2014 Presidential Address

by Edward G. Anderson
July 21, 2014 - Delft, Netherlands

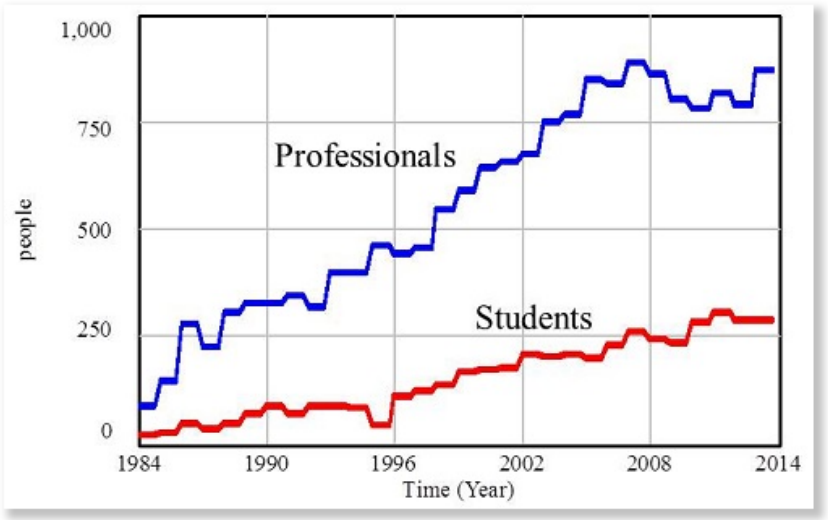
My fellow System Dynamicists:

Thank you for the opportunity to serve as the President of the System Dynamics Society. It is an honor to follow in the footsteps of so many great system dynamicists, beginning with Jay Forrester himself. As is customary, it is now my daunting and humbling task to make some comments to you with respect to the current state of the System Dynamics Society and its future.

I would like to begin by thanking the many people who make the Society work. Beginning with the past and future presidents who advise me; the Vice Presidents and Assistant Vice Presidents who spearhead our Society's numerous efforts; the Policy Council Members who advise us; the SIG and Chapter officers who drive forward our goals at a more local level, and last, but far from least, Ms. Roberta Spencer and the Home Office, whose many and myriad efforts keep the engine that is the Society running. Without these talented leaders, the Society would surely grind to a sudden, jarring, and most painful halt.

The State of the Society

First, I will comment on the current state of the Society. Having been recently reminded of the unfortunate tendency of professors to "power-point" their listeners to death, I will restrict my slides to just four. The first, courtesy of George Richardson based on data from the Home Office, is a slide of the number of Society members, student and non-student, versus time since 1984. There are two long-term trends. Student growth is on a continued upswing, which is a good thing. Unfortunately, growth among non-students, despite some fluctuations, is essentially stagnant since 2007. Moreover, from other data, membership "churn" has increased. We are simply not retaining our membership.

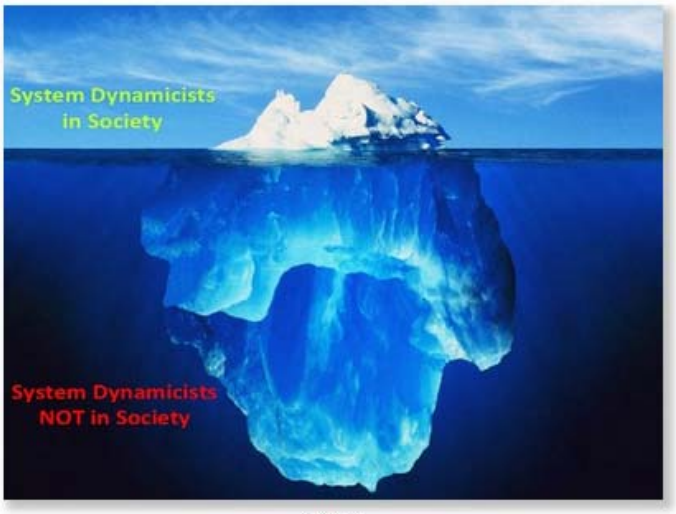


Slide 1: System Dynamics Society Membership (Source: Society Office)

Taken together, these trends could be interpreted somewhat negatively. However, I prefer to look at them as an opportunity. So long as students join the Society, we know that the number of people interested in the *field* of System Dynamics must ultimately increase. Hence, I am not worried that the *field* is going to wither away and die. However, the *Society*, that is another issue.

The Society represents a priceless asset for the field of System Dynamics. Its efforts, taken as a whole, have created a body of knowledge that is the source of much of the rigor that many other fields lack, particularly with respect to modeling and understanding the behavior of social systems. The Society not only provides an outlet for much of our work, it also improves that work by allowing us as individuals to build upon this body of knowledge as well as providing a venue for constructive peer criticism. Moreover, the Society provides the hub of a network that keeps system dynamicists in contact with one another. If there is one thing that social network theory has taught us, it is that social networks, and the hubs that hold them together, decisively influence a social movement's success.

