow and even encourage all biased versions of "the facts" to be submitted to transparency and respectful challenge.

But in practice, it is probably more appropriate to begin with a single "pilot" sub-issue within climate change, and build up to the macro level over a series of manageable subtopics. Whether a given topic or sub-topic might have a moderator, a JFF stakeholder group, or even an expert panel to establish the "conventional wisdom" on that sub-topic could be decided by the tool's organizers and users. Even where conventional-wisdom or panel-of-experts opinions exist, though, a user could still modify the resulting premise or number – but the result might show in red, as a revised assumption that others might want to review more closely than most.

Will People Play?

Like any new technology, it is impossible to anticipate all of the uses to which such an engine might be put. With all due humility, therefore, and focusing on our particular work (i.e., the realm of public issues), we currently identify three distinguishable markets for the particular form of this tool we contemplate: educators; professionals

directly engaged in public policy (e.g., public policy experts and leaders, facilitators, mediators, and various kinds of partisans); and the general public. At a core level, these potential markets are integrated, but they require different interfaces.

For reasons of efficiency and economy, and because of patterns of professional interests and contacts that might not apply to a different team also interested in this "space," our concept includes testing the tool first with a multinational panel of well-known teachers of negotiation and their students, which we describe as "tier 1" of the structure. The reasons are discussed further below. We think that following initial testing at tier 1, the tool could be quickly adapted and adopted at "tier 2" by professionals directly engaged in public policy. It would also, we think, be used by partisans as well as by more flexible "middle-grounders" who would find they can now more easily and more productively engage in serious debates over new or modified laws, rules, standards, or regulations.[7]

If *partisans*, in particular, can be induced to input data in such a structure, either individually or collectively, and to agree on as much of the baseline data as possible, the prospects would improve further, and two positive consequences would flow at "tier 3" on any given issue (described below as the Public Game.) First, the deliberation engine would acquire widespread credibility and a real depth of information. (Partisans often have handy access to much of the information needed to address any public controversy.) The second consequence from partisan or collaborative participation is financial: It becomes possible to envision financial sustainability based on the now-familiar model of fees payable for customized versions by heavy users.

Ultimately, the most obvious and most widely used format, if our particular model goes forward, will be what we are describing for technical purposes as "tier 3." This is a version with a "lite" interface that is free, open, and accessible to anyone through a website, a portal, or an application for iPads and smartphones, etc. The professional version (tier 2) would be used for heavy applications, and might allow for custom formatting. ("Civilian" users might be able to access a certain number of pages per month, in more standardized format(s), and pay nothing directly, but would support the engine indirectly through advertising. Heavy-duty users would pay subscription fees.) Meanwhile the first version likely to be actually developed (tier 1, for faculty and students) is far from temporary, even though it represents our first foray. As an integral part of the structure, it would continue to provide for low-cost population of the database with new data for any newly mounted topic or issue.

We believe that if and when such a structure is competently offered (whether by us or by others), partisans as well as collaborators will in fact play, and with gusto. The reasons are not hard to follow: First, on any issue of perceived importance, no partisan group can *afford* to leave any significant playing field of public opinion to its opponents. The moment any one group becomes interested in mounting its own data on a public database, something of an equivalent is created to a trial in court, in which the worst strategy the opponent can adopt is to fail to show up at all. Second, those in the middle, who often are not engaged productively in highly polarized debates, should see a better opportunity for exercising constructive influence within a consensus-building project, in which posturing is not an advantageous strategy. And third, we are living in a society which already makes great use of online games, whether they are immersive and in-depth (e.g., World of Warcraft) or simple and addictive (e.g., Angry Birds or Farmville).[8] If our design or something similar is implemented well, we think the deliberation engine could become as compelling as many of the games that currently are consuming hundreds of millions of hours of human attention every year.

