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# THINKING ABOUT GOVERNMENT LEARNING

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## INTRODUCTION

Do governments ever learn from experience in the long run? If so, what are the processes? If not, what are the barriers? And what could be done to increase their learning rates?

The concern to promote intelligent government invites attention for reasons beyond simple efficiency or effective governance in America and other countries. The modern high technology state gives political leaders the capability to destroy most human life with ease. It also gives them the resources for legitimate, extensive intervention and even management or regulatory control of society to effect resolutions of problems as defined by different groups (Lowi, 1978; Wilson, 1975). In poorer countries simple humanitarian concerns (15 million annual deaths from starvation, mean life expectancies in the low 40's), as well as desires for more responsible governance, are incentives to analyze current administrative practices and to create constructive alternatives.

Our purpose in this paper is to refine this question of government learning as a first step in the scientific tasks of measurement and hypothesis testing. First, we will divide the concept of learning into two parts: intelligence and effectiveness. We will then consider the case of individual learning and propose five types of individual learning, each type reflecting distinctive academic literatures, research, and measurement traditions. We will next turn to the case of organizational learning, discussing the problems of defining, and measuring, collective learning. In a last section, we will draw upon recent case material to illustrate how these conceptual distinctions can be used to provide a more intelligent account of alternative routes to intellectual success and failure.

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## DEFINING LEARNING

Learning can be defined in several ways. Hilgard and Bower (1975, p. 17), in the standard advanced text in educational psychology, propose a broad conception:

> Learning refers to the change in a subject's behavior to a given situation brought about by his repeated experiences of that situation, provided that the behavior change cannot be explained on the basis of native response tendencies, maturation, or temporary states of the subject (*e.g.* fatigue, drugs, etc.) [1].

This expansive conception of learning—change—may be contrasted with the recent, and highly normative, Club of Rome definition which proposes that 'learning' should refer to the increased use of long-term time perspectives and the advancement of humanitarian concerns through international cooperation (Botkin *et al.*, 1979).

For research purposes, we suggest that government learning be defined by two criteria: the growth of intelligence, and the (related) growth of effectiveness. Neither (alone), as we will discuss, seems adequate to recognize the full range of normative concerns which researchers may have. But both are needed, as we will argue, to preserve as empirical issues (rather than definitional ones) several key issues which are commonly recognized in ordinary language (*e.g.* that to be intelligent is not necessarily to be wise—or that some people may be analytically brilliant but completely ineffective in managing institutions.)

To say learning occurs, then, there should be evidence for increased intelligence and sophistication of thought and, linked to it, increased effectiveness of behaviour.

An example illustrating the issue of intelligence and sophistication is the following: politicians may support or oppose major American arms aid to El Salvador but the thought processes underlying this position may be very different in quality. There could merely be a simple, amoeboid reaction to possible electoral defeat. Or the decision might reflect a conclusion deriving from a thoughtful and detailed study of the issues. Posing the question of learning as a question of intelligence and sophistication points to the question of what *lies behind* a public position [2].

How can we assess, formally, the degree (and rate of change of) intelligence and sophistication? These changes might be assessed, as in teaching, by expert judgment of those who possess these qualities. But three objective indicators can be drawn from cognitive development psychology: (a) increased capacity for differentiation (recognition and articulation), (b) increased capacity for organization and hierarchical integration, (c) increased capacity for reflective thought, perspective on the form and nature of the contents of thought, and on the choice of structuring principles (Goldstein and Blackman, 1978; Miller and Wilson, 1979; Werner, 1948; Werner and Kaplan, 1963).



To use these criteria, we would (a) first assess how many new and different relevant arguments and considerations a President or Senator thought about when he considered the arms aid problem, and the depth and degree of differentiation of thought within each argument. For example, if a President believes there is foreign (*i.e.* non-American) involvement does he think of the rebel actions as *prima facie* evidence that the Soviet Union and other Communist countries caused the revolution, or can he raise (at least in his own mind) questions about different actors with other (indigenous) motives?

Second (b) we would ask about the hierarchical integration of the politician's thought processes. Does he or she coherently pull together and systematically organize the complexity of the problem?

Finally, we would assess, (c) the capacity for differentiation of the decision-maker from first-order thought processes, how much perspective an individual showed about assumptions, problem conceptions, models, and inference processes (an inquiry that would also assess whether the subject is deeply self-reflective or only developing better rationalizations) [3].