What I fear is happening is shown in the second slide, adapted from Kim Warren's address last year. In this slide, the portion of the iceberg above the water represents the number of system dynamicists in the Society, and the portion below represents the number that are not. The data indicate that the iceberg may be slowly sinking, making us irrelevant as a Society. If this is allowed to continue, I believe the net result will be a massive degradation in the average quality of System Dynamics work and the potential dissipation of a uniquely powerful methodology.



Slide 2

What has been done so far

However, all is not gloom and doom. Far from it. Over the past several years, the Society has taken a number of steps to rectify this problem. The results have not shown up yet in the Society's membership numbers, but as we all know, there is a long delay between any intervention in a complex social system and its results.

Among the concrete actions the Society has already taken.

1. There is now a continuity of leadership in the presidency. There are a number of good reasons why the Society's president has only a one-year term, but the downside is that the current president ends his or her term just as they have begun to "learn the ropes" and become effective. Beginning with my predecessor, Rogelio Oliva, there has been a deliberate effort to maintain continuity by having the past-president, current president, and president-elect operate as a team. This has provided a continuity of leadership that is sorely needed in driving through any long-term initiatives.

2. Under Kim Warren's leadership, we have developed a strategy for the Society with a mission statement and initiatives to achieve its vision. This is far from trivial. While mission statements and strategies are a "dime-a-dozen," without them, an organization

cannot get anywhere. As Russell Ackoff used to say, "Plan or be planned for." I'd rather we make the plan. And that begins with a strategy…

3. One of the strategy's identified goals is to improve the marketing and publicity of both the Society and more importantly the field of System Dynamics as a whole. Peter Hovmand was appointed VP of Marketing and Communications and has begun developing a publicity strategy to promote the "brand image" of the field and clarify our "message."

4. Another identified goal is to increase services to our practitioners. Jay Forrester envisioned us as a profession.[1] Thinking of professional associations such as the American Medical Association, the International Federation of Operational Research Societies, or the Institute for Electrical and Electronics Engineers, while they all have strong and vibrant academic research wings, it is impossible to imagine them without their large majority of practicing physicians, engineers, and other practitioners. In contrast, the percentage of academics in the Society in 2013 formed a majority of 55%, and that has been increasing for the past decade. I would submit that even if our Society were experiencing significant growth, which it isn't, that this trend alone should give us pause. Without non-academics, such as K-12 educators and practitioners, the Society risks becoming yet another irrelevant academic debating society without any leadership role in the field as a whole.

   The Creative Learning Exchange, headed by Lees Stunz, has done phenomenal work to rectify this issue in the area of K-12 education. I'd suggest strongly that you take a look at their website at some point to get some idea of what they have accomplished and what services they provide. Unfortunately, available support for System Dynamics practitioners is not nearly so strong. To begin to remedy this issue, we have appointed the highly respected Kenneth Cooper, of PA Consulting's System Dynamics practice, as VP of Professional Practice. In addition, the Business SIG has been reformed and is pursuing a number of substantial efforts, in particular the documentation of successful case studies that we can use to publicize the efficacy of the System Dynamics methodology. The Society is also working on other requests by the practitioner community, such as creating an electronic matching portal (essentially a match.com) between companies wanting to hire system dynamicists and Society members looking for work. We are also creating a task force to look into the issue of professional certification.

5. The Society has begun a concerted effort to increase its presence in the Asia-Pacific region beginning this year with a very successful conference in Japan organized by Akira Uchino, Atsushi Fukuda, Robert Cavana, Ignacio Martinez-Moyano, Robert Eberlein, and Kaoru Yamaguchi. Planning for the next conference in 2016 and regular conferences thereafter is already underway.

[1] Forrester, J. W. (2007). System Dynamics—the next fifty years. *System Dynamics Review, 23*(2-3), 359-370.

The Future: What we need to do
While these are substantial accomplishments, we must now consider the future. I am going to suggest three directions that we should consider.

Modeling and Data First, modeling and data: Up to this point, every step the Society has taken is a "no-brainer," or rather a "no-modeler" in that we have been working without a fully developed and calibrated System Dynamics model to guide our organization. This seems problematic given that any self-respecting system dynamicist would probably never consult with even the local "dog-catcher" without first building a model. And, indeed, there are a number of efforts in progress to address this problem. In particular, George Richardson and Jack Homer are presenting their models addressing the growth of the field at this conference. Further, our strategy development initiative laid out a plausible structure for the field with placeholders for a number of issues on which we have no data. This, however, brings up a crucial issue. While we have good data about some aspects of the Society, there are some critical data that we are missing. Beyond that, we know almost nothing of the nine-tenths of the field that is the metaphorical submerged iceberg. Even the nine-tenths is a figurative number pulled out of a hat. We honestly do not know if the Society represents 75% of the active system dynamicists in the world, 50%, or only 5%.

