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Part I

Organizational Knowing and Learning

1

Double-Loop Learning and Implementable Validity

Chris Argyris

This chapter has two main objectives. The first is to suggest that a greater emphasis on double-loop learning and implementable validity represents a next important focus of research if the field of organizational learning is to become more scientifically robust and provide greater assistance to practitioners. The second objective is to propose that the widespread ideas about theory and research methods that scholars use, when implemented correctly, will inhibit the progress to achieving this objective. I plan to focus on the defensive routines of the scholarly community of practice.

The meaning of double-loop learning

Learning is defined as the detection and correction of error. Error is any mismatch between intentions and implementation. Learning occurs when these features are connected to effective action. The evidence for learning is that we can *implement* what we claim to have learned.

Learning may be characterized as either single-loop or double-loop. Single-loop learning occurs when the correction of the error is accomplished by not changing the underlying values and policies as practised. Double-loop learning occurs when the correction of the error is accomplished after changing the actual underlying values and practices.

The vast majority of empirical research on organizational learning is single-loop (see, for example, Argyris, 1980, 1993, 2000; Argyris and Schön, 1996). This emphasis is to be expected. One of the most fundamental features of managing organizations is to define routines and then expect to implement them (Nelson and Winter, 1982). Implementing routines is a single-loop activity.

There are several reasons why double-loop learning is important in organizations:

1. Routines are intended to reduce the necessity for double-loop change (Christensen and Overdorf, 2000). This predisposes employees to become desensitized to inner contradictions that routines often develop. Overcoming this desensitization requires double-loop learning.
2. The research emphasis upon single-loop learning leads to scholarship that is in the service of the status quo. Such limits unnecessarily constrain the progress of inquiry in producing new knowledge.
3. Combining points 1 and 2, above, leads scholars and practitioners to create and reward mindsets that inhibit the exploration of non-trivial changes within organizations, including those that are derivable from their own research (Argyris and Schön, 1996).

Here are some recent examples:

Example 1: Intel's practitioners

In a recent study of strategy processes in Intel, Burgelman (2002) found that middle managers wanted Intel to move from memory products to the development and production of microprocessors. They strove to communicate their views to the top executives, but failed to get their message across. They explained their failure by asserting to themselves that top management was incapable of being influenced.

Later, when Burgelman told Andrew Grove this story, he did not believe it. To his credit, he interviewed the relevant managers and learned that the story was true.

Grove reacted by reiterating and explaining company policies and practices, emphasizing in particular the importance of open and honest communication around business/technical issues. He did not encourage discussion about leadership or followership behaviours and styles because he believed such discussions would not be fruitful.

Some of the key Intel policies and practices about leadership and performance were:

1. Hire very bright people who know the technology and science relevant to their tasks. Moreover, they should be dedicated to and competent in being at the intellectual forefront of their technical/scientific domain.
2. Hire individuals who have a lot of energy to work very hard and who are dedicated to the governing values of Intel.

3. Manage individuals' performance by focussing on the details of their performance.
4. Reward individuals' performances by using strict, quantitative procedures that are credible and transparent.
5. Manage the actions of individuals by focussing on content and not style.
6. Allocate scarce organizational resources by using strict, quantitative models that are credible and transparent.
7. Hire executives who have the courage of their convictions. The rule is do what is right, not what you are ordered to do.
8. Hire executives capable of crafting positions that are rigorously sound and implementable. Executives should be good at making clear distinctions and not soft-money claims.

Grove's leadership style included these features:

1. Advocate your position; make evaluations or attributions in ways that are clear, explicit, and in the service of winning the argument. Sell and persuade. For example, be very detail-driven, see issues as black and white, and expect clear-cut choices. Nothing mushy, like, 'it seems that', and 'perhaps'. If individuals get into an argument, listen in order to get their inconsistencies and gaps, point them out, and expect them to resolve them or 'I will'. Or, synthesize the views in a coherent whole that is consistent with those views.
2. Advocate courage, honesty, and trust in ways that inhibit these features. If this self-defeating behaviour is revealed, blame it on the actions of others. For example, deal with lack of courage and mistrust by espousing the opposite and do so in ways that make it difficult for others to uncover the inconsistency. If inconsistency is revealed, explain it by 'I am forced to do this by others' actions.'
3. Use rules of effective leadership that keep you in unilateral control. For example, do not trust people to keep their promises, therefore monitor their actions frequently. Claim that the follow-up is not in the service of unilateral control as much as it is holding others responsible for their promises. Solidify and 'vectorize'. Vectorize means establish a direction, a point of application and a strong magnitude of continual energy and commitments. Grove emphasized that Job 1 (microprocessors) was *the* focus. Strive to educate those who appear to disagree. If education does not work, then remove those who are not co-operative or who will delay progress.