Formal procedures for at least the first two parts of this process now are available. Axelrod's (1976) cognitive mapping technique, for example, readily yields a formal representation of intellectual structure. Tetlock's (1980) modifications of measures for integrative complexity have opened pathways to index formally the second measure.

These indices can generate a quick preliminary diagnosis of the intelligence and sophistication attained by a government official about a policy area. For example, thirty years ago, people spoke of 'underachieving children'—today the cognitive map of a sophisticated government expert will include types of underachievers produced by different processes (reading problems of differentiated types; nutritional deficiencies; sub-cultural disadvantage; sub-cultural, community, and school norms; school phobias, *etc.*) and point to different programmes and current research about each of these.

## EFFECTIVENESS

For some people in government to think with more intelligence and sophistication does not, however, mean they know effective problem solutions. Mental patients can have brilliantly elaborated and integrated beliefs and yet be out of touch with reality; social scientists can invent new but unhelpful ways to talk about the same old things or develop a sophisticated capacity to reject old answers more rapidly than their capacity to find better ones. And even brilliant individuals can be ineffective if they lack power to affect bureaucratic processes at key points.

The criteria for effectiveness is a choice by the researcher. This choice is

crucial. Anything can be deemed completely effective if its purpose is to do whatever it is already doing. Often, to an outside observer, what appears as stupidity is simply explained as an astute and effective solution to a more parochial, and different, problem as it appears to different people in different locations. (The President may decide an issue of foreign policy only to affect his domestic constituency. Or he may deliberately 'misconstrue' and overly dramatize evidence for a causal Soviet role to send a message of toughness to Soviet leaders to affect their choices in other arenas.) Thus, to evaluate changes in effectiveness, one must first complete a criteria of 'effectiveness in doing *x*', and a common answer to shortfalls in effectiveness will be that the person involved was actually trying to increase or defend his or her effectiveness in doing *y*.

But an observed increase in effectiveness in doing *x* does not, by itself, show increased learning. Effectiveness may increase from perseverance, money, power, changed public receptivities, or other causes; it is evidence of learning *per se* only where there is a causal link to intelligence. Nor does decreased effectiveness necessarily warrant the inference of non-learning. For example, if relevant societal processes change (as in the early 1960's success of American macroeconomic policy compared with stagflation of the 1970's) government's effective intelligence, growing less rapidly than the phenomenon changes, may still decline. And not everyone in America or the world cheers for the success of Washington: individuals, corporations, or other countries, for example, may themselves become more intelligent over time and thus decrease government effectiveness (some economic policy tools, for example, have become less effective because of investor gameplans that now take account of government's own efforts to gameplan them) [4].

## TYPES OF LEARNING

With this initial overview, it will also be useful to recognize five distinct types of learning corresponding to different clusters of academic literature. These are scientific method learning; intuitive understanding; creativity; skill; and capacities for good judgment, for which the criteria for differentiated recognition and articulation, hierarchical integration, and perspective (*e.g.* for appropriate selection among alternatives) can be applied.

### *A. Scientific Method Learning*

The best developed image of a formal learning process is the well-known scientific positivist vision. This type of learning requires clarity and explicitness for all key terms and procedures, and explicit codification of the degree of confidence in conclusions.



An individual can be said to have increased his scientific intelligence to the extent his ways of thinking about the world exhibit use of:

(1) Explicit models, theories, and hypotheses.
(2) Key terms within such formulations which are translated into operational definitions that point clearly to the phenomena in the external world being discussed—*i.e.* there is good (valid, reliable) referential indexing for all terms.
(3) Inferences of causation based on explicit evidence which is further subscripted in the individual's mind by explicit reference to:
  (a) The degree of reliability and validity of all measures employed.
  (b) The sample characteristics and the validity of such samples for drawing broader conclusions.
  (c) The inferential criteria supporting the causal hypothesis.
  (d) The alternative hypotheses or additional relevant variables that still remain untested or uncontrolled.

Here, and for the other four types, it is useful to consider two secondary characteristics to identify good learning within different modes:

(4) *Speed and completeness of knowledge scanning and summary.* Using this criteria we would ask how quickly and comprehensively an individual can scan, retrieve, and combine pieces of relevant scientific information from memory and reach conclusions both about what he knows and what he does not know.