The Society is currently developing surveys to address this problem. However, their value will only be as good as the number of completed surveys we get back. If I may ask a quick couple of questions:

1. How many of you do NOT fill out those simple 10-minute surveys you get from societies and conferences?
2. How many of you have trouble finding the data you need when you need to calibrate your models?

You see the problem. Hence, as your first action item: When you receive these surveys from the Society, *fill them out and return them!* Otherwise, we will run a serious risk of "garbage-in-garbage-out" in our efforts to strengthen both the Society and the field.

Mentoring A second area is mentoring. While the Society is a wonderful support to us as individual modelers for the reasons I have just described, you also need support at the local level. While we are still admittedly somewhat data-starved, George Richardson's model points to mentoring, and particularly peer mentoring, as a potential leverage point. This accords with some advice by Professor James Orlin at MIT given to myself and a few of my fellow doctoral students. He said, "Look around you. These are your friends. Work with them,


Rockefeller College
of Public Affairs & Policy News Magazine
MENTORING Matters
Dr. David Andersen and members of the Thursday Morning Group
Thursday Morning Group
"...I think that everyone in this group cares about having everyone succeed." – David Andersen
Don't even think about scheduling an appointment with Professor David Andersen on Thursday morning from 11 to noon (Eastern Time, that is). He has a very important standing meeting with at least six or seven other people, and they've come a very long distance to speak with him. "There are certain things that just get blocked into my calendar," says Andersen. "This is one of those things."
director of the Initiative for System Dynamics in the Public Sector; and Eliot Rich, associate professor at the School of Business. Two former students of David Andersen's, whom he mentored while they were completing their degrees at UAlbany, are faithful TMG participants and "now valued colleagues," he says. Hyunjung Kim, PhD '09 is an assistant

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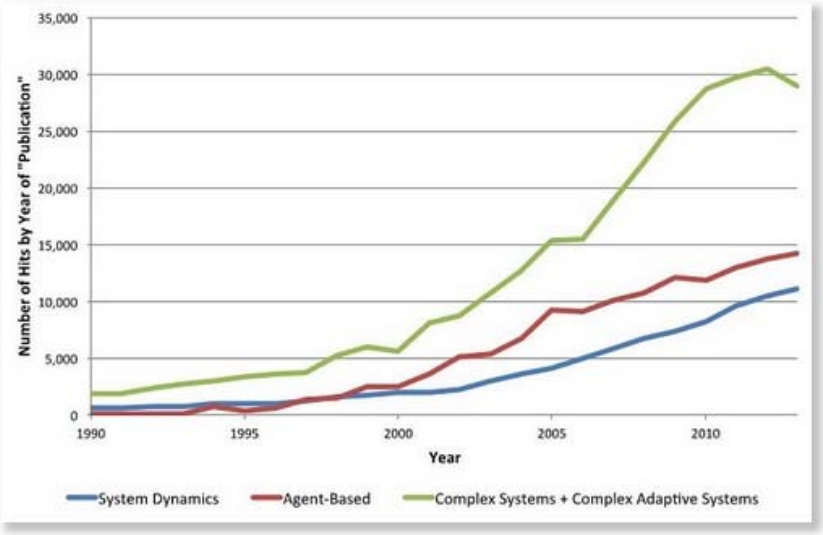
even after you graduate. You cannot make it in this field by yourself." While Professor Orlin was talking about academia, I think his advice applies to all system dynamicists as well. There just are not that many system dynamicists in the world. We need friends to survive.

As an example of this, I have always been impressed by the quality of interaction among the graduates of the Albany System Dynamics program. I now realize that it is not luck. Professor David Andersen (and I suspect Professor George Richardson, though he is too humble to admit it) have been cultivating mentoring relationships with and among their students for years. As one example, David Andersen every Thursday at 11 a.m. holds a teleconference among the appropriately named "Thursday Morning Group" consisting of System Dynamics colleagues from three continents and six time-zones as shown in Slide 3. Importantly, while there are several academics who participate, there are non-academics as well. What do they do? According to Albany's Rockefeller College's Magazine, "they catch up on each other's news, share a few laughs…and knock around some heady topics like System Dynamics modeling, simulation techniques and group decision-making." In short, they are "trusted mentors to one another."[2]

Now, while this is a nice example, what can you do? Well, for one thing, you are here at the Conference, surrounded by literally hundreds of your colleagues in System Dynamics. Meet them. More importantly, talk to them, and build relationships with them. Many of us work alone within our organizations. However, virtual meeting software, like Skype and Google Hangout, is a wonderful thing. You don't have to do System Dynamics alone anymore. Find those you share common interests with at this meeting, perhaps through your SIG, and start having regular meetings to support each other and bounce ideas off of each other. System Dynamics is often a lonely profession, but with virtual peer mentoring, we can make it more of a team sport.

