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WORKING PAPER
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Architecting Large Social Systems

Summary of a Theory and Methods for System Redesign

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Toward a More Systematic Approach to Policy Design

By Walter McClure

Architecting Large Social Systems

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Large System Architecture: The Theory and Methods of System Redesign

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*(The Overview and Applications may each
be circulated independently as stand-alones.)*

Large System Architecture

The Theory and Practice of System Redesign

Overview

States and the nation face a seeming double-bind: either raise taxes or cut important programs. The resulting political squabbling back and forth has been interminable. But a third alternative exists and is finally getting some currency, namely: redesign our important large social systems – education, health care, criminal justice, welfare, etc. – to get more for less. In fact, redesign has suddenly become a buzzword in some quarters, and many people using the term have only a vague notion of what it means. In this brief article I will try to bring some precision and practicality to this third alternative, defining what system redesign is, and suggesting some key ideas on how to pursue it.

I think we all have intuitive notions about what system redesign consists of, but I would like to sharpen our ideas and make the term quite precise. There are in fact two rather distinct ways of trying to better the performance of a large system, and for clarity I propose to limit the term “redesign” solely for the second, more difficult way. The first, and simpler, approach is “*continuous system improvement*,” also sometimes lovingly known as “omnibus tinkering”: simply look for every place that improvements, big and small, seem possible to raise system performance or reduce its cost. System improvement allows continuous fine tuning, and in some cases, over time, can achieve quite worthwhile savings and performance improvements. Disadvantages include that often such efficiencies tend to be small and one-time only. Worse, the system frequently requires continual policy surveillance and intervention: i.e., the system is not itself hunting for these improvements and efficiencies (if it were, outside intervention wouldn’t be necessary). Often as soon as external vigilance is relaxed, a system may begin to return to its less efficient ways. In the worst cases, organizations in a seriously malperforming system simply seem to resist all external private and public attempts to improve their performance. For example, despite decades of tinkering in education and health care, the two largest items in state budgets, the organizations – schools and school districts in the one, providers in the other – have largely evaded, distorted, or diluted to tokenism, all policy measures intended to seriously improve performance. None of the improvements have taken hold in any substantive way. These systems have remained stubbornly resistant to change, so that policies based on more of the same old remedies – only harder and better this time! – seem fruitless. So what’s missing, and what can be done about these more intractable systems?

Which brings us to the second and more difficult approach, *system redesign*. And this approach requires that I introduce the notion of Large System Architecture: Large System Architecture comprises two components: (1) a theory of why organizations do what they do; and (2) if they are not performing as society wishes, methods for designing and executing policy strategies to alter their behavior to the desired performance. I will discuss three things: the theory first, next the methods, and finally some of the ingredients that seem to me necessary for those who seek to lead in system redesign.

Let me start with the theory – why organizations behave the way they do. Let’s hold the formalities for the moment and begin with a little insight-building. How often have you heard that malperformance of various poorly performing large systems is due the moral failings or corruption or incompetence of the organizations and people in the system? Take, say, the health care system: its variable quality and access but especially its runaway cost escalation are variously ascribed to greedy providers or the big bad for-profit insurers or the unhealthy-living, over-utilizing patients. Let’s examine such explanations with a counter-example: a really well-performing system – say, the auto industry or computer industry. The world simply couldn’t make better cars for the money in the variety that people want than the auto industry does today, and its productivity keeps rising; it keeps doing better for less. The same is true of the computer industry. Now, does anyone think this is due the virtue, altruism and purity of auto executives? Or computer executives? Further note: both are

for-profit industries. And both have as much greed (and as much altruism) as any other large group of human beings. So it can't be greed or profits that stops a system from performing well. In the auto industry if a company can't make a car that people want for the money, that company is out of business – ask General Motors, whose incompetent leaders over several decades ran this great company into the ground, requiring a government bail-out and overhaul to save it – giving new meaning to the term 'welfare capitalism'. Clearly, the motives of the people in a car company make no difference. Whatever their motives, whether altruistic or greedy, if their company can't make a good car for the money, they are not around very long. The companies that survive and prosper in this industry must perform well. The same is true of the computer industry: no matter your motives, if you can't make a better computer for less, you aren't around long.

Surprising to many people, the flip side is equally true, as we shall see shortly. In a malperforming system, no matter how dedicated or selfish the people in an organization may be, if the organization does not malperform in the way observed in that system, it is not around very long, and soon the only organizations that survive and prosper are the malperforming ones.

So what determines why organizations in good systems perform well and organizations in bad systems perform badly? That is what the theory is supposed to tell us, because if we understand that, then we know what to change to make the system perform the way we want.

Let me again hold the formalism and jump ahead and put the conclusion in a nutshell. The reason organizations do what they do is not because of their "innards." It is because of their "out-ards." Any organization is part of a larger system...the auto industry say, or the health care system, etc. This larger system – call it a *macrosystem* for brevity – places powerful incentives on the organizations within it that determine what they must do to survive and prosper, and they have no choice about it. The innards of any particular organization merely determine whether that organization can adapt to these incentives or, if it cannot, will perish. This is an enormous simplification for policy. We do not have to beat up on the thousands of organizations in one of these malperforming large systems. We "only" need to architect – i.e. intentionally redesign and restructure – the large system so that its incentives reward the organizations within it for doing what society wants them to do. This is what I define as *system redesign*, and it is a quite precise notion.

Policy has yet to really become aware of the presence and power of these underlying incentives. The great error in much policy effort to date has been to order organizations to act counter to the incentives of the large system they are in. Organizations cannot seriously comply with such orders or the macrosystem will hurt or kill them, which is why many malperforming macrosystems have so strongly resisted and evaded decades of policy attempts to improve them.

Unfortunately, hard experience suggests effective redesign strategies for intractable systems cannot be put together in a legislature or citizens committee. If they could, these systems would not still be a problem after so many decades. It appears to require professionals who can immerse themselves full-time with a given system and become expert, and they may need some years to arrive at an effective strategy and even more years to implement it. So to pursue redesign successfully, policymakers may want to foster policy analysis groups specializing in system redesign (let's call them *large system architects*) as a new tool to whom policymakers can turn – reserving, of course, final say on any strategy not to these architects but to policymakers. Continuous system improvement does not stop while waiting for such architects to propose a true system redesign strategy; quite the contrary, there is no other choice in the short-term. But setting up such a long-term parallel effort seems a promising way, maybe the only way, to eventually break out of the endless, expensive, frustrating, time-consuming annual policymaking cycle of continuous improvement efforts bringing only meager success in these more intractable systems.

The Theory of Large System Architecture

Let's now lay out the theory more formally*. We begin with three empirical observations which make up the starting assumptions (postulates) of the theory, from which we will be able to explain and predict the behavior of organizations in large systems.

Observation 1. *Organizations exist in a larger system – for brevity call it a macrosystem – whose structure they cannot alter by their own action alone.* Thus schools and districts exist in a larger macrosystem we call the public education system, which has a very definite structure. And health care providers exist in a larger macrosystem we call the health care system, which also has a definite structure (quite different than the education system's). If you doubt these large macrosystems have a definite structure, you haven't tried to change it.