(5) *Efficient processing.* We would also want to judge not just speed and completeness but efficiency (effortlessness)—a person who really knows his subject should be one who can go through all the steps with less effort and less wasted motion. This criterion is analogous to saying that it is a better athlete who can run a mile in six minutes using 45 per cent of his or her capacity compared with someone who can do the same thing using 85 per cent of capacity. Thus a person can be said to know something better when processing, storing, and the combining of information are virtually effortless and automatic: a beginning driver may shift gears and steer at the same speed as an experienced driver, but for the experienced driver the task is automatic and second-nature, whereas the beginner has to concentrate all his attention on what he is doing (Brown, 1962; Moray, 1979; Reason, 1977).

### *B. Intuitive Capacity*

Intuition refers to the capacity to sense or grasp the nature, qualities, or operating principles of physical objects, people, or situations with incomplete objective data. The relevant data and rules of inference in intuition may, as

Polanyi has argued, not be amenable to explicit codification (Polanyi, 1958, 1966; Westcott, 1966).

Scientific knowledge refers to learning about causes. Intuitive knowledge may refer to this and more—for example, to grasping 'what is going on here', the essential dynamic, in a situation, to understanding meaning, to sizing up people, to viscerally 'knowing' what to say to put people at ease or the time to be firm in a negotiation.

A promising theory is that intuition is a function of empathy, of identification, hence a function of insight—the capacity of access to the self and its own actual or potential experiences as a resource for being sensitive to the situation and context (Gauss, 1973; Maslow, 1969; Royce *et al.*, 1978; Stotland *et al.*, 1978; Wescott, 1968). While some positivists have said that intuition is merely 'pre-scientific' knowledge, it is probably more useful to note the psychometric evidence for (at least) two forms of mental functioning, the analytic (scientific) and the verbal (intuitive).

### *C. Creativity*

Creativity refers to the activity of generating novel ideas, conceptions, or perspectives which others find to have value. It is likely of special importance to government effectiveness in times of change or increased responsibilities where older theories, methods, or concepts based on previous experience prove ill-suited to new conditions [5].

### *D. Skill to Implement Intentions*

Skill refers to the capacity, given adequate technologies and resources, to translate intentions into successful outcomes. It is engineering knowledge, applied practical knowledge of how to make things happen. It may be the skill to draft a good briefing paper or an effective State of the Union address. It may involve applying current intellectual technologies to analyze the costs and benefits of a neutron bomb. It may be the skills necessary to set political agendas, manoeuvre appropriations reductions through Congress by mastery of standard techniques of psychodrama and symbolic politics, salesmanship, and coalition building; or the skill to implement a programme once it is enacted (Bardach, 1972).

Skills obviously draw upon scientific knowledge, intuition, and creativity, but their core involves know-how—knowing how to combine these: (1) efficiently and with grace (effortlessness and economy of effort); (2) with appropriate linkage of ends to means to translate intentions into desired consequences while avoiding or minimizing undesired or unknown outcomes.

### *E. Good Judgment and Wisdom*

A fifth type of learning is the development of capacities for good judgment and wisdom. Good judgment may serve as a 'master' term to refer to a mature integrative ability to draw efficiently upon scientific knowledge, intuition, creativity, and skill—and to do so in a way that is effective. 'Wisdom' may be defined as a specialized application of such ability in addressing important issues: Plato defined wisdom in this way, as a characteristic of people one could depend upon for good judgment about important issues (*The Republic*, Vol. 4).

If good judgment reflects a distinctive form of learning, can its nature be specified—and measured—more concretely than by the definition (above) of an efficacy-increasing ability to integrate and use other forms of intelligence?

Accuracy seems a good criteria. One would not want to insist that a man with good judgment should *always* be right. Still, it would be difficult to maintain someone had good judgment if, given his (or her) own values there was, *ceteris paribus*, worse accuracy across cases than for someone with allegedly poor judgment. Early studies of individuals with superior judgment in well-defined games (poker [Findler, 1978], chess [Simon, 1978]), have been followed, more recently, by rapidly expanding efforts (with innovative measurement techniques) to study judgment processes of first-rate medical diagnosticians and write computer programs that will 'compete' favourably with most practitioners (*e.g.* Elstein *et al.*, 1978; Szolovits and Pauker, 1978).

A common conception is that a man with good judgment has a perspective on values, and especially an ability to identify the key value issues that affect the long-term interests of an organization. Another component, related, is the tendency to take, and remind people of, the long-term health and credibility of institutions and to take immediate decisions in light of these longer-run consequences. Both criteria also imply that those with good judgment act altruistically, that is (rather than running a personally self-interested agenda) they manifestly address themselves, credibly, to a common, integrative set of concerns [6].