4. Be demanding but fair. Demanding means very high standards and very hard work. Fair means subjecting what he advocates and what he criticizes to test as long as they are about substance. Exclude discussion of leadership style and seek organizational mechanisms by which to bypass style problems.
5. Send mixed messages about effective leadership; act as if they are not mixed. Make these features undiscussable, and make the undiscussability undiscussable.

Grove's theory-in-use about leading people may be summarized by a motto he uses. 'Let chaos reign, then rein in chaos.'

The managers developed ways to deal with Grove that were every bit as unilateral as Grove's methods. They were also covered-up. Based on Burgelman's description, the executives may be said to use the following strategy:

1. Sense Grove's mood.
2. Remember, if he is confused he gets tough. He bulldozes everything in his way. He tells anyone who is in his way to get lost – to get out of the way.
3. Remember, once he has made up his mind, it is difficult to change it. If he does change his mind, he often does it without acknowledging the fact.
4. Remember, Grove is unaware of his actions. Or if he becomes aware, he will likely blame the reasons for his actions as being outside his way of leading.
5. Keep these rules in mind when you craft your conversations with him. Do so by acting as if you are not using these rules.

We have a situation where:

- (a) Top management and middle managers espouse openness and trust.
- (b) Top management behaves in ways that are inconsistent with what they espouse. They are unaware of their inconsistencies while producing them.
- (c) Middle managers also behave in ways that are inconsistent with the espoused theory. However, many are aware of the inconsistency. They blame the top for coercing them to act inconsistently.
- (d) All this is undiscussable and uninfluencable. In order for this strategy to work, it is necessary to make the undiscussability and uninfluencability also undiscussable, and to cover up that this is happening.

Single-loop learning occurs when Grove pleads for openness, and when he creates financial and promotional awards to support such actions. Double-loop learning would occur if the focus was on the causes of the inconsistencies, of the undiscussability, of the cover-up and how these factors inhibited the double-loop learning that would have moved the company faster towards microprocessors.

The same dynamics occurred several years later, when Intel moved from microprocessors to a new product. They attempted to minimize the possibility that existing organizational defensive routines may reoccur by creating a 'separate' company. That is a single-loop solution. There were no changes in the governing values.

The scholars studying Intel

How do we explain that Burgelman knew all this and decided not to focus directly upon the self-reinforcing anti-double-loop learning activities that he documented? When asked, he responded that he did not believe that progress would be made by adopting such a focus. He also recognized that such a stance could produce a self-fulfilling prophecy. Burgelman, the scholar, has the same doubts as do Intel's top and middle management. He does not test the validity of the claim that such an inquiry is not worthwhile. Nor does Jim March, who holds a similar position (Argyris, 1996). His position is the same one that Grove took as CEO. Thus we have scholars 'colluding' with practitioners in ways that inhibit, and in some cases actually prohibit, double-loop learning.

These findings are reflected in our literature (Argyris, 1980, 1993, 2000; Argyris and Schön, 1996). The question arises, why do scholars who espouse an unbridled seeking of truth act in ways to limit such inquiries based on personal, untested, and untestable claims?

Example 2

Van de Ven and Polley (1992) carried out a rigorous study of the development of a new product and the marketing strategy required to bring it to market. After a systematic and primarily quantitative description, we learn that the entire project failed. The authors developed generalizations about organizational learning to explain the failures that were in keeping with their empirical findings.