Observation 2. *The structure of this larger macrosystem creates powerful incentives and restraints upon the organizations within it, powerful enough to punish or kill organizations the more they act counter to them, and to make organizations prosper the more they act consonant with them.*

Now, if a macrosystem's incentives reward the organizations within it for performing as society wishes, and punish them when they stray, then we have a well-performing system. As noted earlier, the auto industry is one such macrosystem, the computer industry another. Organizations in such a macrosystem do what society wants; they do it of their own volition; and they do it far better and more innovatively than policy outsiders could ever order them to do so. And if they do not, they are not around long. In this felicitous situation the only policy task is oversight: to make sure that the structure of that macrosystem remains sound and is not inadvertently (or deliberately) altered.

But of course in the less happy situation, the converse is equally true: if the incentives of a macrosystem punish the organizations within it for the performance society wishes, and reward them for some other behavior undesired by society, then we have a malperforming macrosystem. No matter how well-intentioned the organizations within it, they survive and prosper only if they engage in the undesired rewarded behavior, and if they do not, they are not around very long. In such a case the policy task is much more demanding: It requires system redesign as defined above: i.e. restructuring that macrosystem to alter its incentives and align them with the goals society has for that system. And thus arises the notion of Large System Architecture (LSA): we must architect unsound macrosystems – that is, we must first: (A) come up with a future design for the structure of the macrosystem that, could we wave our magic wand and have it replace the present structure, would place stringent incentives for the desired performance on the organizations within it; and second (B), since we lack any such magic wand, we must come up with a practical strategy to leverage the system from here to there. In short, we must first know exactly where we want to go, and then devise a way to get there.

Which brings us to the third observation:

* As this article hopes to inform a popular as well as professional audience, those who prefer to see and assess practical system redesign strategies derived using the theory and methods here before taking time to look into the formalism itself, may turn immediately to the Applications sections for summaries of two such system redesign proposals. Otherwise, please forgive this fiercely didactic formalism; it is how our approach and our system redesign strategies came to be, and why they are novel compared to usual policy proposals. We believe the theory and methods deserve wider understanding, application and support by policymakers, analysts and the public.

Observation 3. *The structure of a macrosystem can be altered by sufficient collective action.*

In other words, while one organization alone within a macrosystem cannot alter that macrosystem by its own actions, if enough organizations within and without it act collectively, it can be restructured. Organizations already know this whether policymakers do or not. You will note that virtually all macrosystems are rife with multiple trade associations of the organizations within them. And one of the chief aims and activities of such collective activity is to alter the structure of their macrosystem in ways favorable to the organizations; these may or may not be favorable to the public. Public policy must be given the tools to assure that all collective action, including its own, is brought to bear for the public interest.

A theory is nothing but a small set of postulates (initial presuppositions) from which by deduction one can explain and predict a large number of empirically observed effects. These three observations, whose empirical truth (and limits) the reader can see for himself, constitute the postulates of Large System Architecture theory. By examining the structure of a macrosystem, we are able to discern the particular incentives and restraints that it exerts on the organizations within it, and from those incentives we can predict the performance of those organizations for good or ill. (An example deducing one particularly important prediction, The Decentralization Principle, is in appendix 1.)

Once you look through the lens of this theory, you no longer need blame the malperformance of any macrosystem on moral failings, stupidity, incompetence or corruption of the organizations and individuals within it. You do them grave injustice if you do, and you haven't a prayer of altering their behavior because you are looking in entirely the wrong place for a solution. No large group of human beings has a monopoly on the virtues or vices of the race. There are quite as many brilliant, competent and highly motivated people in the education system and health care system as in the auto and computer industries, and just as many incompetents and miscreants. The difference is not the people, it is the incentives of the macrosystem structure they operate in: what performance it rewards, and what it punishes. You cannot change human nature, but you can change the incentives of a macrosystem and then the same people and their organizations will act differently.

Methods of Large System Architecture: I. Designing a Future Model

In addressing a malperforming macrosystem, the large system architect has two main tasks. The first is to come up with a *'future model'*: a design for the macrosystem's structure that will place stringent incentives for the desired performance on the organizations within it. The second task is a strategy to implement the future model: to devise a *'change strategy'* to move the present system to the new future model, and then to assist all those in position to help make this happen. I'll start with methods for devising the future model, and address the methods to devise change strategy later below.

To devise a future model, the architect must (1) determine the problem behaviors of the organizations in the system and then (2) identify the underlying cause of these behaviors, namely: i) the underlying incentives selecting for the problem behavior, and ii) the macrosystem structural elements that give rise to these incentives. [Using a medical analogy, before we can prescribe a therapy R_x we must identify the symptoms S_x and determine the diagnosis D_x] This faulty underlying structure is what must be altered in the future model in order to correct the performance of the system.

A *macrosystem* may be defined as *the set of all organizations which interact strongly to accomplish a definable purpose for society*. That purpose is spelled out by the *performance goals* society desires for that system. The goals then determine more precisely the macrosystem itself, namely: the set of all organizations and individuals (termed elements) and all their relationships and interactions (termed structure) necessary to accomplish the goals. A *problem* may then be defined precisely as *a discrepancy between goals and actual performance*. Problems are what cause societal pain and motivate policy action. This means that before we can accurately determine the problems (symptoms) of a macrosystem, we must first determine the goals society desires of that system. Then we can seek performance measures to see how well the system is doing against the desired goals. Therefore the first step for the architect is to identify a complete set of societal goals for the system; it must be complete if it is to capture all problems. (A crucial question is: how and by whom are societal goals determined, see appendix 2.)

Having a complete set of all goals is even more important when we begin devising a future model with correct incentives. Politicians are always eager to work on the easy and more popular goals and defer on the politically more difficult goals, thinking they can be added later and become someone else's headache. This is usually a recipe for failure in system redesign. Because goals often conflict and require trade-offs, it is usually impossible to tack on additional goals to a completed future model design aimed at only one or two of the desired goals.

An effective design must incorporate incentives for all goals simultaneously. In this sense macrosystem design is a bit like rocket science. If you have a rocket design, and afterward decide you want to double the payload or range, you cannot just tack on a fix. You must redo the entire design because all parts depend on all other parts. Macrosystem design appears similarly complex. Empirically it has been found that despite year after year of time-consuming effort, legislatures and citizen panels have seldom proven able to produce effective system redesigns in intractable macrosystems – nor can they be expected to, given the many demands on their time, any more than they could design a rocket or automobile. Identifying and rethinking the structure and incentives in these systems seems to require full-time study and experience. What legislatures and citizen groups can do is express what they think are the goals society desires, and then, as one more tool, set up a long-term effort on the side with system architects to see if these professionals can eventually bring back to policymakers a promising system redesign proposal for them to approve, reject, or request further work. Note, this is much what Congress did when it created NASA; it did not try to design a rocket itself in committee. Because lay groups have more familiarity with macrosystems than rockets, they usually assume, with unfortunate results, that they can cobble together a system redesign strategy themselves. That is one reason we have made so little progress on our most difficult systems like health care and public education despite decades of effort. Akin to NASA, I believe a small profession of “large system architects” is needed – policy analysts and researchers who specialize in study and development of system redesign strategies for each particular problem macrosystem – to whom this specialized work can be assigned. Setting the goal and final approval remain, as it should, not with these architects but with established legitimate public and private decision makers.