The issue of how to develop capacities for good judgment has always been crucial to the design of public management curricula. Major civil service systems in history—for example the Chinese and British—based their training systems on moral character. It was a theory of policy implementation: the personal virtue of the leader would inspire followers, and retain public allegiance in the face of difficulty. It was also a theory of good judgment: good character was thought to be its base. The American preference has been technocratic, giving central position to rational analysis techniques in decision-making. Rather than a sense of moral heritage (the common law tradition, Latin, the stories of ancient Greek and Roman leaders who, through moral virtue, decided wisely or—from dissolute morals or *hubris*—brought disaster), professional preparation has emphasized economics (March, 1978).

Value choices would undoubtedly play a part in being wise about politics and public policy, especially in informing a public philosophy, but it may also be useful to include both requirements for a long-term perspective

(above), and (in Tuchman's (1980) view) a realistic appraisal of the role of chance and ignorance in human affairs (*i.e.* humility). People who are wise are also said to have a sense of the appropriate limits of power.

## ORGANIZATIONAL LEARNING

Organizational learning may be defined by analogy with individual learning. Three definitions suggest themselves, and we discuss each:

### *A. Intelligence of Top-Level Decision-Makers*

A first, and attractive, operational measure is to assess the intelligence and sophistication of top-level decision-makers, as they make policy statements and decisions, and to record this as the level of intelligence and sophistication of the organization.

Such a conception has several advantages. It focuses attention on the decision-making processes within the organization (*e.g.* George, 1980), and it emphasizes the traditional, and intuitive, notion that top-level direction and leadership are necessary components of new organizational learning.

Just such emphases, however, risk substituting a definition for an empirical issue. It is not obvious, for example, that the intelligence of an organization is expressed in, let alone reaches its peak in, the intelligence of senior officials. Organizations may have an intelligence that exceeds, and survives, the effects of passing and mediocre leaders.

Moreover, policy statements by public officials themselves should be treated with two cautions as guides to intelligence. The first caution is that publically stated policies may not be implemented: 'policy', as has often been noted, may only be 'position taking without follow-up or follow-through' (Burns, 1978, p. 427). A second caution is that public statements may reflect learning about how to make public statements that serve political objectives but not accurately reflect the degree of sophistication achieved about the substantive policy issues the official appears to be addressing.

### *B. Collective Intellectual Coherence*

(1) *Conscious across individuals.* A broader criteria of organizational intelligence would be to assess the nature of the 'maps' of reality, and shared intellectually coherent policy commitments, embodied in the behaviour of officials throughout an agency.

If one adopts this criteria, the mind focuses naturally on a rather novel conception—assessing the extent to which policy is, in fact, a social movement (*e.g.* Berman, 1974). It must be such if it is to capture imaginations (under conditions of voluntary compliance) and lead to the initiative and vigilance by which intra-agency and inter-agency coordination make for genuine intellectual coherence.



This 'collective intellectual coherence' definition is similar to the 'integration' criteria for the development of individual intelligence. It is a serviceable definition, but it should be noted that it is also weighted in a way that may make it difficult for democratic, pluralistic polities to achieve a high rating. For example, if different government programmes are adopted, at different times, to achieve different ends, in response to different constituencies, the cumulating *mélange* (*e.g.* HUD) may have no other collective rationale. Under these conditions, individual programmes may embody high degrees of intelligence within themselves—and such intelligence can be noted by an analyst—but (if they operate at cross purposes) growing 'sub-unit' intelligence may actually detract from the overall coherence and effectiveness of an agency.

(2) *Inferred coherence.* What 'lies behind' the actions of individuals, and can be assessed—in principle—by studying them directly, need not be the sole locus of organizational intelligence. It is both conceivable, and logical, that the degree of intelligence that should be attributed to an organization will not be manifest in any of its constituent parts nor, indeed, even in the consciousness of any set of members. Computers, for example, may be designed to have increased capacities for differentiated processing, coherent integration of these processes, and substantial task effectiveness, although each component (even those formally involved in the 'higher order' or 'control' functions) has no consciousness and is, in fact, only 'off' or 'on'.