Will partisans, in particular, play with good manners? We believe that Wikipedia is far from unique: there are many and heartening examples of unmoderated or only lightly moderated conversations in which public discourse is conducted in a spirit of (relative) mutual respect and a degree of procedural cooperation, even among parties who are implacably opposed on a policy level. In fact, several of the authors have earned our living as facilitators and mediators in such settings, both online and offline. It is routine to us to create such dialogue, often among parties who doubted that it could be done.

At the same time, once such an engine reaches tier 3, we are not naïve as to the incentives for public policy players to "game" systems, or ignorant as to the history of such activity with systems much older than our game. Robust electronic security measures are called for at that stage. Fortunately, robust security is a feature already developed for the platform we are working with; and again, we are not the only potential implementers thus equipped.

Conclusion

In the United States, we live in an age in which public policy is all but paralyzed by intransigent political conflict. This paralysis is abetted by dysfunctional discussions around complex issues, frequently disconnected from anything resembling objective facts. Whether or not we as a group manage to navigate the financial, technical and other hurdles inevitable in development of an idea into a practical

tool, we would be delighted to see other groups take up the challenge we pose here. Our reasoning is not purely altruistic, either: there are many markets, and even whole industries, which became credible and achieved "scale" only when more than one offering became available.

Notes

[1] There are, of course, complementary ways to view the current state of affairs in public disputes. One of them is a particularly useful sidelight on the exceptionally complex situations we hope the deliberation engine will help to address. In recent years, the concept of an "uncertainty monster" has been gaining traction. Judith Curry and Peter Webster (2011) summarized the emerging concept as follows:

> The "uncertainty monster" is a concept introduced by Van der Sluijs (2005) in an analysis of the different ways that the scientific community responds to uncertainties that are difficult to tame. The "monster" is the confusion and ambiguity associated with knowledge versus ignorance, objectivity versus subjectivity, facts versus values, prediction versus speculation, and science versus policy. The uncertainty monster gives rise to discomfort and fear, particularly with regard to our reactions to things or situations we cannot understand or control, including the presentiment of radical unknown dangers. An adaptation of Van der Sluijs's strategies of coping with the uncertainty monster at the science–policy interface is described below.
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> - *Monster hiding*. Uncertainty hiding or the "never admit error" strategy can be motivated by a political agenda or because of fear that uncertain science will be judged as poor science by the outside world. Apart from the ethical issues of monster hiding, the monster may be too big to hide and uncertainty hiding enrages the monster.
> - *Monster exorcism*. The uncertainty monster exorcist focuses on reducing the uncertainty through advocating for more research. In the 1990s, a growing sense of the infeasibility of reducing uncertainties in global climate modeling emerged in response to the continued emergence of unforeseen complexities and sources of uncertainties. Van der Sluijs (2005: 88) states that "monster theory predicts that [reducing uncertainty] will prove to be vain in the long run: for each head of the uncertainty monster that science chops off, several new monster heads tend to pop up due to unforeseen complexities," analogous to the Hydra beast of Greek mythology.
> - *Monster simplification*. Monster simplifiers attempt to transform the monster by subjectively quantifying and simplifying the assessment of uncertainty . . . .
> - *Monster detection*. The first type of uncertainty detective is the scientist who challenges existing theses and works to extend knowledge frontiers. The second type is the watchdog auditor, whose main concern is accountability, quality control, and transparency of the science. The third type is the merchant of doubt (Oreskes and Conway 2010), who distorts and magnifies uncertainties as an excuse for inaction for financial or ideological reasons.
> - *Monster assimilation*. Monster assimilation is about learning to live

with the monster and giving uncertainty an explicit place in the contemplation and management of environmental risks. Assessment and communication of uncertainty and ignorance, along with extended peer communities, are essential in monster assimilation. The challenge to monster assimilation is the ever-changing nature of the monster and the birth of new monsters.

[2] It has been estimated that between three and one-half and five positive experiences for every negative one with the other party are required, to get people unmired from a deeply felt dispute. This is a daunting figure, which demands a sustained strategy (Coleman 2011).