Note, setting up an architect group is simply one more tool in the policy arsenal. It should be done without hoopla, nor does it mean everybody else stops their own efforts. To the contrary, they cannot and mustn't; a problem macrosystem has to be continually dealt with. Setting up an architect group in addition to continuing short-term efforts simply means that leadership has seen the wisdom of also investing in a parallel, longer-term effort with one or more skilled policy groups to look at the possibility for genuine system redesign to finally cure the problem system.

In the meantime everybody else must continue strenuous improvement efforts to achieve what good they can.

In sum, system redesign (like all policy design) *starts with societal goals*. To arrive at a proposed redesign, the large system architect has four principal tasks: (1.) identify a complete set of societal performance goals for the system; (2.) identify system problems: compare actual performance against goals; (3.) determine the underlying cause of system problems: the incentives that drive actual performance, and the structural elements that generate these incentives; and (4.) devise a future model: come up with a new design for the system structure aligning incentives with goals. While it might seem in principle that these steps would be carried out sequentially, in practice this is found not the case. Experience shows that as one proceeds, what is learned in one task influences the others. Completing the tasks thus requires constant iteration among them; the architect winds up working at each of the tasks simultaneously, going back and forth among them to make progress on each.

As just one instance of the demands of system redesign, simply arriving at a complete set of workable goals and measures may require months of full-time work, iterating between problem analysis, incentive diagnosis, and potential future model designs, before resolving into a practical set of goals. In practice, in many cases we must settle for proxy goals and measures. Moreover, society seldom speaks with a uniform, let alone informed, voice, and each special interest group has its own notions about what the goals should be. The architect must arrive at his own best formulation of the goals he believes society has expressed desire for, goals that serve the public interest rather than some particular special interests. Indeed, clarifying goals is often one of the more useful tasks of the architect. But the architect has only the power to propose, not to decide; and his proposal will be merely one among many suggested policy options. He can simply state that if society wishes the goals he has set out, here is a proposed future model design likely to achieve them. Legislatures and citizens groups can then select amongst rival designs for the one that best reflects their opinion about the goals and seems most likely to work in practice.

Like any design exercise – be it rockets, cars, computers, or macrosystems – there is no recipe for devising a future model. Once the goals, problems and underlying causes have all been identified, one only has knowledge of what needs altering to eliminate the existing perverse incentives, and knowledge of all performance goals that the new incentives must select for, as well as all relevant research. Arriving at a future model that entrenches stringent new incentives for these goals then depends on the skill, imagination and experience of the architect.

Methods of Large System Architecture: II. Devising Change Strategy

Future model design follows a fairly definite iterative procedure – identifying goals, problems, underlying causes, and then design – all of which proceeds more or less as a research and analysis project. But change strategy – to move the present system to the future model – puts us immediately in the world of action; it is much more of a moving target and may require shifting gears frequently. Nevertheless certain principles appear to offer useful guidance.

The first rule is to *have the future model design in hand* at the start. All parties involved in facilitating the change must know with precision where we are trying to move the present system. Thus we can constantly monitor if actions are leading in the right direction, and alter course when they are not.

The second rule is *always work on the front log in the jam*. We may liken the task of change strategy to breaking up a log jam. Working on a back log does nothing to unstick the jam. We must find the front log and move that one. By “front log” I mean the step or action most likely to

unbalance the status quo holding the macrosystem in its present form and produce the most response in the direction of the future model.

“Working” on the front log means *finding and persuading those parties of interest with the power and motivation to take the needed action*. Parties of interest may include public and private interest groups and various levels of government or its agencies. This usually requires a lot of educational work, diplomacy and consulting assistance, to show the advantage to a party of interest of taking the action, and the disadvantages of not taking it, and then to help them actually take the action. If successful, and the action is taken, the log jam shifts, sometimes predictably but often not. The shift usually brings a new log to the front of the jam. Again the architect must identify this new front log and then identify the coalition of interested parties with the power and motivation to move it. Those parties interested and capable of moving the new front log may be the same or a completely different coalition of parties as took action on the first front log.

The architect is now chasing a fluid situation, attempting to identify each new front log as it comes to the fore; then identifying the interested parties that might move it or fortify the action; continually monitoring and assessing whether the resulting movement is in the right direction toward the future model or has resulted in a reversal of progress; and altering and adapting course to keep the change strategy moving and homing on the future model.

Note that depending on the nature of the problem macrosystem and the desired future model, *government may play a more useful role by leadership than by legislation*. Legislation tends to reduce flexibility. Often a coalition of public and private leadership can produce better, faster, more agile progress. But also, in some cases, legislation done well can help or be crucial.

The architect and advocacy groups working for the redesign must *also always work steadily on the rhetoric battle*. Rhetoric addressing all relevant parties as well as the general public must be created to build understanding and support for the proposed system redesign. Every special interest will attempt to capture the rhetoric and try to put its own spin on it to favor itself and oppose change threatening to it. Interest groups may expend considerable effort and money on propaganda and disinformation to muddy the waters. The forces advocating for system redesign must be prepared to counter such efforts with equally frequent and skillful informative rhetoric.

Finally, to the extent feasible, *it is best that change strategy be staged*. As much as possible, one would like to create discrete local demonstrations of any proposed new future model and test and refine it before scaling up to more widespread implementation. One does not build a new moonrocket and load the nation on board on the first launch; one runs tests and gradually scales up as the design is refined and proves out. For the same reason, given the complexity of a macrosystem design, we would prefer, to the extent possible, to establish limited test beds first to assess and refine a proposed future model, and then gradually implement it more widely, always monitoring and refining it along the way if and as problems emerge.

LSA theory and methods do not obviate the formidable task of implementing major reform in a society’s large systems. That task was accurately spelled out almost 500 years ago:

- There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things. For the reformer has enemies in all those who profit by the old order, and only lukewarm defenders in all those who would profit by the new order, this lukewarmness arising partly from fear of their adversaries, who have the laws in their favour; and partly from the incredulity of mankind, who do not truly believe in anything new until they have had actual experience of it. — Niccolo Machiavelli, *The Prince*, 1532

Machiavelli's observation is eternally true. The only thing that changes is the old order and those who profit from it (and thus accrue power to stall change). These slowly evolve, each age producing its own – those of today, for example, wholly different than those in Machiavelli's own era. What LSA can do is improve the likelihood of success: inform and arm reform advocates with the ability to identify and attack the underlying cause of a troubled system's problems – to address the diagnosis, rather than, as so many do today, the symptoms. Symptom-curing without eliminating the underlying cause means only that the symptoms endlessly return, diverting and wasting the effort of advocates in ineffective action, playing into the hands of the old order.

Fostering System Redesign

Because public and private policymakers have too many responsibilities to devote several years full-time to a single macrosystem, they must think like executives: not how will I solve this problem, but rather, who will I get to solve this problem. System redesign requires a system redesign group: a long-term group of LSA architects for each poorly performing macrosystem of interest. Thus, for instance, if a state wishes to be in the forefront of system redesign, then public, private, and/or foundation leaders in that state should see to setting up and supplying long-term core support of system redesign groups in the state (or contracting with outside redesign groups). Foundations and public and private agencies at the national level can do the same, fostering one or more LSA groups for the poorly performing national macrosystems in which they take interest. The Center for Policy Design is such an LSA group and has developed and assisted interested parties across the nation with proposed redesign strategies for each of the two largest items in state budgets: public education and health care (brief descriptions of these strategies may be found in the Applications sections below). Thus my discussion is not some ivory tower exercise; for three decades we have been doing in the real world what I have described here. We are the only group I'm aware of specializing in the kind of system redesign work described here. Should leaders wish to foster system redesign groups, it may help if I briefly describe our experience and try to draw from it suggestions about what such groups may need in order to succeed.