The authors concluded their report with a qualitative description of what happened during the many meetings that they had observed. They provided many illustrations of miscommunication, politics, cover-ups, and other organizational defensive routines (Argyris, 1990). The defensive routines were key to the failure of implementation. However,

they were not integrated into the theory of learning that Van de Ven and Polley had presented. If they had been, this would have helped to create a more generalizable and valid theory of organizational learning.

Example 3

Nielson and Nørjberg (2001) conducted a systematic study intended to re-design a model for evaluating the maturity of the IT practice in organizations. They showed that defensive routines within organizations played a crucial role in inhibiting the effective implementation of the IT model. However, they did not conduct research on how to overcome the organizational defensive routines.

Example 4

Peters (2001) identified key organizational factors that inhibit the implementation of effective leadership in organizations. They include that leaders are faced with too few choices, time is fragmented, bad news is normally hidden, and major choices take months or years to emerge. Peters then identified 'silver linings' for each. For example, the one-option strategy is acceptable because it usually reflects senior leaders' previously expressed preferences, each fragment can be used to signal the leaders' preferences, using the good news given them eventually reinforces their own values and priorities and, over time, consistent choices will accumulate into consequences.

It is not clear how these 'silver linings' actually emerge. Nor is it clear if dark linings do not accompany them. What is clear is that the solutions are examples of single-loop learning in that they are designed to work within the constraints of the status quo. There is no attempt to advise leaders how to change organizations so that the 'sad facts' are reduced and that the 'silver linings' are not simply a guaranteed reinforcer of organizational defensive routines.

Example 5

A review of the current themes and practices about leadership, learning, change, and commitment indicates that much of the advice espoused is consistent with double-loop learning. Yet the implementation is single-loop. The professionals who provide the advice appear to be unaware of this discrepancy. When they are helped to become aware they blame others or the systems, and ignore their own responsibility for the situation (Argyris, 2000).

For example, an analysis of transcripts depicting change professionals' attempts to produce double-loop changes shows that they fail to do

so. As a result the line executives become disenchanted, which causes the professionals to adopt the very same sorts of defensive actions that they advise against using. The line managers soon distance themselves from the 'soft stuff', which frustrates the change professionals, and causes them to escalate their actions in even more counterproductive ways (Argyris, 2000).

To sum up, scholars recognize the importance of the counterproductive impact on learning of organizational defensive routines. They do not provide theories or empirical research on how to reduce them. Practitioners, who espouse double-loop learning, are unable to implement it and are unaware of their own limitations. When failure occurs the predisposition is to blame others (for example, line or organizational structures and policies).

The meaning of implementable validity

Scholars see their task as to produce valid, generalizable knowledge where validity is assessed by deriving hypotheses and testing them in the empirical world. Campbell and Stanley (1963) wrote a highly influential book on how to accomplish the above.

Campbell and Stanley argue that field research that is quasi-experimental can be conducted in ways that meet the criteria for validity. They specify two kinds of validity: internal and external. Briefly, internal validity is about making as certain as possible that the theories and the research methods used do not produce unrecognized gaps and inconsistencies that make it difficult to assess the validity of the claim being made. External validity is about the relevance of the findings in settings external to the ones in which they were produced.

These requirements are necessary but not sufficient if one intends to produce knowledge about effective action. For example, we saw above that the concept of organizational defensive routines has high external validity. Yet knowledge was not produced as to how to implement the advice the researchers gave to reduce them. Organizational defensive routines have high external validity and low implementable validity.

This has scientific and practical implications. With regard to the latter, human beings are not able to implement the actions they seek to produce. As to the former, the opportunity to test robustly the scientific claims about the impact of organizational defensive routines upon learning is missed.

Implementation occurs as a result of human beings taking action. Action is behaviour with meaning. Meaning is represented by the

intentions of the actors. Human beings must use their mind/brain to bring about implementation. What does the mind/brain require if it is to accomplish this function correctly? Cognitive neuro-scientists are providing the features necessary to act (Churchland, 2000; Simon, 1969). Among the features they identify the following.

Action and the mind/brain

1. Actions are produced by human beings using their mind/brain.
2. Actions are produced by designs stored in the mind/brain and can be retrieved, that specify the behaviours and the procedures required to implement whatever consequences that are intended.
3. The designs for action are causal. They specify *If A then B*.
4. Producing causal designs requires skills. Skills, in turn, are developed by practice. Practice, in turn, produces the designs used to take action.