[3] A good example would be one hosted by the New York Times, which specifically invited readers to "Make your own plan, then share it online." See http://www.nytimes.com/interactive/2010/11/13/weekinreview/deficits-graphic.html (last accessed September 10, 2012).

[4] A general description of this game and its progeny can be found at http://en.wikipedia.org/wiki/SimCity_(series) (last accessed September 10, 2012).

[5] This method of assigning issues not only value, but also weight, has been used in other negotiation platforms. For example, in iCan Systems' Smartsettle system, parties make offers to one another on multiple issues; however, they also privately rate the degree to which each issue is important to them. This allows the program to seek to optimize each party's outcome, by suggesting offers in which parties might gain relatively more on those issues which are most important to them.

[6] If the underlying structure is made totally available for the user's choice of any issue (one of several possible scenarios), the tool can have *many* possible uses. Three relatively simple examples demonstrate uses at different scales:

- A student and his or her family are trying to decide which of many colleges to consider attending. They could array their specific choices (e.g., Butler, University of Missouri, George Mason, etc.), plug in specific data (location, tuition, transportation costs, music or sports opportunities, etc.), structure and prioritize their criteria, and play with the weightings to refine their hunt for the preferred school for that particular student. Where there are different factual assertions, say the quality of teaching, they are encouraged and helped to find ways to display the differences in quantitative terms, and to evaluate how this relates to the pertinent cost issues.
- An organization working to plan essential cutbacks might use the engine to lay out options, structure criteria, and invite executives in the organization to enter their conflicting assertions about the ripple effects of key decisions. For example, one manager may argue that disintermediation, e.g., trimming whole layers of management, will save core costs by speeding up decision-making. Another might argue that those same actions will actually cascade into additional costs as remaining managers become overworked and make more superficial judgments. The engine will facilitate and encourage these managers to find and set forth data that truly rather than superficially support their respective points of view. The potential quantitative consequences of different cuts can be debated with greater clarity and less office game-playing, leading to sharper understanding of potential impacts.
- The procurement division of a national business, or of a state or federal agency, considering its "green-greener-greenest" purchas-

ing policies for bulk supplies, could set up a customized version of the deliberation engine to compare hundreds of key products from its supply chain. The potential factual assertions can be deliberated with much greater precision, assertions of cost effects can be quantified, and decision choices can be arrayed with increased precision.

These examples are offered for simplicity and variety, not because we will necessarily adopt so open a structure, or necessarily see anything like these three uses as priorities to address. Although new technology applications often have unanticipated but wildly successful applications – indeed, we expect to be surprised by the uses this tool is put to – we are particularly interested in the deliberation engine because of its special relevance to the public policy questions of the day.

[7] Adler notes: In The Keystone Center's current work, diverse projects that could use a deliberation engine right now include managing chemicals of concern; solving the marine debris and ocean plastics problem; reducing greenwashing and the marketplace confusion of hundreds of eco-labels; and developing new interconnected smart grids on the eastern seaboard of the United States. Other issues can arise at any moment, and a deliberation engine that is ready to go with a new implementation twenty-four hours a day could help with the most emergent of public policy issues. On May 8, 2010, for example, shortly after the Gulf of Mexico oil spill, one of the members of Keystone's Board of Trustees wrote: *"We should think about what role Keystone can play in the aftermath of the spill. There will be a debate both about new offshore leases and about needed reforms in regulation and oversight of existing drilling. Like most things, emotion and exaggeration will likely dominate the debate. If ever there is need for science-based dialogue and consensus building, it will be on this. . . ."*

[8] See, e.g., a list of twenty-five "highly addictive" games on Facebook compiled by the design weblog Hongkiat.com, at http://www.hongkiat.com/blog/highly-addictive-facebook-games/(last accessed September 10, 2012).

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Appendix: Our Team's Current Design

We will briefly discuss here how our own conception of a deliberation engine works – in the full knowledge that by doing so, we may be fostering a competitor with a better idea. If that happens, so be it.