The Center has two principal projects, one on public education system redesign, and one on health care system redesign. Our senior fellow Ted Kolderie has led our Education|Evolving group on public education system redesign. He began in 1982 and he and his colleagues are still at it, working on change strategy to move our proposed future model for public education into being, here and around the country. Minnesota's state government and private leaders recognized early on, the promise of this redesign strategy and have been bringing it into being with our assistance. Minnesota was thus the test bed for this strategy (an example of staging), and it has been continually refined and improved with our growing experience. An important part of this strategy involves state-authorized chartered *public* schools, and we have assisted many states in enacting chartering legislation based on the Minnesota model. We have also developed many tools to assist charterers and organizers of such schools. We have monitored progress and note gross distortions from our proposed strategy in many states by various special interests, but presently the Center hasn't the resources to respond adequately.

I led the Center's health care system redesign efforts. I started on the problem in 1969 at InterStudy under Paul Ellwood's leadership and then left to start the Center in 1981. Our first big initiative at InterStudy was HMOs, new prepaid integrated health care organizations to compete with the traditional fragmented provider system. I wrote the enabling legislation for Medicare

and the HMO Act in the early 70s. Later, at the Center, I was finally able to crystallize Large System Architecture theory, and realized that introducing new actors like HMOs, even if they had better “innards”, into the larger health care system with the same old perverse incentives was not going to solve the problem. In retrospect our HMO work was a good thing that I now feel was a false start. Thus a new redesign strategy (at the time tagged with the unlovely name Buy Right and now renamed Informed Consumer Choice) was developed to alter the perverse incentives in health care, to reward providers for better care for less cost. During the ‘80s we got the first step (the “front log”), severity-adjusted health outcomes assessment, implemented in three places: Medicare, Pennsylvania, and Cleveland. The remaining two steps, cost assessment and consumer insurance incentives, were not taken because I fell prey to serious major clinical depression in 1986 (I had nothing to be depressed about except that I had it) and was knocked out of the saddle by 1990 and progress ground to a halt. Remarkably, a remnant effort continues in Pennsylvania, but Medicare and Cleveland abandoned outcomes assessment under industry pressure.

What can we conclude from this experience? First, some macrosystems have obvious redesigns, or an excellent redesign design has already been demonstrated elsewhere. For example, the British have shown how to reduce prison violence while virtually eliminating the barbarous practice of solitary confinement, producing better performance for fewer prison dollars. These easier cases we can move on right away. On the other hand, in our experience, developing and implementing a workable system redesign from scratch for a really difficult macrosystem can take years, with not always much to show for it for some time. And one can expect some false starts – though we now have theory that may reduce such occurrences. Thus *we will need both architects and knowledgeable funding support, both willing to stay the course*. And, as with the moonshot, we will need leaders with the vision to set goals and launch initiatives that *may take beyond their tenure to complete*, proud to set the course and claim the future results as legacy.

Second, the difficult macrosystems clearly require *full-time immersion and a team*. Redesign architects starting on a new system have to get up to speed and develop expertise not yet existent. In our experience the best team combines a creative *system redesign architect* with an experienced *veteran professional of the system*, an insider who knows how it really works, along with a *‘go to’ guy* with diplomatic, executive, and political savvy, to assist with the consulting and change strategy. These people will need *adequate staff*, all of whom will need considerable on-the-job training.

Third, large system architects seem to need an *independent home*. It doesn’t work well when housed in conventional academia, though it might if housed in a separate institute which includes graduate dissertation candidates only after all course requirements are complete. The time demands of change strategy are heavy and irregular and cannot accommodate teaching schedules and faculty committee meetings and academic overhead. Moreover, if effective, the work can be controversial, making a university skittish. (Ted tried a university base for a few years and then, to our good fortune, asked if the Center might want to give him a home – it certainly did.) For similar reasons, an architect group is not well-housed as a sidebar in some larger organization, be it government or private, with a different operational mission, particularly one in the macrosystem under study. Talented staff, particularly in government, get pulled from long-term redesign work into all the pressing short-term firefights, the urgent trumps the important; and a host organization with special interest will bias redesign work to favor that interest.

Fourth, a group doing large system architecture needs *steady core funding*. They have great trouble with capricious support that is big on them one year and on to something else the next. They do not need, say, a million dollars for a year, they need a hundred thousand annually for ten

years. This has three effects: It provides support for the kind of basic research and design spadework that no one else will pay for; it allows them to hire and train staff without fear such staff will have to be laid off after short-term grants expire whose renewal is problematic (an enormous loss of investment to the group); finally, the group can spin up the core grant, often effectively doubling it, with project contracts when a client is found who wants assistance acting on the redesign strategy. But the presence of core support allows the group to choose only projects that move the strategy. One is not left scrambling for irrelevant projects just to cover payroll, nor figuring out who to charge when you go to the restroom.

We pioneers of this profession have had a demanding time. We had to come up with the ideas, a time-consuming exercise; we had to seek and educate potential clients (those who could move the front log) all over the country; we had to conduct consulting projects assisting them to implement our redesign ideas; we had to run a small non-profit, non-profitable organization; and we had to beg for core money all over the country from a largely uninformed foundation community to support ideas considered controversial. A knowledgeable community of government and private leaders and foundations could provide long-term support and assure a much stronger, vibrant set of system architect groups, who could work both locally and nationally. And I would recommend the use of foundation funding rather than the rigidities and political exigencies of public funding.

In the final analysis I believe the key ingredient in any redesign group is *the lead architect*. I had the intention for the Center, as soon as I knew it might survive, to add education and welfare as program areas along with the health care program I was laboring on, since Large System Architecture theory, which arose out of the health care work, seemed generally applicable to many macrosystems. I envisioned the Center as a place to train up new architects, letting them learn on the job from experienced architects who were actually engaged in redesign work. But to start, say, an education program, what I needed first was not money or staff or a proposal, but the person – one with imagination and experience, a *committed person of vision with a visible track record*. This is what you are looking for in a system architect. So when Ted Kolderie approached me looking for a home, I gladly accepted. I knew I had my architect, the man I was looking for, with vision and a track record and thereby the solid basis, the only solid basis, for the Center's new education redesign program.

In conclusion I suggest to everyone concerned – public, private and voluntary leaders and citizens who wish to foster system redesign in our several problem macrosystems in a state or nationally – you need to foster and support one or more system architect groups to work on each. (Perhaps government should have, besides a council of economic advisors, a council of such large system architect advisors.) You need to build public understanding and support for such work. To build such a group, *bet on the person, not a proposal*. This person will think about redesign of macrosystem X for five years, eventually leading the way from thought to action, and keep you abreast of his or her progress; that's what you're betting on, so seek this right kind of person. What's his or her track record of innovative thought, deep and lasting commitment, and accomplishment; if it's there, that person is worth a bet. Find that person – they are rare – and help them build a group and give them their head; stay informed of progress and, as long as you see promise there, provide steady core support. I venture if you build several such capable groups around proven, imaginative lead architects to work on system redesign for problem systems, they will cross-pollinate and keep you ahead for years. □

Application 1: Informed Consumer Choice

Better Care at Less Cost

A national, state and local strategy for health care system redesign

A front-page article in the Wall Street Journal in 2009 (Oct 6) reported on Pennsylvania's admirable agency, initiated in the mid '80s, that compares hospitals on severity-adjusted health outcomes. What may not be obvious from the article is that outcomes assessment, such as that in Pennsylvania, is likely the key to cost-containment in any sound plan for universal coverage, if we wish a plan that won't eat the country out of house and home, and that will actually improve quality of care as it seriously reigns in cost escalation.