Effective action

Human beings have theories of action programmed in their heads, that they use to design and to implement what they intend to be effective action. Some of the most prominent features of these theories-in-use are (Argyris and Schön, 1996):

1. Human beings hold master designs/programs about how to produce effective consequences. These programs are causal. They specify the actions required to produce the consequences that they intend.
2. Human beings hold two types of designs. These are the designs that they espouse and the designs that they actually use when they act.
3. There is a systematic discrepancy between the espoused designs, and the designs-in-use (typically identified, in the literature, as theories-in-use). The number and scope of the discrepancies increase, as the issues being dealt with are embarrassing or threatening.
4. Individuals are unaware of these discrepancies while they are producing them. If they become aware, their automatic response is to explain away their errors by blaming someone else or some larger social system. The same individuals are able to observe accurately any inconsistencies that others produce and hold them responsible for doing so.
5. Human beings hold the same theories-in-use. Culture, gender, race, age, wealth, education, and type of organization make no difference. Espoused theories vary but they do not produce action.
6. The theory-in-use has been modelled. It has been described extensively and hence I will not dwell on it (Argyris, 1982, 1987,

Model I Theory-in-use

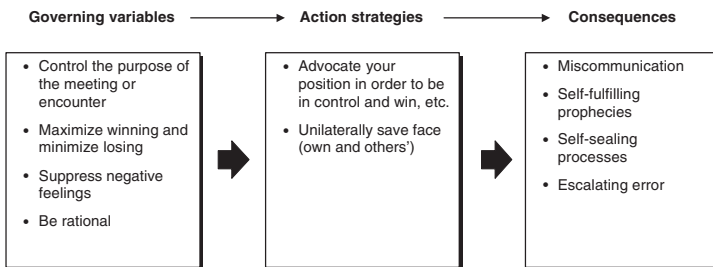


Figure 1.1 Model I theory-in-use

1990, 1993, 2000; Argyris and Schön, 1974, 1996). The theory-in-use is called Model I (Figure 1.1). Simply put, Model I is a theory-in-use that values unilateral control, winning not losing, and suppressing negative feelings. Model I leads to defensive behaviour such as skilled unawareness and skilled incompetence. Andy Grove's leadership is consistent with Model I.

Model I causes organizational defensive routines that, in turn, feedback to reinforce it. An example of an organizational defensive routine found frequently in organizations is mixed messages.

1. Mary, you run the department, but check with Charley.
2. Bill, be creative, but be careful.

The theory-in-use that human beings use to produce mixed messages goes something like this:

1. Produce a message that is mixed.
2. Act as if it is not mixed.
3. Make the first two undiscussable.
4. Make the undiscussability undiscussable.

The result is an ultra-stable state. Human beings and their organizations appear as if they are 'hard-wired' to prevent double-loop learning. One is reminded of Lawrence Kubie's (1958) definition of neurotic behaviour – namely, actions that are compulsively repetitive and not open to examination and correction. Fromm (1955) reached similar conclusions about society.

Interestingly, the features of the ultra-stable state are similar to the features of routines. Both resist double-loop changes. So we have human beings who may be asked to make double-loop changes in the routines, yet who lack the necessary skills to do so.

In the next section of this chapter we return to the theme of how scholarly researchers ignore or inhibit double-loop learning.

Theories scholars create that inhibit double-loop learning and implementable validity

A common norm about research is that scholars should seek to describe their chosen universe as completely as possible, typically in the form of generalizations that are testable.

Focussing on describing the universe 'as is' limits the description to the status quo. Descriptions of the universe, as is, are inherently incomplete because they do not tell us how the universe is likely to react if it undergoes dramatic changes. Describing the status quo will not provide such knowledge.

What is needed: first, organizational theories that define organizations that are different from the ones in good currency. Second, causal theories of how to get from here to there. Third, we cannot specify how to get from here to there without first specifying how the patterns were created in the first place. If, for example, we describe inter-departmental rivalries, low trust, cover-up, and cover-up of the cover-up, we must answer the question: how did the human beings create these in the first place?

