

**Descriptive and Normative Research on Organizational
Learning: Locating the Contribution of Argyris and Schon**

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The dual purpose of this paper is to identify some key issues in recent research on organizational learning, and to situate the contribution of Argyris and Schon within the field as a whole. The task is a doubly difficult one, not only because the field of organizational learning has two quite different strands, each with its own variations, but because the work of Argyris and Schon straddles both strands, yet is different from each of them (Argyris & Schon, 1978; Argyris & Schon, 1996). In choosing issues to discuss, I have had an eye to selecting those that illustrate distinctive, challenging or controversial aspects of their work.

In a previous publication (Robinson, 1995), I distinguished between the descriptive and normative strands of research on organizational learning. The former strand, with its roots in social psychology and increasingly in cognitive psychology and neuropsychology, pursues questions such as “What processes are involved in organizational learning?”, in order to reveal more about the nature of organizations and organizing (Fiol & Lyles, 1985; Huber, 1991; Levitt & March, 1988; Weick, 1993b). The latter, normative strand, sometimes referred to as research on the ‘learning organization’, is concerned less with the question of how organizations learn in general, than with their capacity to direct their learning in ways that bring them closer to their targets. The orientation is to the improvement rather than description of organizational life, so questions about how to intervene to improve learning are central to this group (Argyris & Schon, 1996; Senge, 1990; Senge & Sterman, 1994).

There should, of course, be a close connection between the two strands, so that knowledge of organizational processes informs intervention, and intervention

provides a tough test of descriptive theory. In practice, however, while the normative group makes reference to the descriptive group, there is little scholarly exchange between them. For example, promoters of organizational learning in both education and management advocate forward planning processes such as the creation of an organizational mission or vision, unaware that the descriptive literature attributes more organizational learning to processes of retrospective evaluation and adjustment than to anticipatory rationality (Levinthal & March, 1993). Conversely, writers from the descriptive strand sometimes append practical advice to their scholarly work without investigating the substantial barriers to the adoption of that advice that have been uncovered by interventionists (Weick, 1995).

While Argyris and Schon's commitment to the improvement of practice clearly puts them in the normative camp, they have breached the partition in the field by their methodological commitment to the development of theory that is both rigorous and of high utility (Argyris, Putnam, & Smith, 1985). They have advanced the description and explanation of organizational learning processes through their detailed case studies of what they call an organization's behavioral system, and their models of generic inquiry processes. Their contribution to the normative strand is a theory and practice of intervention that provides an empirically and ethically grounded demonstration of how to collaborate with practitioners to improve the quality of organizational inquiry (Argyris, 1970; Argyris, 1990; Argyris, 1993).

What Is Organizational Learning?

Given the youth of the field, it is probably a mistake to answer this question with a precise definition because precision is the result of empirical and theoretical advances rather than its precursor. Organizational learning is a composite of two complex and contested ideas, and that complexity, together with the paucity of empirical studies of

the processes of organizational learning (Weick & Westley, 1996), should make us sceptical of precision. On the other hand, inquiry cannot proceed without some account of the object of inquiry, so I offer the following example as a starting point for discussion.

When a student applies to enrol in a university, she triggers a set of routines designed to check eligibility against entry criteria, to gather, disseminate and store personal data, and to obtain or guarantee payment. The knowledge required to perform these routines is located, partly in the heads of those academic and administrative staff who process the student, partly in the paper files and publications to which they might refer, and, increasingly, in the software that regulates and sequences their activities. These academic, administrative and financial routines are the result of a history of learning by this university and others about how to enrol students.

How is it that we can attribute the development of these routines to organizational rather than individual learning, when it is only individuals that have a physical apparatus for learning? The idea of organizational learning has validity in that it captures the distributed and coordinated nature of individuals' contributions to task performance (Hutchins, 1991; Lakomski, 1998). The university enrolment routines were learned through the repeated interaction and mutual adjustment of individuals whose knowledge and purposes overlapped sufficiently to enable them to coordinate their actions. They were also learned through the interaction of those individuals with external representations of relevant knowledge such as procedural manuals and computer programs (Hutchins, 1995). In short, the learning required to enrol this student was distributed across time, space and organizations. The staff built on the learning of those who had gone before (time); the relevant learning took place across

physically separated locations (space) and it was dependent on knowledge generated in other universities as well as this one.

What Are Some Processes of Organizational Learning?

