

# **Teaching Government with System Dynamics**

## **Framework before Lessons**

By

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### Presentation Preview

This is a brief preview of the presentation planned for Session 6 on Sunday, June 25th, the actual final product having recently reaffirmed the PowerPoint principle (i.e., the tendency of computer slide presentations to be modified at a rate proportional to the time remaining until the scheduled presentation). Those interested in receiving the final presentation product after the conference, should contact me by toll-free telephone (888-667-8850) or email (dwheat@wheatresources.com), indicating whether you want to receive the PowerPoint file on disk or as an email attachment, or would prefer a paper copy of the slide presentation.

In addition to suggested applications of system dynamics concepts to specific “lessons” traditionally taught in a government course, the presentation includes an outline of a general system dynamics model for the study of government, politics, and public policy that I have found to be a valuable tool for organizing and teaching such a course. The context is the American political system, but I believe the model is adaptable to other systems, and, indeed, might prove illuminating in comparative government courses.

I have long shared the conviction that “the most basic thing that can be said about human memory... is that unless detail is placed into a structured pattern, it is rapidly forgotten” (Bruner, 1963), while “with a framework into which facts can be placed, learning becomes more relevant and meaningful” (Forrester, 1994). My particular academic interest has been influenced by my experiences as a student of politics and public policy, a government official, a university lobbyist, a business and education consultant, and an instructor at both the secondary and college levels.

Thus, the starting point for me as a teacher was thinking hard about how system dynamics could provide a framework for understanding government, politics, and public policy. Only after I began developing a high-level systems model--accompanied by causal loop and stock-flow diagrams and some simple STELLA models that further prodded my thinking--did I feel prepared to construct specific “lesson plans” that made use of systems thinking and computer simulation models. Typically, those of us infected by system dynamics fever rush too quickly to adapt system archetypes or someone else’s simulation models to our traditional lessons. The result is often frustration and/or abject failure. Moreover, even when we *are* successful at re-casting a traditional lesson as a systems thinking lesson, we often find that our success is reduced to an “I told you so” affirmation: “See I *can* teach a lesson in [whatever subject] using system dynamics!” To which our non-infected colleagues might justifiably respond, “So what? Are the students any better educated?”

If we can’t answer that question unambiguously (for ourselves as well as our skeptical colleagues), we should call time out and re-examine the madness behind our methods. In my case, that meant it wasn’t enough to demonstrate that system dynamics *could* provide a framework for understanding government behavior. It meant that such a framework must be an *improvement*, that it must have particular qualities making it preferable to other frameworks, explicit or implicit.

Otherwise--in an age of flavor-of-the-month fads in both education and business--why bother? In other words, what could be gained pedagogically by going beyond mere metaphorical references to “political systems” that have been around for centuries? Why make an effort to operationalize Easton’s pathfinding conceptual model of a political system by using a methodology developed by Forrester at about that same time (Easton, 1957, 1965a, and 1965b; and Forrester, 1958, 1961, and 1968)?

For Easton, the key question was how political systems persist, and his generic conclusion was that survival requires successful conversion of demands on the system into outputs that are more or less acceptable to the environment from which the original demands originated. While his *question* about political system persistence is both interesting and important, it is much too narrow as an organizing concept for a survey course in government, civics, or political science. Political system survival in the face of demands that ebb and flow is certainly a legitimate lesson topic for secondary and college students, but there are so many other topics that necessarily require more time and attention in an introductory course. Yet, in Easton’s *answer*, we see the essence of what political systems do: They respond to public issues by issuing public policies, which inevitably give rise to new issues because of the policies’ failure to adequately address the original issues or because of unintended side-effects. The new issues, in turn, result in new policies, which generate even more issues, and round-and-round it goes. (See Richardson, 1999, for a critique of Easton’s model.)

Traditionally, to learn about the Constitution and government institutions is to study formal and informal power arrangements and the factors influencing the use of those powers. But power to do what? In essence, I would argue, it is the power to respond to emerging public *issues* (e.g., inflation, infringement on liberties, threats from abroad) by generating new *policies* (e.g., interest rate adjustments, court orders, mobilization of troops). The past fifty years have added public opinion, the media, political parties, voting behavior, and interest groups to the “civics” curriculum. In that context, they are most usefully studied as Easton’s interacting environmental sub-systems that generate the demands and supports that influence the government officials having the power to deal with public issues.

Moreover, system dynamics principles assert that the behavior of any system depends not just on inputs from an external environment, but also on the structural relationships found inside that system. Indeed, simulation experiments like “The Beer Game” remind us that *the behavior of the system* is often more affected by *the response of the various elements to one another* than by the influence of external factors (Sterman, 1989). Within government institutions, the systemic response of the various officials to one another is largely influenced by their formal and informal power relationships, their willingness to use those powers, and the skill with which they exercise those powers. (Allison, 1971).