Theories about new forms of organization are normative. They are based on subjective cultural values. They are not objective. In order to test theories, we derive hypotheses and test them in the empirical world. Such hypotheses are causal in the sense that they claim if we behave in such-and-such a manner, the following will occur. All causal hypotheses when implemented prescribe the actions to be taken, hence they are prescriptive. Hence we need normative theories about effective action and prescriptive theories as to how they are to be implemented and tested. These tests should be implementable in everyday life situations by scholars or practitioners.

All these ideas are illustrated in the Intel case. The company was structured and managed by normative propositions. The propositions were subjective in that they conformed to top and middle management's views. The everyday tests of the validity of these propositions were based on how well they were implemented. Those who created the rules carried out the implementation. In doing so, they used self-serving, self-referential logic.

The logic used to create the propositions was the logic used to test their validity. There was no room for double-loop learning.

Making knowledge actionable

The majority of the studies that Donald Schön and I reviewed about organizational learning were based on studying variance among variables. The difficulty with the knowledge produced in these circumstances, is that it was not actionable.

For example, a curvilinear relationship is specified between two variables. The human mind can produce a curvilinear relationship in order to understand and explain. However, the mind cannot produce a curvilinear relationship when it acts.

The first reason that such knowledge is not implementable is that it does not specify the causal designs required to act. The second reason is that such a generalization is very rich with variables and their relationships. Typically, scholars make many observations over time to produce these generalizations. Even if causality were not required, it is not possible for the human mind, given its limited capacity for information processes, to produce the relationship in such a way that it is timely for effective action in a given situation.

In order to produce effective action, it is necessary to begin with knowledge that is generalizable. This knowledge alerts the actors as to what actions are likely to be required to implement. However, the actual implementation occurs in a specific context. Theories of effective action therefore require propositions that are generalizable *and* applicable in the unique context. For example, a general theory of organizational defensive routines should be useable to engage the defensive routines in a specific context.

Empirical methodologies that inhibit and limit valid and implementable knowledge about double-loop learning

Elsewhere, I have argued that the theory-in-use of empirical research methodologies is consistent with Model I (Argyris, 1980, 1993, 2000; Argyris and Schön, 1996). For example, the researchers are largely in unilateral control over the 'subjects'. They hide important knowledge from the subjects in the service of internal validity. They control the subjects' time perspective. They control the nature of the feedback to the subjects during and after their participation. They cover-up that they are doing so. They make these features both undiscussable and incapable of being influenced.

There are two consequences that follow from this: first, propositions that have been developed through adherence to the Model I theories-in-use, regardless of their substantive claims, will lead to propositions that are consistent with, and limited to, the status quo. I quote four examples from my book (Argyris, 1980):

1. From some of the most sophisticated research on mass communications the following advice could be found. If you are trying to convince an audience about choosing an option or stance, and if you consider the audience to be composed of human beings who are not so bright, describe only one alternative. If the audience is considered 'bright', describe several alternatives. Imagine what would happen if those communicating to a 'dumb' audience were to state that they are providing them with one alternative because science recommends that they deal with not-so-bright audiences in this way.
2. Scholars recommended to activists who were against the Vietnam War how to lie and spin in order to get their foot in the door, and to convince the listener of the injustice of the war, and to cover-up that this was their intention.
3. Scholars quoting reactance theory advised individuals on how to manipulate people into buying window shades that were often unneeded and in many cases would not fit the windows for which they were being bought. Most of the buyers were poor.
4. Scholars using reinforcement learning theory advised executives how to reward their subordinates in ways that required the use of reinforcement schedules that were covered-up. These schedules would work if the subordinates behaved as dutifully as did the animals in the experiments where the results were originally produced (Argyris, 1980).

The second consequence is that if someone tries to implement such propositions, be they scholars or practitioners, they will find that they must use Model I actions to do so. For example:

In a careful, systematic experimental study, Barker, Dembo and Lewin (1941) reported that frustration leads to regression. They also reported that mild frustration leads to creativity. Let us picture a leader who wishes to use this knowledge to enhance her groups' creativity. How would she go about implementing this knowledge?