To understand organizational learning is to understand the processes by which such routines evolve. In this section, I offer a necessarily over-simplified summary of three different accounts of how this might happen. Perhaps the most familiar account describes organizational learning as a process of adaptation to the environment (Van de Ven & Polley, 1992). Organizations obtain feedback on their actions by scanning or sensing aspects of their environment and creating a better match by progressive adjustment of their responses. While this account is true in general terms, much of the scholarly literature on organizational learning is devoted to understanding the conditions under which such adaptation does not occur (Levinthal & March, 1993; March, 1991; Simon, 1996). These limits will be discussed throughout this paper – at this point I deal only with some problematic features of the implied relationship between the organization and its environment.

First, to say that organizations adapt to their environments is too simple, for organizations select and enact the environments that they respond to, and this richer notion raises the possibility of reverse influence processes as organizations buffer or even transform their environments (Huber & Glick, 1993). For example, whether the families of students in an impoverished community are interested in helping their children with homework, is partly a function of how the school treats its parents. If they are seen to be insufficiently educated to play this role, the school is likely to reinforce this perception of its environment through the messages it gives the parents, and the parents, in turn, are likely to react to those messages in ways that create a self-fulfilling prophecy. A different sort of parental environment may be created, if the

parents' involvement in their children's homework is seen to be a function of their low level of understanding and relevant skill, and the possibility of creating higher involvement is tested through a competent community intervention. Thus rather than adapting to a given environment, organizations sense their environment, act on what they sense, and in so doing, partly create their environment (Weick, 1995).

Second, the account of adaptation to the environment erroneously suggests that the external environment is the only, or even the major, source of wisdom about the strategic direction of the organization. Educational organizations, at least, need to enter a dialogue with relevant external stakeholders about the implications of adapting or not adapting to various feature of the environment. Teachers frequently have quite different views from parents or employers, for example, about the relative importance of various curriculum areas, and the problem of what to teach may not be well solved by adoption of the preferences of either group.

A second view of organizational learning treats it as a process of error detection and correction. This view is broader than the first, for errors may be either mismatches with aspects of the environment, such as customer preferences or regulatory agencies, or mismatches with internal organizational standards. Since this is the perspective on organizational learning taken by Argyris and Schon, it will be discussed in more detail in the subsequent section.

My own view of organizational learning as organizational problem solving has been outlined in an earlier article (Robinson, 1995) and will not be repeated here. While many writers on organizational learning agree that routines are the solutions to organizational problems, none have incorporated a theory of a problem and problem solving into that account, and without doing so, the processes of learning remain a mystery (Robinson, 1993). The constraint satisfaction account of problem solving

which I employ has the advantage of cohering with recent advances in cognitive science about the physical basis of learning, and these theories are already having an impact on research on organizational learning (Evers, 1998; Hutchins, 1995; Lakomski, 1998)

Whether organizational learning is seen as adaptation to the environment, error detection and correction, or problem solving, it is claimed to involve learning from experience by interpretation of feedback from prior action. The source of wisdom lies more in retrospective evaluation of past action rather than in the anticipatory rationality of strategic planning, or formulating an organizational mission or vision. While planning may be guided by retrospective evaluation, Weick believes that much long range planning assumes more certainty about and capacity to control the future than are warranted (Weick, 1993a, p. 361)

[People] may decide to start some activity, such as implementing a design, and they may also try to control how the activity will unfold.

Nevertheless, this control is never complete, and unintended consequences are commonplace. These unintended consequences force people to revise their sense of what is happening and what can be accomplished. And it is these revised interpretations, rather than the initial decisions, that guide action and constitute the actual design in use. That design in use is shaped more by action than by plans, and more by interpretation than by decisions.

A complete theory of organizational learning needs to explain not only how organizations adapt to their environment, but also how their responses can be maladaptive; not only how errors are detected and corrected but why neither may occur; not only how problems are solved but why they may be ignored or solved

badly. These are the questions that are central to those who want to explain and promote not only how organizations learn, but how they learn that which takes them closer to their targets. It is to this normative strand of research, and the work of Argyris and Schon in particular, that I now turn.