To date, all the noise and hysteria in the federal health care debate appear to be over side issues. The central issue on which all else depends, the gorilla in the room if you will, is cost containment. And it is being missed by the entire debate. Everything we want to do depends on how well this gorilla can be tamed. Put more precisely, the gorilla is: How to significantly control health care cost (that is, lower the rate of cost escalation down to the rest of the economy) but without compromising quality, efficiency and access.

Why enact universal coverage? Because it is not just good *but smart*. Beyond promoting the general welfare, universal health care coverage, like universal public education, creates a notably more productive, longer-lived and less costly workforce. Do the math. If you wish to out-compete a billion Chinese, you better have a smarter *and* healthier workforce than anyone else. And that starts not at work age but at birth if you want it at the least cost and greatest benefit. Why do other countries have a healthier workforce at less cost: a big reason is that they cover everyone. They start at birth and reap the benefits: better health maintenance and its attendant lower costs. Universal coverage is no more bleeding-heart charity than universal public education, it is a crucial high-return public investment that the nation is short-sighted not to make.

But if we simply extend coverage to everybody and ignore cost-containment, we will be pouring gasoline on an already run-away fire – a fire making our private sector less competitive abroad, and devouring every dollar for public social expenditures at home, starving other domestic programs far more vital to the nation's wellbeing than more medical care.

To see why outcomes assessment is so critical to cost containment, we must appreciate the root cause of why the health care system malperforms – what causes its variable quality and access and, above all, its run-away cost. It is not greed, it is not profits, it is not insurers. *The fundamental cause is the powerful perverse incentives our present system places on providers.* They cannot do other than what they are doing or these incentives punish them. Any provider who raises costs prospers. Any provider who tries to be maximally efficient goes broke. The more efficient a provider (i.e., better patient health outcomes for less cost), the more severely the incentives punish him. He earns that much less per patient and does not gain a single additional patient for his pains. Nobody has any advantage to choose him over costly providers. Worse, nobody, not even providers, knows who he is.

The good news is that the best, most efficient providers today achieve outstanding patient outcomes for 20 percent less cost than the national average, and they aren't even pressed. *If* all providers could be led to similar performance – and most could – the nation could eventually retire 20 percent of its doctors and hospitals by attrition: an enormous savings. And quality would improve. The bad news is, with few exceptions nobody knows who these good efficient providers are, and patients have reason only to choose for quality, not efficiency, even if they did know the true quality and efficiency of every provider.

Put simply then, the gorilla in the room is: how will you reverse the present powerful cost-raising incentives on providers? Until you reverse these incentives, any cost controls will be spitting into the wind. Providers will be forced by the perverse incentives to fight you, to game the controls

and beat you. Until the incentives are reversed, cost control strategies will fail or else brutalize quality, efficiency and access to care.

Too many on the left have a mystical belief that if the government gains control, cost will be magically contained. (The code word is single payer.) The facts are 180 degrees opposite. We have a single payer program, Medicare, and for 50 years it has been the most inflationary payer of all (not by much: private insurance has done little better). For instance, the Twin Cities of Minnesota with their notably superior outcomes cost Medicare half as much per elder as notoriously over-doctored Miami. Their reward: Medicare pays Miami twice as much per elder as the Twin Cities! The more you raise cost, the more it pays. Is it any wonder costs escalate?

And that's where Pennsylvania's effort is key. It began as part of a strategy (nicknamed Buy Right then, recently renamed Informed Consumer Choice) directly aimed at reversing the perverse incentives. *Informed Consumer Choice aims to reward providers the better and more efficient they are over providers who are less good and less efficient.* Unfortunately, Pennsylvania only managed to take Step 1 of the strategy. A fine start, but Steps 2 and 3 are perhaps even more difficult, and the incentives will not be adequately reversed until they are also taken.

In a nutshell: if all three steps are taken, then patients will receive information identifying (Step 1) the quality and (Step 2) the efficiency of each and all providers, based on severity-adjusted patient health outcomes and patient satisfaction. They will know which providers are better for less. And (Step 3) they will have proportional rewards – discounted premiums and co-pays, extra benefits, and the like – in their insurance to pick those who are better-for-less over the more costly. The best, most efficient providers then get the patients. The less good and less efficient lose patients; they either shape up, or fold up shop. The result should be sound incentives on providers to maximize quality, efficiency, and productivity gain.

The way to sound cost containment without harm to quality and access is incentives on all providers to steadily improve productivity (better outcomes with fewer resources), not to browbeat them with crude draconian cost chops gutting quality of care, eligibility and coverage...bureaucrats second-guessing and micromanaging doctors, denying services, slashing fees and miring the system in ever greater red tape. Productivity gain comes from sound incentives, not from top-down prescriptive government controls. Get the incentives right and I believe American providers will solve the quality and cost problem for us better than any controls we can devise.

The proper reward for an efficient provider is *more patients* at the expense of less efficient providers, not some kind of bonus payments which have nowhere been shown to contain cost. Bonus payments raise cost by paying efficient providers more than they ask. Patient-shift through properly informed and incited consumers is the simplest, most powerful incentive to reward provider quality and economy, and is the force behind Informed Consumer Choice.

And the best (and probably only) way to win politically on serious cost containment is to lead with quality. If you cannot assess quality first, providers will claim any effective cost controls undercut quality, and the public will support them. If the Informed Consumer Choice strategy above does not appeal or proves insufficient alone, this does not change the diagnosis. The nation must come up with a supplementary or alternative strategy to reverse the distorted incentives. And no matter what that strategy turns out to be, outcomes assessment will clearly have to be an essential part of it. Which means *the nation should not wait to get started on outcomes assessment.* It should start now.

In short, outcomes assessment is not just some worthwhile thing to do sometime. It is essential not just for quality improvement, it is the key to serious health care cost control without harm to health care. If cost is to be controlled, outcomes assessment cannot be left to meager hit and miss efforts about the country. It must become a central well-designed thrust of national and state health care policy. All the more so with advent of universal coverage. □

Application 2: Public School Choice

The Missing Ingredient in Public Education Reform Thinking

A national, state and local strategy for public education system redesign

In this discussion please distinguish between charter schools – short-hand for state-authorized chartered *public* schools – and the *Public School Choice* strategy (*PSC*) for system redesign of the nation’s public elementary and secondary education system. The point – the goal – of this strategy is not charter schools; it is to *foster good public schools, be they charter or district schools*. *PSC* demands charter schools be public schools, fully satisfying the state definition of a public school (*PSC* excludes private, religious, or for-profit schools). They are simply one essential part of the *PSC* strategy to broaden the public school system, opening the door wide to create new, innovative public schools. We do not believe that charter public schools are intrinsically superior to district public schools. The differences between the two types are dwarfed by the differences within each type. Some of each type are superior, others are unacceptably poor.