Negotiation Teachers and Students as "First Testers"

A number of writings in the first two books in the Rethinking Negotiation Teaching series (beginning with Alexander and LeBaron 2009) critiqued our field's tendency to build scoreable games, as well as role-plays and other teaching devices, around brief, context-free, culturally arbitrary (or distinctly culturally American), and emotionally unrealistic scenarios. Up to now, teachers have typically also found it daunting to try to replicate another aspect of negotiations in real work and public policy environments – the almost inevitable existence of multidisciplinary teams on more than one side. One of our goals has been to create a deliberation engine in such a way that anyone using it will find themselves working with a team of diverse members, as well as negotiating or otherwise relating to a counterpart team that is similarly composed. For any professional in the modern world to imagine that lawyers work only with (or against) other lawyers, that business executives need not take public bodies into account, or that public officials can achieve public goals without the input of business, law and many other kinds of professionals, is naïve in the extreme. We would like to replicate that real-world condition from the outset.

The fact that the Rethinking Negotiation Teaching project, at the time of this writing, can count over 100 leading teachers of negotiation and other professionals among its committed contributors, means that very unusual circumstances now exist, in which multidisciplinary, multinational teams can actually be convened at very low cost for experimental purposes. The fact that our conception uses global climate change as the basis for the early test games lends itself well to convening teams that will include business, law, public policy, planning, natural resources, and peace studies students, all in mixed teams. The fact that three dozen or more countries are represented among the project's contributors reflects the important reality that climate change is indeed a global concern. (Faced with this situation, negotiation exercises that did not transcend national borders would seem poverty-stricken.) The particular versions of such a platform that appeal to us, as well as the issues we propose to address, lend themselves to multinational as well as multidisciplinary teams.

We anticipate that *teachers* will be motivated to engage their students in exercises using the deliberation engine for these reasons, among others:

1) The game's inevitable initial roughness, a characteristic of first-generation computer-based tools everywhere, is counterbalanced by the attraction of being able to tell students, truthfully, that their work is not merely a junior version of "academic" in its most dismissive sense, but an opportunity to take part in a real-world developmental project.
2) Beyond the real-world significance, the game would keep students motivated (see below) and challenged, taking at least a bit of the daily pressure off teachers to provide this motivation and challenge

within the classroom. Similarly, the grading of student performance could be largely programmed in advance, and therefore less labor-intensive than other types of exercises teachers are using.

3) Participation in the game leads to an experience inherently more realistic than some of the previous techniques critiqued in the Rethinking Negotiation Teaching project. The Deliberation Engine, far beyond simply providing a platform for conducting an e-negotiation simulation, supplants existing exercises which are designed to be conducted by email, and provides teachers with new methods for computer-mediated negotiation interactions for purposes of both practice and assessment (see Ebner et al. 2009; Nelken 2012). As a result, by assigning students to participate in the game, teachers stand to improve their own courses, in ways explored in a number of previous project writings that have stressed the need for authenticity.
4) Students engage in a process closely mimicking the reality of the modern business environment: multidisciplinary, multinational teams working together on complex issues. Nothing we do in the classroom as negotiation teachers today comes close to the degree to which these conditions can be modeled through participation in the game.
5) The game does not just provide an excellent learning opportunity, it can also serve as an easy-to-assess evaluation method (see Ebner, Efron, and Kovach 2012).

We expect students' motivation to participate to stem, in turn, primarily from three factors:

1) The novelty of the platform and nature of the interactions incorporated in their assignment would be intriguing.
2) The game presents a real-life opportunity to take a key role in the development of tools for addressing real problems that affect all of humanity.
3) They can be graded on their work, as their participation could be an assessed assignment in their negotiation course.

Tier 2: The Professionals Go to Work

While the initial focus is on teachers and students, which is appropriate in the context of the project which gives rise to this book, in our conception of the suite of tools that is just the beginning. Every major public issue, and many a minor one, seems to generate at least a phase, if not an enduring frustration, of factual incoherence, as between parties who talk past each other without ever grappling with the extreme factual inconsistencies powering their beliefs. Whether public policy or business policy is at issue, mediating organizations have at times created processes specifically for addressing the factual inconsistencies. A notable one is joint fact-finding ("JFF"), described above as used by Keystone.