Competitive market systems may embody a remarkable capacity for efficient long-term allocation of resources, and adaptability, without meeting the requirement that any individual component know the rationale of the system. (Indeed, if they become intelligent, they may resort to political mechanisms which reduce overall effectiveness by altering the market to their favour—*e.g.* protectionism). And it is clear from organizational research, for example, that some organizations are better designed for long-term learning. They have a more 'intelligent' formal design, norms, cultures, role networks, worldviews, *etc.* (Argyris and Schön, 1978; Etheredge, 1981, 1983; Katz and Kahn, 1978).

It is also conceivable that the effort to produce a first-order intelligence on the part of government (*e.g.* through rational and synoptic national plans and policies) may actually be 'less intelligent' than to design a system which embodies, in the intelligence of its design, a reduction in manifest intellectual coherence. For example, the fast-paced and chaotic world of computer innovation, carried out *via* the market, surely exceeds the capacities of most individuals to monitor fully. Were government to seek to become intelligent about such choices for society, to pre-plan such innovation, it is likely that we would only now be moving beyond vacuum tubes while committees debated and various groups argued how their interests might be hurt.

Of these three definitions, while the second is practical and serviceable, only this third seems wholly satisfactory by virtue of making the fewest prior

assumptions which risk hasty settlement of empirical questions. At the moment, however, there appears to be no established method for making such 'system intelligence' inferences, and each investigator will probably need to state the argument for considering a particular system to have more intelligence embodied in its design [7].

## ILLUSTRATING DISTINCTIONS

With this array of concepts, it is possible to recognize and discuss more exactly the nature of learning and non-learning in government policy cases. We take three cases: the development of the M-16 rifle, Three Mile Island, and the Bay of Pigs, to illustrate separate processes with different—and increasingly complex—causal paths.

### (1) *The M-16*

The Army's traditional conception of an excellent combat rifle was based on performance capabilities for single-shot sharp-shooting. This required high muzzle velocity and a heavy bullet, both characteristics making for stability in flight. Until the 1960's the Army (as it had for over two centuries) merely assumed that maximum damage in combat was produced by a heavy bullet impacting human beings at high speed.

An improved combat rifle became possible when a designer creatively combined two independent types of research. First, the field of wound ballistics had established that lighter bullets, less stable in flight, were much less stable in the human body; being unstable, they created far more damage, churning end-over-end, than did the heavier, faster bullets that went straight through.

Second, studies of troop firing rates in actual combat (World War II) had shown that only a small percentage of those men who might usefully be firing their weapons did so. There were several reasons: a man firing exposed his location, and himself, to return fire; firing single shots among the hundreds or thousands being exchanged seemed to most soldiers unlikely to make a difference; nor did enemies whose location was hidden from view provide clearly located targets to make single shots obviously effective. But, by contrast, men equipped with rapid-fire rifles (Browning Automatic Rifles in World War II) fired much more frequently in combat. A soldier's ability to 'hose down' an entire area rapidly increased the sense of safety from retaliatory fire, and it made it more persuasive to the individual soldier that his decision to fire would make a significant difference to the outcome.

The 'learning' embodied in the new rifle was impressive. It combined two independent branches of research; it reconceptualized the nature of the 'best combat rifle' problem to be 'maximum lethal effects actually realized during combat' (firing rates and human damage). But it is important to notice that



this learning actually was a dependent effect. The research results had been available for decades, and the creativity originated from an outside contractor, looking for ways to apply new technology and win an Army contract. The contractor (in fact, one individual designer) generated the idea for a prototype of what would become (later) the M-16. And to become more intelligent and effective the Army had to be sold (see also Sundquist (1978)) [8].

### (2) *Three-Mile Island*

The nuclear accident at Three Mile Island resulted from mismatched learning rates. The investment in scientific method learning to design the plant was not accompanied by a similarly well-funded agenda to learn how to guarantee its competent human management, especially during accidents (Kemeny, 1979).

The 'scram' (emergency shut-down) of the reactor, which occurred just after 4:00 a.m. on the morning of Wednesday, May 28, 1979, was triggered because a valve in the coolant system was left in the wrong position. This was a result of human error during routine maintenance—and apparently the result of boredom by men doing routine jobs and inundated by countless safety regulations and forms.