The Perspective of Argyris and Schon on Organizational Learning

Argyris and Schon (Argyris & Schon, 1996, p. 16) explain their view of organizational learning as follows:

Organizational learning occurs when individuals within an organization experience a problematic situation and inquire into it on the organization's behalf. They experience a surprising mismatch between expected and actual results of action and respond to that mismatch through a process of thought and further action that leads them to modify their images of organization or their understandings of organizational phenomena and to restructure their activities so as to bring outcomes and expectations into line, thereby changing organizational theory-in-use. In order to become organizational, the learning that results from organizational inquiry must become embedded in the images of organization held in its members' minds, and/or in the epistemological artefacts (the maps, memories and programs) embedded in the organizational environment.

Three features of this definition will be used to locate the work of Argyris and Schon within the field of organizational learning as a whole, and to raise questions about the state of research and practice in the field. These are the role of theory-in-use in organizational learning, organizational learning as a process of inquiry, and the process of error detection and correction.

Organizational Learning as a Change in Organizational Theory-in-Use.

Argyris and Schon equate organizational learning with a change in an organization's theory-in-use. A theory-in-use is a model which purports to describe the values, beliefs and assumptions that explain a particular pattern of organizational behavior, together with the consequences of those behaviors. While a theory-in-use is implicit in organizational practice, an espoused theory is explicit in its written or oral self-descriptions.

The work of Argyris and Schon is replete with detailed cases identifying the pattern of values and organizational practices that have contributed to unintended organizational problems. By making explicit what is implicit in their practice, Argyris and Schon "empower" practitioners in the non-trivial sense of showing them how they have contributed to the status quo, and how, having constructed it, they might contribute to its reconstruction. For that reconstruction to count as organizational learning, it must involve change to the values that underpin problematic practice (double-loop change) and not just change to surface level practices (single-loop learning).

Organizational Learning as a Process of Inquiry

A second notable feature of Argyris and Schon's definition is its portrayal of organizational learning as a process of inquiry. While their account of inquiry is sketchy, they treat organizational learning as a much more deliberative process than those writers who see organizational learning as embedded in rather than interrupting organizational action (Weick & Westley, 1996). Rather than theoretical disagreement, what we have here is probably a difference in focus, for Argyris's concern is to explain and promote learning of those things that are desired but not routinely accomplished, while those whom I have called the descriptive group are more

concerned to explain how organizations learn at all. If existing organizational routines are preventing learning that which is desired, then identifying and altering what is dysfunctional is of necessity a highly deliberative and reflective process.

What this suggests is that organizational learning may not be a single process, and that we need to be careful to craft theories with both deliberative (reflection-on-action) and non-deliberative (reflection-in-action) in mind, for the cognitive basis of the two processes may be quite different. Deliberative learning of the sort promoted by the interventions of Argyris and Schon works on symbolic representation of organizational action through detailed analysis of verbal accounts of organizational life. Even though great care is taken to ground those accounts in concrete referents, much of the knowledge embedded in organizational action may not be represented and learned in this way (Evers, 1998). Just as we do not learn skills by manipulation of verbal descriptions of them, but by practice and feeling our way, so some of the knowledge involved in changing theory-in-use may be of this sort. As Nicolini and Mezner (1995, p. 744) put it, “Reflecting and abstracting often impoverishes cognition in action, for such cognition must be framed along certain theoretical perspectives to become abstract formal knowledge.... Fields of everyday action, and fields of discursive examination of everyday action are different contexts where modes of effective cognition might be different”.

Understanding the role of symbolic and non-symbolic knowledge in organizational learning is crucial not just to the success of the interventions of Argyris and Schon, but to our understanding of organizational learning as a whole. Sterman (1994) presents a balanced account of the issues in his defence of his focus on mental models. The criticism that Sterman addresses is that solutions have evolved to many human problems without people examining the accuracy of their mental

models. Many performance skills are learned by acting, gaining sensory feedback and adjusting subsequent motor responding over numerous trials. Why is it then, that researchers like Argyris and Schon, Senge (1990) and Sterman intervene through detailed examination of actors' symbolic representations of the relevant organizational practices? Sterman's response is that the environmental conditions for learning motor skills are much more favourable than those for solving those organizational problems, like new product development, where the failure rates are typically high (Van de Ven & Polley, 1992). In the case of motor skills, there are many more opportunities for repeated trials, feedback is immediate, salient and accurate, there are fewer confounding variables to cloud its interpretation, and there is more scope for varying responding without incurring unacceptable levels of risk. None of these conditions exist in the case of new product development – so learning proceeds through manipulating symbolic representations of the environment, which may or may not be accurate. Furthermore, as I discuss in the next section, Sterman provides considerable empirical evidence that trial and error learning produces more failure than success on this type of complex organizational task. So it seems that non-symbolic trial and error learning and symbolically-mediated inquiry may be two different processes of organizational learning, and that further work is needed to integrate them theoretically.