The trouble in our present district systems is that good schools don’t spread and bad schools don’t change or go out of business. Equally troublesome is the rigid monofom pedagogy and schedules of present district school systems. Districts appear locked into the standard lecture/test method – this despite the growing cognitive research showing that different children learn in different ways requiring different educational methods. Many fail to progress under the standard pedagogy and lose interest, morale and motivation, the heart of successful learning. They drop out, many in spirit even when not in body. And most districts are locked into standardized daily schedules. Many children face circumstances – work, home conditions, teen motherhood, etc. – that require far more flexibility than these rigid schedules allow. They, too, drop out. Despite decades of effort and spending, present district school systems have found it difficult if not impossible to break out of their rigid pedagogy and schedules in more than token fashion.

It is not that there aren’t good and great district schools. The majority are. But just as there are inferior charter schools, there are all too many inferior district schools. The principal difference, unfortunately, is that in the present system poor district schools do not go out of business. They are propped up and allowed to go on year after year short-changing students – a captive group with no escape – by their inability to motivate and help children learn.

We must face the fact that *decades* of trying to improve poor district schools – by all the good things being recommended today: more public and private leverage, more money, better personnel, better training, better method, etc., imposed on schools and districts top-down – have all notably failed. Why? What’s been missing...people have not asked themselves that question. Those now advocating these things (only, now, bigger and better and harder) must explain why they will work this time. The failure is not due to lack of skilled, innovative educators and teachers; the system is loaded with them. They know what needs done and don’t need outside lay policymakers to tell them. Rather, in the present system poor districts and poor schools have a culture and circumstances that resist change and frustrate innovative educators at every turn. Worse, under the present system these schools are monopolies with no real inherent incentive to change. Since massive policy interventions cannot be sustained long-term, it seems likely that when all the present policy attention and hoopla get redirected to the next national crisis, the present education system will revert to business as usual, just as it always has in the past. An effective strategy must introduce changes that will be sustained after the interventions have been accomplished. There is only one type of strategy likely to do this: system redesign – i.e., fundamental structural change in the larger education system that *alters the incentives* on

schools. Yet it is the one strategy overlooked, the one strategy all but ignored. We believe it the missing ingredient in education reform thinking, and without it our present well-meant efforts have little better prospect than our decades of past well-meant efforts.

What is genuine system redesign? It is not telling schools what to do. It is “incenting” them what to do. It is changing the structure of the education system to place powerful incentives on schools and districts rewarding good performance and penalizing poor performance. Consider the incentives in the present district monopoly school system. When children do not learn, who loses their job? Who goes out of business? When a school succeeds in motivating children to learn, are more students allowed to go there? There is neither penalty nor reward, whether children learn or not. Unless these incentives are altered, why will schools improve? Institutions, public or private, without performance incentives tend increasingly to serve themselves, not their mission.

Done right with proper incentives, system redesign will bring about all the good things above, heretofore recommended and tried for years without taking hold; but schools will now do them on their own in their own interest, and do them far better and more economically than anything any massive, centralized external policy effort can impose on them.[†] In education, the needed system change must by its design implant strong new built-in incentives rewarding school performance. It must allow bad schools that will not improve to be put out of business and replaced with new and better schools – with schools that give innovators much more free rein to innovate better learning methods and school cultures. All this is exactly what the *PSC* strategy is designed to accomplish. It is the one strategy that is not simply more of the same – the same things that have not worked in the past – as seems so in vogue today.

The basic redesign idea of *PSC* is to end the present district monopoly and introduce a variety of *competing public schools*, some authorized by local districts as at present, and others by state-authorized charterers, with freedom for all these public schools to enter and leave the field depending on their success. State-authorized chartered public schools add two critical virtues missing in the present education system of solely district monopolies. First, chartered schools have a flexibility, largely unavailable to present district schools, to innovate or specialize in new learning methods likely to reach and motivate students poorly served at present by the monofarm lecture/test pedagogy of our district schools. Thus instead of continuing the decades-long failed strategy of trying to reform poor district schools directly, innovation and flexibility can be introduced via entirely new schools free of district rigidities. Thereby *PSC* provides innovative teachers and educators unparalleled opportunities to introduce a variety of new learning methods and schedules frustratingly difficult if not impossible in their present standardized district school systems. Indeed, increasingly, new charter schools are being *teacher-designed and -operated* exactly by such innovative teachers and educators, because they finally provide them the freedom and opportunity they have sought and needed for so long.

We emphasize: research has established that not all children learn in the same way or at the same speed; Albert Einstein and Michael Jordan do not learn in the same way. In particular, many children (Einstein famously so) do not learn well by the lecture/test methodology that dominates present district school systems. Because different children learn in different ways, some flourish under certain learning methods but not under others. New chartered schools that base themselves

[†] Note, this is true of all large systems – education, health care, etc.: policy cannot order organizations to act counter to the powerful incentives placed on them by the larger system in which they operate; they have no choice but to ignore or resist, else they will be hurt. The correct policy approach, too frequently overlooked, is to appropriately redesign the larger system to replace its bad incentives with good incentives.

on methods neglected or difficult to implement in standard district schools can thereby provide learning opportunities for a whole class of presently poorly served students. By adding a variety of such chartered schools to our district schools, all these different classes of neglected learners should find a school, district or charter, appropriate to motivate their learning progress. With far fewer drop-outs and far more learners, 'no child left behind' should become more than an empty phrase.

The second and equally vital virtue of adding chartered schools is that good charter schools grow and bad charter schools go out of business! Some critics protest that charter school failures are a terrible thing, an intolerable weakness. The opposite is true; it is a virtue that schools that cannot attract students or are poorly run do not continue. If a State does its regulatory job well, assuring the initial capability of a proposed charter school, and that it meets the requirements for a public school in its curriculum (non-sectarian, non-ideological, etc.), it can minimize such failures. But it likely cannot eliminate all. These poor chartered schools should be allowed to fail. Students can be moved to other schools of the parents' choice. The idea in *PSC* is to protect students, not schools.

The other side of this virtue is that good charter schools grow and draw students from poor district schools as well as poor charter schools. So under *PSC* poor district schools will now also be put out of business – not by public fiat (almost impossible politically), but for lack of students. Parents of children in poor schools, district or chartered, or whose children are failing to learn under the standard lecture/test method will have alternatives. They will not be told that waiting lists for district magnet or special schools, if any, are full. They will be able to send their children to whichever public schools, district or charter, they find best for their children. And since districts cannot stop the entry of charter public schools into their area, we expect district schools to develop much more flexibility and variety in the future to meet the competition from charter schools. The point is to *reward school excellence*, district or charter, *with students*. Thus the net, and devoutly to be desired, effect of *PSC* redesign should be that good public schools, whether district or charter, flourish and grow at the expense of poor public schools, whether district or charter.

In conclusion, to assess *PSC* by simply comparing the averaged performance of present district public schools with that of charter public schools misses the entire point. On average neither sector is superior. It is a misdirected static snapshot when what is being attempted under *PSC* is to put in place new system-wide incentives on schools, incentives that introduce *an entirely new dynamic* in public education where, over time, good public schools, whether district or charter, take students from poor public schools, which either improve or close. This dynamic will not bear full fruit in a year or two, but given the strong new incentives, in a decade or two the public education system should be much less rigid and centralized, much more properly varied in learning methods and schedules, much more innovative, and much more responsive and effective for all students. We urge people to understand *PSC*, the *Public School Choice* strategy for system redesign of public education, and help it happen. □

Appendix 1: The Decentralization Principle

A number of theorems useful for policy can be deduced from the postulates of Large System Architecture (LSA) theory. To illustrate, this appendix will provide one example, but a particularly important one for policy: when is it safe to decentralize control of a macrosystem?