Plant operators were trained to handle single-fault emergencies, but unfortunately—as events proved—there was more than one fault in the TMI system. Unknown to the operators, a second valve, operated during the emergency coolant process, failed to close, as it should have, and their indicator panel also falsely reported that it had done so. And they were overwhelmed: the control room was alive with over 100 alarms and warning lights, and it had not been designed for trouble-shooting; their actions were not producing the reliable effects they expected. The operators had not been trained for rapid scientific hypothesis testing that assumed more than one failure and at least one 'false' reading on their instrument panel. Using rules of thumb provided by their training, the operators intervened, and erroneously took actions which left the reactor core uncovered.

In Washington, the response of the Nuclear Regulatory Commission was carried out, in the words of the Kemeny Commission, in an 'atmosphere of almost total confusion'. If we decompose this characterization we can see that intellectual confusion actually had several different causes depending on the type of learning that was inhibited. For example, without prior practice, the NRC was quite unskilled in drafting good press releases. It was not a 'scientific learning' problem or even an 'intuitive' problem of accurately imagining how they expected the press and news media to respond to different phrasings. They simply had to spend hours drafting and re-drafting press releases before they were satisfied they had the right words to express skillfully exactly what they intended to convey.

The basic 'scientific method' learning needed to develop a 'cognitive map' of the situation at Three Mile Island, and to address their policy choices, actually was available to the Commissioners within the government. Confusion arose because they did not have, on their staff, experts who could tell them even the questions to ask; and it was not until the news media began to report commentary about some of these issues that the NRC sought to locate help for itself. An illustration is the issue of evacuation lead-times. Technical specialists recognized that special lead-times were needed if hospitals (with critically ill patients) were to be evacuated; or prisons. A different warning threshold could be required for pregnant women (and women who thought they might be pregnant). In which direction should the people be evacuated? (*e.g.* what prevailing winds did the Weather Bureau expect over the next several days?) By the end of the crisis the Commissioners were 'up to speed' about all of the technically sophisticated questions they needed to pose. But they wasted time reinventing the wheel as they tried to do it all themselves: and they did it with delay and confusion.

The overall federal response was also slow and uncoordinated. Various agencies had expertise and resources that were needed: the Department of Energy had radiation monitoring helicopters; the Defence Department had communications equipment and personnel to assist any evacuation. The Public Health service had radiation health specialists who knew that the 'general level of radiation release' measures being discussed by policy-makers were inadequate. (One of the elements likely to be released if the situation deteriorated was radioactive iodine. It had especially sinister health effects because it is absorbed in the thyroid and greatly multiplies the dosage and potential health damage to that organ. Thus government officials needed to be alert, early, to the need to assemble tens of thousands of doses of potassium iodide solution (and print dosage instruction labels for people of different ages, existing health problems, *etc.*) The potassium iodide would 'fill-up' the thyroid so any radioactive iodine would be excreted.) All of this technical expertise was, in principle, supposed to be activated and coordinated by activating IRAP (the Inter-Agency Radiological Assistance Plan). The failure to use it was an institutional memory problem. In the changeover of top-level personnel to the Carter Administration, no senior official was left at the White House who knew IRAP existed, or that there was a phone number to call at the Department of Energy to trigger it. Active attention and initiative within various agencies eventually produced the necessary activity and put decision issues before Jack Watson (named White House coordinator), but did so with delays that would have likely been costly in a major catastrophe.

### (3) *The Bay of Pigs*

Documents and testimony now available show that President Kennedy's Bay of Pigs decision was a more intelligently conceived plan than was initially



reported in the memoirs published by surviving members of his administration (Etheredge, 1983; Wyden, 1979). It actually included a plan to assassinate Cuban Premier Fidel Castro (*via* the Mafia) coincident with placing 1,200 men on an isolated beachhead to face Castro's 250,000 troops and militia. Moreover, it is now clear that the complete plan was for psychological warfare, employing sophisticated technological tricks: the troops were stage props. Clandestine radio operators were on the island and were primed to feed false messages over the Cuban military radio networks. These messages were designed to make the invasion appear to come from all sides and to be massive. The radio operators also had the capability to jam all military and civilian communication channels (after B-26 strikes—cancelled by Kennedy—destroyed microwave and telephone facilities on the island.) Thus the government would be paralyzed, just as it thought it was facing massive invasion from all sides, and would be unable either to receive accurate reports or to contact troops and control them. The plan also included destruction of all Cuban aircraft, leaving the invaders with approximately 15 bombers free to roam the island, and strafe troops at will. The CIA planners expected Castro's élite supporters to lose their nerve and desert him, even if he survived the assassination attempts.