Organizational Learning as Error Detection and Correction

For Argyris and Schon (Argyris & Schon, 1996, p. 16), organizational learning is triggered by a “surprising mismatch between expected and actual results of action...” The error may comprise either a worse or better outcome than anticipated and, in either case, it may be corrected by adjustment to the expectation, the results, or both. It would be a mistake to assume that the more error detection and correction the better

the organization's inquiry system, for any organization must strike a balance between maintaining and transforming existing routines to survive (March, 1991; Weick, 1996). Since an organization's capacity simultaneously to reproduce and redesign its routines is limited, we can expect selective noticing of error and selective attempts to correct those which are noticed.

The rubric of learning from the detection and correction of error suggests that relevant knowledge of the current state of the organization is available together with a standard or target against which that state can be evaluated. As explained earlier, this is a version of the adaptive adjustment model of organizational learning. There is considerable empirical evidence, however, that on many occasions organizations neither detect, correctly analyse, nor make adaptive adjustments to feedback. Here is how (Levitt & March, 1988, p. 335) described these limits in their classic review article:

Learning does not always lead to intelligent behavior. The same processes that yield experiential wisdom produce superstitious learning, competency traps, and erroneous inferences. Problems in learning from experience stem partly from inadequacies of human cognitive habits, partly from features of organization, partly from characteristics of the structure of experience. There are strategies for ameliorating some of those problems, but ordinary organizational practices do not always generate behavior that conforms to such strategies.

While Argyris and Schon agree with the description of these limits, they disagree with the explanation provided by Levitt and March and others, and with their views on their alterability (Argyris & Schon, 1996). The research literature offers three different though interrelated explanations of maladaptive response to feedback. These

explanations concern features of the tasks to be learned, characteristics of human cognition, and the defensive patterns of reasoning frequently employed in situations of task uncertainty and complexity. The first explanation, which is particularly associated with the work of the systems dynamics and organizational learning groups at the Massachusetts Institute of Technology, attributes much of the difficulty to dynamic complexity. When problems involve dynamic complexity, they “require[s] us to think in terms of complex causal interdependencies involving multiple sources of delay and non-linearity and evolving patterns of change over time” (Kim & Senge, 1994, p. 277) The second explanation, which Levitt and March describe as “inadequacies of human cognitive habits” refers to patterns of information processing which accommodate our limited cognitive capacity by sacrificing accuracy for efficiency. Hogarth (1987) summarises research on decision-making which shows over thirty different types of bias and error. People make faulty causal inferences by over-attributing events to individuals, seeing causal relations where only concurrence is warranted, and overlooking long-term and unintended consequences. In addition, in ambiguous situations, people tend to see what they expect and to take far more notice of evidence that confirms rather than disconfirms their preconceptions (Weick, 1995). All these factors will reduce opportunities for learning by detecting and correcting error.

While Argyris and Schon agree with these two explanations of maladaptive learning, they believe that what they call defensive reasoning is at least as important. Defensive reasoning occurs in situations of anticipated or actual threat or embarrassment and involves thought and action that prevent inquiry into the source of the threat or embarrassment (Argyris, 1990). Defensiveness at the interpersonal level shapes organizational practices when alternatives are ruled out because of their

potential for eliciting negative emotion. For example, a school may redesign its timetable to accommodate parental complaints about one teacher, rather than deal directly with the complaint.

The difficulty of sorting out the relative contributions of these three explanations of maladaptive learning, is compounded by their interaction effects. Senge & Sterman, (1994, p. 198) point out the interaction of task complexity and cognitive limits by declaring that “the source of poor performance and organizational failure is often to be found in the limited cognitive skills and capabilities of individuals compared to the complexity of the systems they are called upon to manage.” For individuals wishing to be knowledgeable and in control, these conditions are also likely to be experienced as threatening, thus triggering defensiveness and further reducing the likelihood of learning.

One way to test the role of defensiveness in solving problems of dynamic complexity is to investigate what happens when the conditions that create defensiveness are removed. A second way is to intervene to teach people how to react nondefensively under conditions that would normally produce defensiveness.