Partnering with other fields

Thirdly, we can partner both as a Society and as individuals with other fields. Complex systems theory in the social sciences, including the specific sub-discipline of agent-based modeling, has been growing rapidly. I performed a recent Google search looking for trends. This is presented in the fourth slide. While these are highly informal and preliminary and hence need to be taken with the appropriate caveats, the publishing rate of complex systems, agent-based model, and System Dynamics papers published in the area of management have all increased since 1990. However, the number of agent-based modeling papers clearly overtook System Dynamics' at some point in



Scholar Google Publication Rate in Management (1990-2013)

[2] Rockefeller College News Magazine, Spring 2014, p. 8.

the late 1990s. This seems to be also true with respect to general awareness of the two fields. According to a general Google search on July 3 of this year, I found 2.36 million hits for agent-based models in management versus only 1.52 million for System Dynamics models.

However, again this is not so much a problem to be solved as an opportunity to be grasped. While there has been much argument in the Society over the value of the Systems Thinking movement in the 1990s, it no doubt increased the awareness of System Dynamics and brought many people into the field. I myself was minding my business at the Ford Motor Company one fine spring day in 1991 when my boss came into my office and said, "Ed, there's a course on something called Systems Thinking run by a guy named Senge at MIT that we need you to go to." Twenty-three years later, I find myself standing here.

I believe there is a similar opportunity with respect to complex systems and specifically agent-based modeling. Byrne and Callaghan, acknowledged leaders in the field of complexity theory, in their book *Complexity Theory and Social Science: The State of the Art*, make the following critique.

> In general, [agent-based models] assert constantly micro-foundations of social reality in a wholly atemporal fashion…[In much of agent-based modeling], not only is there no sense…of the problem of establishing some sort of isomorphism between the mode of the operation of the model, how the model produces the given result, and reality…but there isn't even an acknowledgement that models may generate outcomes which do not correspond to reality in any meaningful sense…This beggars belief.[3]

These issues are not restricted solely to agent-based modeling in the social sciences, but are common to the entire huge field of complex systems in the social sciences. I submit to you that we in System Dynamics have the methodology to exactly address the issues behind Byrne and Callaghan's critique. As my colleague, Reuben McDaniel, a highly respected scholar who applies complex systems theory to healthcare delivery, recently said to me, "I can tell where a system is now, and I can even describe a stable equilibrium where I would like it to be, but I cannot tell you the dynamics of how we get from here to there. I think you could help me with that." This past year alone, I have been approached by several complex systems theorists and two agent-based modeling projects seeking my advice as a system dynamicist on their research. I am vigorously taking those opportunities, and I would suggest, when the opportunity presents itself, which it will, that you do so as well.

At a more organized level, we need to make our presence felt as a field, not just individuals, at gatherings other than the ISDC. System dynamicists have a long-established foothold in the Hawaiian Conference on Complex Social Systems. I would encourage you to attend that and similar conferences, present your work, and make some friends among the complex systems theorists. Similarly, the Business SIG is looking into reviving efforts by several system dynamicists over the years to create a permanent presence at such conferences as the Winter Simulation Conference, which is probably the biggest computer simulation conference in North America. While that conference tends to focus on Discrete Event Simulation and, more recently, agent-based models, they are always eager to have a larger System Dynamics presence.

[3] Byrne, D. and G. Callaghan (2014). *Complexity Theory and the Social Sciences: The State of the Art*, p. 169.

Moreover, it is heavily attended by practitioners, including potential clients giving us great scope to increase awareness of SD. If you are interested in participating in the Winter Simulations Conference, please contact Seth Cordes and the Business SIG or feel free to speak with me and I will put you in touch.

In short, knowledge is not a zero-sum game. If you have an opportunity to participate in a complex systems or agent-based modeling effort, take it, and use it as a chance to increase awareness of the power of System Dynamics among those who could really benefit from it.

Volunteerism

To recap, I have suggested that we as a Society gather data, increase our mentoring in the Society, and make connections with other fields that are "fellow travelers" to System Dynamics. As I say this, however, I can hear in the back of the room, "Ed, you've laid out all these action items. Some are what the Society will do, but most of them involve my getting out there and putting forth some individual effort." And you would be correct in this assessment. At the end of the day, we are a society of volunteers, from the President on down. All our achievements as a Society, all of the good that we do, are the result of pure volunteerism. As van Gogh said, "Great things are done by a series of small things brought together." Without your individual efforts, no matter how seemingly small, we as a society are nothing.

Thank you for your attention.