This intelligence reflected genuine learning. The plans were explicit attempts to learn from history. The CIA had conducted exactly this type of operation in Guatemala (1954) and Americans, for decades, before, had found Latin American governments easy push-overs when confronted by American troops. (CIA planners also expected President Kennedy to authorize American troops to complete the operation if necessary.) The planners had become more intelligent about how to overthrow Latin American governments: they had learned generalizations and increased their confidence. But effectiveness decreased because they had not yet learned enough to recognize exceptions to the new generalizations. They did not accurately assess, for example, the difference that Castro was an experienced guerrilla fighter who responded with energy and effectiveness rather than 'losing his nerve'.

The plan also failed to take into account the consequences, for effectiveness, of the learning rate of the Cuban revolutionaries. They, too, knew the Guatemala success, and they diagnosed key vulnerabilities and planned effective counter-moves. Castro's agents penetrated the CIA operation and knew the location of the Guatemala staging base. He moved quickly, once acquiring power, to purge the army command, and his government, of moderates to assure his own control and to forestall being betrayed (as had been the fate of Arbenz in Guatemala) by men less ideologically committed than himself. He prepared his police with lists of potential collaborators and moved swiftly to jail 100,000 to 200,000 (when D-2 air strikes gave an early warning invasion was imminent) to block mid-élite leadership of popular uprisings behind his lines.

Difficulties in intelligent action by the American government also came from another source, the poorly calibrated, over-confident use of intuition by people at the White House. In retrospect, the more removed a decision-maker from first-hand knowledge about Cuba, and the less a decision-maker knew about Cuba, the more likely he was to believe, with confidence, there would be a mass uprising.

We now know, for example, that the CIA did not believe there would be one: they told the President they had 2,500 (one percent) of Castro's military on their side. They thought they had only 25,000 people on the island who would be 'active', and they expected only 25 percent of the people would be favourable to their 'liberation'. But the White House became caught up in its project to add New Frontier rhetoric, promising a genuine revolution 'unbetrayed' to the Communists, 'Fidelismo sine Fidel'. The CIA said nothing to discourage bureaucratic allies. (Afterward it did not publically challenge the mass uprising scenario so as not to discuss the true plans and betray the existence of its clandestine radio agents still on the island.)

Perhaps the crucial failure of the decision process was the loss, without President Kennedy's awareness, of a 'guerilla fallback' option he counted upon heavily. When he approved the invasion plan, the President thought he had a 'low risk' decision. If things went wrong, the men he placed on the beaches could, he thought, 'go guerilla', disappearing into the Escambray Mountains. But that was true only until the last minute when, to reduce further the visibility of the operation, the President himself ordered an alternative site more remote than the port city of Trinidad.

Planners selected an isolated area, the Bay of Pigs. A special advantage was that this beachhead was surrounded by the impenetrable Zapata swamp. The swamp was traversed by only three roads, built-up on causeways. The planners were enthusiastic that, by landing 'blocking' paratroopers to mine these three roads they could quickly secure the beachhead, and hold it indefinitely, against attack by 20,000 Cuban troops Castro was expected quickly to deploy.

A moment's thought would have led the President to realize that, if his new site was blocked against 20,000 troops headed inward, then it was equally 'impenetrable' to 1,200 men seeking to escape. But the CIA did not say this aloud, and the President did not see the obvious, nor did his senior (non-CIA) advisers [9].

'What failed' and kept senior officials crucially uninformed about the plan they were approving is a long list. For example, they needed to have a senior staff who would be alert on their behalf. The normal procedure of Joint Chiefs of Staff commentary on a guerilla option failed because no senior White House staff member monitored the process: as there was no guerilla option, the CIA provided plans for JCS review which did not have any guerilla option appendix. The President thus did not receive the full review from the Department of Defence that he expected.



## CONCLUSION

Each of these three cases illustrate a single basic point: government learning failures often arise not from the absence of intelligence but from failures to recognize and use existing capabilities. For example, the Army 'knew' for several decades the different pieces of research that, in combination, produced a better rifle. It lacked the proper bureaucratic organization that a civilian contractor created. The Three Mile Island malfunction grew to serious proportions because the needs of human managers in crises had not been thought-through (a good control room lay-out, good training and rehearsal (and especially for people at the White House), institutional memory (and memory about what was stored in institutional memory)). A strong National Security Council (NSC) following adversarial processes (*e.g.* Etheredge, 1983; George, 1980) would likely have prevented key Bay of Pigs failures.