Empirical evidence relevant to the first type of test is available from Sterman and his colleagues’ research on tasks of dynamic complexity that range from managing production distribution systems, capital investments, or consumer product markets to fighting forest fires or ordering medical tests. When subjects performed alone, that is under conditions unlikely to arouse defensiveness, even those with considerable relevant experience, overordered supplies, bankrupted their firms, let the forest fire headquarters burn down, and created boom and bust cycles despite stable consumer demand. Furthermore, they learned little even with repeated trials and performance-based monetary incentives. Sterman (1994, p. 309) attributes these results to both

faulty causal maps and to inability to anticipate the dynamics of the system's response to alternative decisions.

Thus bounded rationality simultaneously constrains the complexity of our cognitive maps and our ability to use them to anticipate the system dynamics. Schemata where the world is seen as a sequence of events and where feedback, non-linearity, time delays and multiple consequences are lacking, lead to poor performance in settings where these elements of dynamic complexity are prevalent.

This research program provides compelling evidence that a mismatch between cognitive capacities and the demands of complex tasks is sufficient to cause failure to learn from repeated cycles of feedback. The same research program also provides evidence of the role that defensiveness plays in non-learning, however, for when teams of people from companies are brought into the learning laboratory to model and critique their mental maps of such tasks, even decision makers who reason well as individuals are caught in interpersonal dynamics that prevent disclosure and robust testing of the mental maps that guide the inferences the group makes about the task. In Sterman's view, both cognitive and interpersonal skills are needed to enable real teams to learn from systematically comparing the mental models which informed their decisions with the properties of the systems that they are attempting to manage.

The second type of test of the respective roles of defensiveness and cognitive limitations in faulty organizational learning requires an intervention to teach groups how to respond non-defensively to the uncertainty and ambiguity that are an inevitable feature of tasks of dynamic complexity. There is less relevant evidence available for this than for the previous test, for few scholars of

organizational learning publish rigorous studies of intervention, and many of those who do, do not intervene to sufficient depth to teach non-defensive responses under conditions of potential threat. Argyris and Schon have published descriptions of such interventions, but their impact on learning particular tasks is difficult to judge because these authors, as I shall explain in the next section, are more concerned to demonstrate improved processes of inquiry than the impact of those processes on any particular task. What we can safely conclude from this discussion, however, is that tasks of dynamic complexity, such as implementing new policies and creating school improvement, pose formidable learning challenges which are attributable to both the cognitive and interpersonal habits that are typically employed in completing them. It would also be reasonable to conclude that for such tasks, interventions to improve both sets of skills and their associated mental models are required.

The Quality of the Learning System

Many writers on organizations make a distinction between surface and deep levels of learning because they see the latter as requiring different processes from the former. For Argyris and Schon, the relevant distinction is between single and double-loop learning where the difference turns on the extent and location of revision to the organizational theory-in-use. Single-loop changes occur when feedback from organizational results prompts a shift in strategy; double-loop changes involve a second feedback loop from strategy to values and an additional change in the latter. If results cannot be brought into an acceptable range using strategies that are consistent with current values and assumptions, then a solution is ruled out unless strategies that challenge those values become acceptable. Understanding the Argyris approach to

organizational learning requires appreciation of not only the single-double-loop distinction, but a further related distinction between first and second-order error. The latter is illustrated by the following example:

A school consultant on literacy gathers together and analyses a school's data on the reading achievement of junior students in preparation for a meeting with the senior staff responsible for literacy. Those data show that the children's performance has declined steadily in the previous three years. The staff were not aware of the decline because they had not collated or aggregated the individual student records, even though their policy on collective assessment required them to report regularly to the board on student literacy levels.

The results could trigger a number of different types of organizational learning process. If results were improved by adjusting or fine tuning the existing teaching program, we would have an example of single-loop learning. If this proved unsuccessful, more radical shifts in the program might be contemplated, such as adopting more phonics teaching, direct instruction or individual conferencing with students. If these proposed changes challenged staff's assumptions about what counted as a good program, their adoption would involve a double-loop learning process of altering program strategies and the beliefs and values that had previously ruled them out.