System dynamics can also provide some relief to a perennial source of tension among political scientists: the appropriate level of detail in explanations of government decision making. When is it appropriate to make a trade-off between clear (but simple) insights and rich (but complex) understanding? When is it appropriate to conceptualize “Government” as a unitary decision maker rather than recognize that government action results from conflict among officials with varying degrees of power, skill, and motivation? The answer depends on what we are attempting to understand or explain.

For example, are we interested in conveying a sense of the fundamental dynamics of the arms race? Or, are we trying to explain why Soviet nuclear missiles were placed in Cuba in the early 1960s, and why the U.S. policy response was aimed at removing the Soviet missiles rather than putting additional American missiles in Turkey? To answer the first question, the unitary decision making model might suffice, while answers to the latter set of questions require a more thorough understanding of bureaucratic politics within both the Kremlin and the White House. (Allison, 1971)

I should mention that when both types of questions are posed to untutored government students at both the high school and college levels, their typical response is framed by a tendency to mentally divide the world into democratic and totalitarian nations, and then to explain the policies of the former by reference to public opinion and the latter by the motives of leaders. They imagine national governments as decision makers, with public opinion accounting for almost all decisions in democracies and virtually none elsewhere. Students' mental models need some work.

System dynamics can help by aggregating or disaggregating a model according to one's instructional objectives. Thus, a very high-level representation of the arms race has frequently been represented in system dynamics literature as two balancing causal loops that, together, reinforce a tendency towards behavior that illustrates the "escalation" archetype. "Nation A" in one loop reacts to a perceived disadvantage in relative armaments by building more weapons, "Nation B" in the other loop responds in like manner to the new imbalance resulting from Nation A's action, and so on. The corresponding stock-flow diagram reveals two weapons stock managers (Nation A and Nation B) that are unitary decision makers. (Bellenger, 2000.)

When instructional objectives justify sacrificing clarity and simplicity for deeper understanding, it is not difficult to contemplate disaggregating the high-level stock-flow diagram. Including subsidiary stocks and flows and specifying their relationships can improve understanding of the behavior of multiple officials in positions of authority relevant for a particular public issue, with each official subject to pressures that determine a personal definition of the issue(s), a personal stand on the issue(s), and the likelihood of success in cooperation and conflict with others involved in that political process.

"The structure [of the model] should show the dynamic significance of the detail--how the details are connected, how they influence one another, and how past behavior and future outcomes arise from decision-making policies and their interconnections." (Forrester, 1992). In other words, when the details are of dynamic significance to the instructional task at hand, disaggregate accordingly. When such details are tangential to the main instructional objectives, aggregate accordingly.

Earlier, I suggested that clarity had to be sacrificed for understanding. While that is true to an extent, it is not difficult to have a productive mix of both clarity and understanding once students see that the aggregate resultant of the power struggles within the system can be *cautiously* characterized as "the government's policy." Grasping the various policy processes--how government institutions deal with public issues--thus becomes the crux of the learning challenge.

At the Waters Center for System Dynamics, John Heinbokel and Jeffrey Potash emphasize the importance of students learning to ask "better questions," which I take to mean those questions that are essential to constructing more accurate mental models and are also useful as a guide in the search for the data needed by those mental models. In my government classes, I am convinced that "better questions" result from a focus on the dynamic feedback process that connects public issues and public policies, at whatever level of aggregation is appropriate for the learning task at hand.

Therefore, to skeptical colleagues, I say, "Yes, systems thinking and simulation can help government students become better educated. System dynamics helps students achieve a higher correlation between their mental models of government behavior and the real-world political system, and equips students with the learning tools for adjusting those mental models as the real system changes over time."

My goal in Presentation #6 will be to amplify that conclusion with supporting details, including both the general model and some specific lesson plans. I will also venture across disciplinary borders and tentatively suggest how teachers of English and history might search for a "framework" before getting caught up in the lessons. (I'm guessing that most science and math teachers utilizing a comprehensive system dynamics approach have already crossed that bridge.)

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The author is a consultant, educator, and writer. He is president of Wheat Resources Inc., a consulting firm established in 1981 that specializes in helping clients solve problems and choose strategies through the application of systems thinking and computer simulation. He also coaches teachers and administrators in the educational uses of system dynamics. His political science students practice system dynamics skills at Virginia Western Community College, where he is an adjunct faculty member. His consulting work is enhanced by several years of nationally recognized classroom instruction experience in Virginia, during which time 70 percent of his Advanced Placement Government students scored high enough on national exams to earn college credit, compared to 30 percent nationwide. While a public school teacher, he served on the Governor's Commission on Champion Schools, where he participated in the upgrading of the history and government standards of learning for Virginia's students.

He received his Master's Degree in Public Policy from Harvard University's Kennedy School of Government in 1972, and then served at the White House as Staff Assistant to the President, specializing in economic and energy issues. Later, he was an adjunct instructor in public policy at the University of Houston, where he also served as Director of Federal Relations. He is a member of the Association for Supervision & Curriculum Development and the System Dynamics Society, and he is a Senior Fellow at the Thomas Jefferson Institute for Public Policy.

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