When an industry or other macrosystem is performing poorly, there is often a rush by some policymakers (particularly progressives) to “command and control regulation”: i.e., by using strong, top-down regulatory controls over the industry’s decisions, government is supposed to make the industry straighten up and fly right. Unfortunately, this strategy seldom works as well as its advocates hope, and there is an extensive literature* as to why: how the structure and incentives of command regulated macrosystems are stacked against the regulators, no matter how competent and dedicated. For insight, consider just one such obstacle among the many raised in this literature. In command and control regulation all critical regulatory decisions must go to the top and be decided by a small panel of central regulators. But the theory tells us an industry performs badly because the incentives of the system strongly reward bad performance and punish good performance. No matter how brilliant and hard-working, these regulators simply do not have the staff and time to nimbly process all the myriad decisions necessary to stay on top of an industry, particularly an industry with strong incentives to end-run them. And they are badly outnumbered by all the brilliant people in the industry who know its business better than the regulators and continually invent ways to evade the controls. And because only the few most important decisions can be made with limited staff and time, command regulatory decisions tend to be blunt weapons not easily changed, so a command regulated industry often not only continues to perform badly but rigidifies and loses both effectiveness and responsiveness.

Of course other policymakers (particularly conservatives) push to deregulate, get government off the industry’s back and decentralize decisions back to the industry, so that all the thousands of competent private individuals and organizations in the industry can use their creativity and skill to drive the system aright. But this strategy seldom works well either, despite its advocates’ hopes. It is indeed the case that thousands of industry people familiar with the system can bring to bear far more brainpower, expertise, imagination and agility than a small group of outside regulators, so the capacity to decentralize authority is devoutly to be desired. But these advocates overlook that decentralization presupposes that the industry is properly structured with incentives rewarding the desired performance, which the theory tells us is exactly what doesn’t obtain in a badly performing system. Therefore these thousands of industry people will use all their brainpower, expertise, and imagination to excel at performing badly in exactly the way the bad incentives reward them to do, and punish them to do otherwise. Hence in a poorly performing system with bad incentives, neither command regulation nor decentralization solve the problem. Decentralized control is far more effective and nimble than command regulation for the reasons observed above, but it will only work in the public interest if the system is made sound, i.e., if the system’s structure is re-architected to align system incentives with goals.

Hence follows the following theorem on how and when to decentralize:

Decentralization Principle: It is only safe to decentralize control in a macrosystem when its incentives are aligned with societal goals.

If policy will implement such structural redesign in a poorly performing system – not a simple task – than regulators can decentralize, leaving operating decisions to the autonomous organizations and individuals in the system, and limit regulatory purview just to maintaining the integrity of the new system structure (termed “system oversight regulation” and much less

intrusive than “command and control regulation”). This is but one of many useful policy principles and insights that can be derived from LSA theory. ○

[*Note: A review of this considerable literature may be found in McClure, *Structure and Incentive Problems in Regulation*, The Milbank Memorial Fund Quarterly, Health and Society, Vol. 59, No. 2 (1981), pp. 107-144]

Appendix 2: On Societal Goals, Policy and the Role of Large System Architects

The purpose of policy is to achieve societal goals. But what is meant by a societal goal for a macrosystem? And how and by whom are such goals specified? In practice, societal goals are specified by those holding the political power to decide them. In a despotism for example, goals will reflect the ambitions and values of the leadership cadre in power. They will reflect the interests and values of the cadre *for* the society, not necessarily the interests and values *of* the society. The cadre would then use LSA to incent the macrosystems of the society to accomplish its despotic goals.

In a democratic society, goals will reflect the aspirations and values of the elected leaders for the society which, depending on the fairness of the election process, are more likely to correspond to the aspirations and values of the citizens of the society. Ideally all citizens would share common aspirations and values, but no large society achieves such perfect unanimity. Moreover many of the aspirations and values of a society are in conflict with each other, so that a balance acceptable to the citizens must be struck by any realistic policy. Such a balance will never satisfy all factions perfectly; some will be more happy with any given balance than others. A spirit of compromise for the good of the greater society over special interest or ideology is essential to any well-functioning democratic society. (When one or more factions, in self-interest or self-righteousness, set their prized goal above all others and refuse compromise, such crippling factionalism paralyzes democracy. In their refusal to recognize any other interests than their own, such obstinate factions act more like despots than democrats.)

Desirably each societal goal in a republic, provided that it does not infringe the basic human rights guaranteed by the republic to all citizens (protecting the minority from the tyranny of the majority, and vice versa), should have the support of the great majority of the citizenry. The greater the percentage of support, the more legitimate a proposed societal goal would appear to be. A goal supported by a bare majority of citizens would more aptly be called a goal of the majority party rather than a societal goal. But goals supported by three-fourths or more of the electorate would seem legitimately termed societal goals.

Consider now the role of the large system architect: he can only propose societal goals, he has no power to decide. Just as a home architect can propose a house design to a client, it is the client, not the architect, who makes all final decisions – to approve, reject, or modify. Just so, the power to decide societal goals (and any proposed system redesign strategy to achieve them) rests with those holding legitimate authority to decide – in a democracy, its elected officials. They may approve or reject any set of proposed goals or request modification. Independently, they may accept or reject any proposed system redesign or request modification. In proposing a complete set of goals the LSA architect certainly tries to anticipate and help clarify the goals that society and its legitimate decision-makers have for the macrosystem in question. In eventually bringing his proposal to society and its leaders, he says to them in effect: ‘Here is a set of proposed system goals; if you agree with them, then here is a proposed redesign strategy to accomplish them; but if you do not share these goals, then this is the wrong strategy.’ And then, like a home architect whose house design is rejected or modifications requested, it’s back to the drawing board for the

LSA architect, to devise a more acceptable set of goals and a new redesign strategy to accomplish them. ○