Notice that both the single-loop and double-loop learning process has so far focussed on the effectiveness of the reading program and not on the staff's ignorance of its results. The failure in reading is what Argyris and Schon call a "first-order" error, that is, ineffectiveness or inefficiency in some aspect of the task system. Second-order errors concern deficiencies of the inquiry or learning system that produced the first-order error. The failure to monitor the reading achievement of the

students, and hence to detect the decline in performance, is a second-order error, which like the first-order example, could be corrected by either single or double-loop learning processes.

The relevant questions involved in such inquiry might be “Why do we have a policy that we do not implement?” “What stopped us reviewing these data?” “Given our lack of data, on what basis did we assume that the program was going well?” Argyris and Schon consistently attend to these second-order errors for they believe they are symptomatic of more fundamental limitations of organizational inquiry systems, and that without their correction, many first-order errors will remain undetected or uncorrected. They are critical of those researchers of organizational learning who are “selectively inattentive” to second-order errors and to the behavioral phenomena, such as defensive reasoning, competitive micro politics and mixed messages, that cause and perpetuate these errors.

Argyris and Schon insist on this focus because they believe these errors are not one-off, random occurrences, nor inevitable weaknesses that must be lived with, but alterable, systematically designed patterns of inquiry that are counterproductive to the achievement of those qualities of organizational life that are espoused by both practitioners and researchers of organizational learning. Their description of this pattern of interrelating is summarised as Model One, a generic model, based on thousands of cases, of the theory-in-use that is typically used in situations of anticipated threat or embarrassment to self or others (Argyris, 1982). Inquiry is limited under this model by a concern to keep control while avoiding any unpleasantness in the process. Staying in control is achieved by either a hard sell persuasive approach, where views about what is and ought to be the case are asserted without reasons, examples or openness to challenge, or by a soft sell tentative

approach where vagueness and non-disclosure leave views unknown and unchecked. In short, Model 1 processes stifle inquiry through the win-lose dynamics associated with protecting one's views from critical scrutiny, while attempting to impose them on others.

To my knowledge, the empirical base of Argyris and Schon's Model One has never been disputed. This is not surprising, given it incorporates many of the cognitive strategies attributable to our limited information processing capacity. Talking in abstractions, making leaps of inference, disconnecting those inferences from supporting reasoning and evidence, and noticing confirming and not disconfirming data enable us to make sense and act quickly. The price we pay for efficiency is that we make mistakes, and it is easier to spot those made by others than by ourselves. Put these cognitive capacities (or incapacities) together with a socialisation that teaches that public detection and correction of error is threatening, and we have the recipe for the Model One organizational world that Argyris describes.

While their description of Model One is accepted, Argyris and Schon's views on its alterability and dysfunctionality are more controversial. While many researchers treat the dysfunctional aspects of Model One as an inevitable consequence of otherwise adaptive processes, Argyris and Schon set the standard of organizational learning for both researchers and practitioners much higher. The reason they do so, I suspect, is that they have a theory and practice of organizational and interpersonal behavior under which higher quality inquiry is possible under real world conditions. Argyris and Schon detect more errors in organizational inquiry systems than their colleagues because their theories of intervention give them more resources to correct them.

Model Two is their generic model of organizational inquiry processes that overcome the limited learning that is possible under Model One. Under a Model Two theory-in-use, the central value is the pursuit of valid information about what is and ought to be the case. In many ways, Model Two involves translating the values of science into everyday life, so that even though formal procedures of testing and experimentation are frequently impractical in real organizational contexts, informal equivalents are practised in conversations and more structured inquiry procedures (Popper & Lipshitz, 1998). Views are held openly, differences are welcomed as opportunities to test validity rather than to persuade, and power is shared so that what is relevant and what is productive can be jointly determined. Double-loop learning is possible because problem-solving is valued above preservation of the status quo, and the difficulties of change, including emotional difficulties, are discussable and managed in a way that cares for people and the task without unilaterally sacrificing either.

The goal of Argyris and Schon's interventions is that organizations learn Model Two inquiry processes, not only in the context of particular first-order errors, but that they achieve a generalised and sustained improvement in their inquiry system. This ambitious goal is implied in their critique of interventionists who bypass Model One features of an organization's inquiry system (Argyris & Schon, 1996, p. 245-246).

[These cases] indicate the occurrence of some double-loop changes in organizational outcomes at the level of theory of action. But these changes are only temporary (one shot) or affect only a part of the organization or affect only some key values and assumptions of organizational theory-in-action and not others. In both groups of examples, the organization's

theory-in-use for organizational inquiry did not undergo double-loop change...The Model Two values that govern double-loop organizational inquiry are foundational to sustained productive organizational learning.