Although we have not developed, in this brief space, the technical basis for believing that shortfalls in learning have distinctive causes that vary partly with the type of learning, we can draw upon these three cases to advance relevant propositions. We include a listing in table 1.

Table 1. Some basic propositions about government learning

*Scientific Method Learning*

1. Government performance is likely to improve dramatically when policy analysts use measures of final impact rather than seemingly plausible, but indirect, indicators (M-16).
2. Effective technological innovations require simultaneous research investment both in the hardware and in the analysis of human behaviour in the management of the innovation (Three Mile Island).
3. Policies based on limited experience are likely to embody generalizations that underestimate the exceptions that will occur in future cases (Bay of Pigs).

*Intuition*

4. The less expert an official, and the fewer facts he knows, the more likely he is to rely on intuition. The more likely he is to rely on intuition, the more likely he will be overconfident without realizing it (Bay of Pigs).

*Creativity*

5. Creativity is less likely in large government bureaucracies because they are poorly designed to produce it. Specifically, the division of labour fragments and restricts the distribution of pieces of information needed for creativity, and it confronts operating units with overly-restricted incentive systems (M-16).

*Skill*

6. Prior practice in performing routine tasks required during crisis management would improve government performance during crises (Three Mile Island).

*Good Judgment and Wisdom*

7. Government decision-makers will be wise to expect new programmes to face more implementation problems, and more complicated ones, than they anticipate (even when taking this caveat into account) (Three Mile Island, Bay of Pigs).

*Connections of Individual Intelligence with Organizational Intelligence*

8. Failures of senior officials and Congress to attend intelligently to the design of large bureaucracies reduces organizational intelligence (M-16).
9. Consequential losses of institutional memory occur as a result of Administration changeovers and inadequate transition processes (Three Mile Island).
10. Government officials are more likely to rely on experts for *answers* than to consult experts to tell them the *questions* to ask. And the questions they pose alone will, as a result, inhibit their learning rates (Three Mile Island).
11. Politically sophisticated subordinates with-hold information to control the decisions of superiors and they thus make the actions of superiors less intelligent in the long-run (Bay of Pigs).
12. Presidents often do not grasp completely the key issues and intellectual rationales behind the options they consider. Professional staff tend to over-estimate the extent to which a President has mastered his briefing materials and underestimate the need for well-designed procedures including explicit, direct, oral reminders (Bay of Pigs).

*Government Intelligence and Government Effectiveness*

13. Sophisticated salesmanship from outside the government is a crucial requirement for government learning (M-16).
14. The more sophisticated the questions and criticism raised from outside the government, and reported prominently in the news media, the more rapid the learning rate of government (Three Mile Island).
15. In a world with conflicting interests, learning by adversaries will likely reduce the future effectiveness obtained by repeating past successes (Bay of Pigs).

## NOTES

[1] In some cases this conception can be tricky. If you do it right the first time and then simply persist, learning has occurred even though there is no change; learning in this case must be indexed not as change within a situation but as a non-random deviation from the organism's base-line behaviour or search patterns.

[2] Position changes adopted for political expediency might reflect substantial intelligence and sophistication about political expediency.

[3] See Fingarette (1969); Lane (1969); Searles (1979); Etheredge (1978, 1979) on processes of self-deception.

[4] It is also possible that the nature of individuals (Bass and Brown, 1973; Hulbert, 1979) or of social processes (including successful implementation of government policy) will turn out to be stochastic, so complete knowledge can provide only limited control and effectiveness.

[5] Reviews of representative research in different traditions include Stein (1974); Campbell (1960); Zaltman *et al.* (1973); Brenman-Gibson (1976); Deutsch *et al.* (1971); Gruber (1974); *Technology Review* (1979).

[6] It may also be a component of good judgment to find ways in which individual interests and collective interests coincide.

[7] See also Deutsch (1963) for the seminal book on the problem.

[8] There are more gruesome aspects to the story, especially the ways in which the Army's bureaucratic units (each pursuing the objectives in which it specialized) made the M-16 less effective, and more likely—dangerously—to jam, by modifying the prototype. See Fallows (1981) for a general discussion of the case.

[9] The CIA likely did not emphasize the point in oral briefings because its spokesmen—Allen Dulles and Richard Bissell—had learned political sophistication, did not want further last-minute changes imposed as the embarcation deadline approached, and did not want to risk abandonment of the project if the loss were a salient one.



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