Appendix 3. On The Role of Large System Architecture

The purpose of policy is to accomplish societal goals. This profound point is so obvious that it often seems overlooked, but it has consequences for effective policy design, also often overlooked: good design *must start with setting out the relevant societal goals*. A society's goals not only include practical needs such as productivity increase and efficient allocation of resources, they are where a society expresses its values: its sense of fairness, compassion and respect for the wellbeing of its members. A society's goals are often carried out by macrosystems – large systems of organizations and individuals, such as the health care or education systems, etc. It is usually better, when feasible, that government itself not operate the organizations. But it is the function of government to see that all macrosystems and their organizations pursue desired goals. Designing policy to improve macrosystem performance is presently in many cases a grab-bag of ad-hoc methods specific to a particular macrosystem. The purpose of Large System Architecture (LSA) is to provide a more systematic approach to policy design across macrosystems generally, incorporating all relevant disciplines. LSA provides a general theory and practical set of methods to help policymakers properly assess and, when necessary, improve macrosystem performance. LSA theory predicts that macrosystems will only perform well when their incentives are aligned with the desired societal goals, otherwise organizations will be rewarded for undesired behavior. Perhaps the most important and distinguishing property of the LSA method, its particular advantage over more common approaches, is that, as emphasized above, it starts directly with explicitly identifying society's desired goals for any given macrosystem. (In this it differs somewhat from standard disciplines such as economics, law, political science, etc. which often focus on disciplinary objectives more than overall societal goals for the system; LSA then incorporates all standard disciplines relevant to a problem macrosystem, concerting them to focus on the desired goals and on so-called "system redesign" strategies to achieve those goals.) Its basic predictive insight, that organizations must follow the incentives placed on them by the larger system they are in, is often overlooked by usual policy strategies that take the basic system structure for granted and attempt to regulate or fix its failures while ignoring its unsound incentives. In contrast, when LSA architects identify a macrosystem with incentives not aligned with goals, they use LSA's methods to (1) propose ways to redesign the system structure to align incentives with goals – termed "system redesign" – and present these to policymakers. If the redesign is approved, they (2) assist policymakers to implement the redesign. LSA thus offers a superior alternative to either government controls, which stifle organizations, or no controls, whereupon organizations soon stray from desired goals. Rather, government oversees that correct macrosystem incentives are put in place and properly maintained, allowing the organizations within full freedom as each sees best, to follow the incentives rewarding them to maximize on goals. Societies who wish their macrosystems to perform steadily better for less would do well to encourage the new discipline and its practitioners. ○

Appendix 4: Large System Architecture and Economics

Because economics also deals with system structure and incentives, many economists might not readily see that LSA adds much to their discipline. This appendix will suggest it does. While LSA uses methods from economics and all other disciplines relevant to a problem at hand, it is in fact a discipline of political economy and policy development. It begins by identifying a complete set of policy goals for a given macrosystem, and then designs and helps implement policies to maximize the performance of that system on those goals. An example may make the

distinction clear, comparing the difference in how these two disciplines, economics and LSA, approach economic policy. The economy is a macrosystem for the production and distribution of material wealth. Economics, more particularly macroeconomics, is a powerful discipline to explain and manage the economy on a broad set of economic objectives: GNP growing at a satisfactory rate, unemployment down to acceptable levels, inflation under control. Economists use a set of disciplinary methods to accomplish these objectives, on the private sector side using regulation to assure efficient markets and stable financial institutions, and on the public sector side, using monetary and fiscal policy as stimuli and controls to keep business and employment up and inflation down. Presently these methods appear to be succeeding, if slowly and uncertainly, the main outstanding concern of economic managers being the risk that the volatility of the financial sector still poses to the larger economy, threatening repeat of the 2008 crash. In contrast, LSA looks beyond these disciplinary objectives, indeed beyond any given discipline's objectives, seeking the actual primary policy goals desired by society. For the economy it finds these to be two of the stated goals in the Preamble of the Constitution: promoting the general welfare and liberty. By these the Constitution clearly means the general wellbeing and liberty of all Americans, not the individual wellbeing and liberty of some segment or segments of Americans to the neglect or at the expense of the remainder. LSA regards the purpose of the economy (and every other macrosystem) to maximize Constitutional goals. It therefore regards all the other economists' performance objectives as means rather than ends – as instrumental goals subordinate to helping accomplish the two primary goals – because these instrumental goals, unlike the general welfare and liberty, are not explicitly stated goals in the Constitution and therefore not themselves Constitutionally obligate. If the present economy is not achieving these two Constitutional goals, then these instrumental means, and any others necessary, must be redeployed in ways so that it does. LSA's concern is that all these economic measures mentioned above can appear satisfactory, yet miss that the economy may be failing to promote the general wellbeing or general liberty, indeed can even be putting one or both at serious risk. Therefore LSA assesses performance of the economy directly on these two Constitutionally obligate goals. If the present economy is acceptably increasing the wellbeing and liberty of the general population, then LSA would regard the present economy as sound. But if on the contrary the general wellbeing or general liberty are stagnant or slipping, or the individual wellbeing or liberty of particular segments of the population are disproportionately increasing to the neglect or expense of the majority, then – no matter how satisfactory such measures as GNP growth, employment, inflation, and stability of financial institutions, etc. – LSA would regard the present economy as falling short on its stated primary goals and therefore unsound; it would conclude its current structure and incentives require modification or redesign to acceptably promote wellbeing and liberty more generally. To my knowledge these two goals do not usually arise explicitly or as primary within the present discipline of economics. People may unthinkingly presume that the general welfare is being promoted if the instrumental economic objectives above appear well met, but as just noted, this can be untrue. Unless measures of the general wellbeing itself are directly monitored there is no way to know. Judging from the actions of the present managers of our economy, promoting the general welfare would appear at best only one of many objectives, even a minor objective, rather than *the* primary goal. And the second primary goal, promoting the general liberty, is presently not usually considered part of economics, yet it is obviously a critical part of managing the economy: unduly excessive concentration of the nation's wealth in too few hands is a dire threat to the general liberty. Thus LSA's effort to first identify fundamental goals makes a substantial difference in policy design, and the utility of macroeconomics would appear strengthened as a tool for economic policy development were it augmented with LSA methods. In sum, the distinction between LSA and other disciplines is that, as in this example, LSA is first concerned to identify the fundamental goals society desires of any particular macrosystem, and then design and implement policies, drawing upon all relevant

disciplines, to maximize performance on these goals; it is not limited to the objectives, methods and viewpoint of any one discipline. ○

ABOUT THE CENTER

The **Center for Policy Design** is a non-profit, non-partisan policy research and design organization based in Saint Paul, Minnesota and working nationally, that develops and helps apply system redesign strategies for health care and public education.

ABOUT THE AUTHOR

Walter McClure is chairman of the Center for Policy Design. He received a BA in philosophy and physics from Yale in 1959, and a PhD in theoretical physics from Florida State in 1967. Between undergraduate and graduate study he spent two years from 1959 to 1961 at the Applied Physics Laboratory, the Navy's chief development lab, as part of a team working on problems in rocket engines then afflicting, among others, Polaris and Minuteman missiles. His dissertation research, on nuclear cluster theory, was performed at the University of Tübingen in Germany, and he co-authored a book on the subject with his major professor Karl Wildermuth. In 1969 he switched from physics to health care policy for reasons, he says, having to do with "relevance." He worked at InterStudy under Paul Ellwood's leadership from 1969 to 1981, at which time he left to start the Center for Policy Studies (now the Center for Policy Design). He directed the Center until retiring from active work for medical reasons in 1990. At InterStudy he worked with colleagues on the HMO strategy for health care reform, among other tasks drafting much of the Federal legislation. At the Center he developed Large System Architecture which is both a general theory of why organizations do what they do, and a set of methods to design and carry out system redesign strategies to redirect their behavior when necessary toward the goals society desires of them. With these methods he and his colleagues at the Center developed a health care system redesign strategy to get better care for less, and developed a national universal coverage proposal consonant with this strategy. He assisted Medicare, Pennsylvania and Cleveland to implement the first step of the strategy, severity-adjusted outcomes assessment of providers, before his reluctant retirement. He remains chair of the board of the Center but for many years has been inactive in its professional work and management. The Center became inactive in health care system redesign after his retirement, but continued very active in public education system redesign under the leadership of Ted Kolderie. Recently McClure has begun to reactivate the Center's health care system redesign work.

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