The standard Argyris and Schon set for themselves and others is no more nor less than that of learning how to learn. This standard assumes a generic capacity to detect and correct errors across a wide variety of organizational tasks and contexts. One troubling aspect of this formulation is that it seems to fly in the face of the history of research on problem solving. After decades of attempting to construct a generic model of problem solving, Newell and Simon recognised that the context specific nature of problems means that there is no such thing as a generic capacity to problem solve – that the knowledge and skills that make someone skilled in one context were acquired after considerable experience with that type of problem, and are unlikely to generalise across problem types (Wagner & Carter, 1996). If this is correct, then learning to identify key assumptions, craft ways of testing them and integrate those that survive (key skills of Model 2) cannot be abstracted from the particularities of the problems through which those skills are learned.

The issue can be examined further by identifying what is involved in the detection and correction of first-order errors. Detecting the possibility of an error presumes knowledge of a standard; identifying the practices that may have produced the error presumes the ability to generate likely causal hypotheses; proposing and integrating requirements for an alternative solution presupposes the resources form which to craft alternatives. Learning to learn, in other words, is not a metalevel skill that can be abstracted from the theoretical and empirical content of what is learned. At the level of practice, Argyris and Schon recognise this, for their interventions are always grounded in the details of the tasks which practitioners seek to improve. At the

level of theory they may not, for it would seem to be incompatible with their expectation that interventions into processes responsible for second-order error will produce generalised improvements in the inquiry system.

If organizational learning is contextualised as I suggest, then it may make more sense to talk of an organization's capacity to learn specific things rather than of its overall capacity to learn. Or at least to recognise that, in speaking of such a capacity, one is aggregating across a range of learning activities each of which is grounded in task-specific knowledge and expertise, and which may be furthered by different processes. It may be the case that the intensive organizational interventions that Argyris and Schon have documented, some of which have continued for up to ten years, have produced generalised change, but the issue at stake is whether they have done so without practice in how to instantiate values of inquiry, openness and testing in every context in which the learning is evident.

Conclusion

Significant advances in research and practice in organizational learning will probably come from a closer integration of the currently partitioned descriptive and normative strands of the field. Scholarly descriptive work reveals some of the conditions under which organizations learn independently of the efforts of leaders and consultants. It points to the intra and inter-organizational processes by which organizations build on knowledge in their internal or external environments to solve or re-solve problems that are currently relevant. It identifies the types of resources and social arrangements that scaffold certain types of learning. At the same time, this descriptive strand provides sanguine warnings about the substantial barriers to learning that are attributable to features of learners, of interaction, and of organizations. Individual

cognition sacrifices accuracy for efficiency, groups sacrifice accuracy for cohesion, and organizations sacrifice learning for stability.

While normative researchers of organizational learning accept the inevitability of such tradeoffs, they do not accept that organizations cannot learn to make them more skilfully, more openly, and with fewer unintended negative consequences. The descriptive evidence on barriers to learning, is, after all, the product of a particular set of learning conditions, and if those conditions can be changed in a given context, then so might the possibilities for learning. The ambitiousness of Argyris and Schon's interventions into organizational inquiry systems reflects their capacity to collaborate with practitioners to change these conditions and thus to test what is possible in a locally different world. Their intervention research provides a warning to descriptive researchers against reifying conceptions of what is realistic, and a warning to fellow normative researchers against underestimating what is involved in delivering their promises of a learning organization. On the other hand, just as Argyris points to significant gaps in the explanations and interventions of those researchers who do not probe deeply enough into the organizational inquiry system, so the work of some descriptive scholars raises questions about the completeness and generality of Argyris's work. The real question, though, is not whether a single researcher or research group can provide such completeness, but whether the field as a whole can work across the two strands to forge a more integrated theory of organizational learning. Such a theory is needed to address questions about why organizations learn some of the things they espouse readily, and others hardly at all, about how symbolic and non-symbolic processes of organizational learning can be integrated, and about how policy and technology can be designed to direct organizational learning to those problems for which society demands better solutions. Finally, empirical and

theoretical work is needed on the generality of organizational learning. If it turns out that it is highly context-dependent, like individual learning and problem solving, then the idea of the generically skilful learning organization should be replaced by one that recognises task and situation-specific variation in organizational learning capacity.

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