Tier 2 of the deliberation engine represents, at least in part, an electronic version of JFF. The tier 1 start, compiling from student teams the data and arguments that have been found relatively persuasive or unpersuasive

by their negotiating counterparts and their professors (and using the platform's ability to track more and less persuasive arguments and facts *within* a team as well as across teams) provides a team of professionals with a starting place for their own, presumably more sophisticated, inquiry. Since the structure would aggregate not only all information from all iterations of the game on a particular topic, but also the "roll-up" effects and reliability ratings given by observers, students in search of a good grade would have a double incentive to seek out and document *reliable* information to buttress their positions. With enough "runs" at tier 1, in other words, even before the professionals are invited into a particular issue, a significant quantity and variety of data can be amassed, sifted and weighed – at little or no direct labor cost. To a professional, in turn, this "pre-filling, pre-screening" element promises substantial cost savings compared to traditional "hands-on" methods of compiling and evaluating comparable starting data. In turn, the promise of this efficiency makes it possible to charge for use of the platform by professional groups; they will save much more than they will expend.

The time savings alone in mounting a JFF or related exercise, compared to the two years that is typical for the in-person variety of such an exercise, represents an enormous improvement in a professional team's ability to get work done. It also means that it becomes possible for such a team to run the exercise more than once, with different counterparts, to see if the results vary (generating new insights) or are consistent (generating higher confidence.) Either way, the learning expected is substantial, yet much less expensive to generate than by using more traditional approaches.

An additional feature of the technology platform we are working with, and one particularly valuable at tier 2 and tier 3, is the ability to recruit, at very low cost, large numbers of online citizen volunteers, prescreened for typical sources of bias, who are willing to evaluate the propositions set forth by competing parties. Voting with their clicks, they offer a reality check that is also very expensive to match using older approaches. But again, we are not the only group with ready access to large numbers of people online.

The Public Game: Tier 3

Of course, the ultimate purpose of the whole structure as we would create it is not just to serve teachers and students, nor even to serve professionals, but to serve the public. Tier 3 of the structure depends on tier 1 and tier 2 to create and validate data and arguments that can be drawn on and evaluated by the general public, citizen groups, lobbying groups, political parties, business and trade associations – indeed, all of those who participate in our political processes. Unlike the professionals, however, most of those participating at tier 3 do not have an immediate economic incentive to find and sift large quantities of data. Unlike students, they do not get graded, at least not directly. And they are easily overwhelmed by too much information.

In our version, accordingly, tier 3 is designed with an interface significantly different from both the "professional" and the "teacher/student" interfaces. While professionally-staffed business or environmental organizations may opt for a quite sophisticated interface that allows many choices, but also rewards prior practice with the engine, any member of the general public

with an interest in a particular issue will be invited to participate too. But such "regular citizens" will not be expected to delve into unreasonable complexity. The interface designed for them would therefore *allow* deep study, but it would not *require* it, and it would be possible to participate meaningfully in a deliberation simply by identifying one's general preferences and political, economic or social stance, and/or one's particular conclusions from the data reviewed, and then joining an "electronic party" (in the negotiation, rather than the political, sense of the term) that has similar beliefs and/or conclusions.

Still, the party's handling of *facts*, as it proceeds to deliberate with parties with very different beliefs, would be subject to the same rigor as the engine applies at tier 1 and tier 2. By clicking on any asserted fact that fails the electronic check for validity, made possible by compiling the most well-accepted facts from tier 1 and tier 2 into the database, any citizen can find out just what about his or her asserted fact had already been rejected – and rejected, part of the time, by people who *started out* making exactly the same arguments he or she is making now. We believe this element is a powerful tool for pushing public debate in the direction of reality-based disputation.