Would she tell her group members that she intends to frustrate them mildly in order to enhance their creativity? How would she assess when mild frustration is produced and when it was exceeded? How would she stop it when the frustration became too high?

Consider also the situation of the group members. How would they react to learning about her strategy? How would they react to periodic attempts to measure their frustrations? What kinds of measures would they be? If they were intrusive, would that not be a major act of manipulation and cover-up? If so, both parties would be acting in ways that support mistrust.

The argument so far is:

1. Theories about organizational learning and the research methods used to test them are consistent with Model I and with scholarly community norms of organizational defensive routines.
2. The resulting generalizations, if they were implemented in the everyday world, would require that the implementors act consistently with Model I, with organizational defensive routines, and act as if they are not doing so.

Concluding statement

I should like to begin my concluding statement by describing the most frequent claims scholars make when I question them about double-loop learning and implementable validity.

<i>They claim</i>	<i>My response</i>
There is interest in double-loop learning. Witness concepts like surprise and competency traps.	Yes, we find many scholars cite the importance of double-loop learning, yet few study it.
The research on learning is in its infancy. As knowledge accumulates, it will deal with research on double-loop learning and implementable validity.	Theories that focus on describing the status quo and research methods that are consistent with Model I, no matter how cumulative, will not lead to actionable knowledge about double-loop learning.
Produce credible evidence that double-loop problems exist and scholars will begin to study them.	Burgelman and March (to cite but two) state that double-loop problems exist. They also state that they are not correctable. They do not seek to test their claim.
What is needed is more sophisticated quantitative research.	Numbers are abstractions that, at best, focus on espoused theories.
Be patient. Progress will occur.	My three reviews of the literature since 1980 do not support this claim. The claim may act as a defence by scholars that inhibits progress.

Intervention

Next, I turn to the central role of intervention in producing knowledge about double-loop learning that has implementable validity. Lewin and his colleagues illustrated an early form of this strategy that was a combination of ethnography and social psychology. Argyris (1970), Jaques (1951), and Likert (1961) have each developed different views of intervention.

Argyris and Schön (1996) represent a view that uses intervention in the service of learning in organizations that is based on what is called Model II (Figure 1.2) theory-in-use. Detailed descriptions have been published that describe the interventions using Model II. They describe double-loop changes at the individual, interpersonal, group, inter-group and organizational levels. The interventions last from one day through eleven years (Argyris, 1982, 1985, 1987, 1990, 1993, 2000; Argyris, Putnam and Smith, 1985; Argyris and Schön, 1996).

Although it is beyond the scope of this chapter to describe these interventions, I should like to describe a few of their fundamental characteristics.

In all the interventions we *begin* by helping the participants become aware of the degree to which their theory-in-use approximates Model I (or some other). There are two reasons for this strategy.

1. Any interventions that focus on double-loop changes require individuals who are competent in problem-solving and interacting with

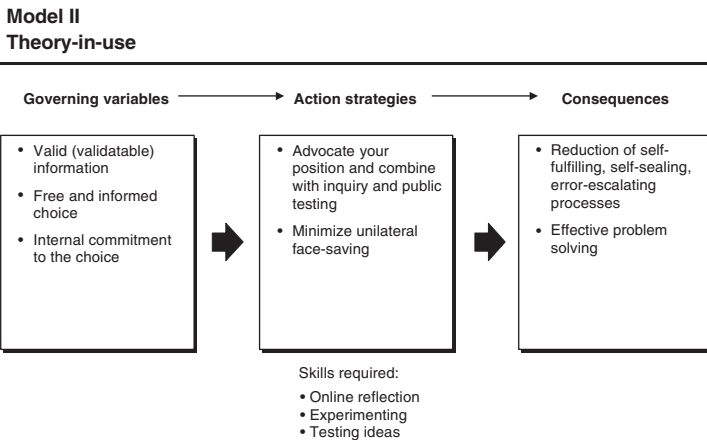


Figure 1.2 Model II theory-in-use

each other using governing values of producing valid or validatable information, creating informed choice, being causally responsible for their actions, and learning to detect and correct errors. Model I theory-in-use, as we have seen, is not suited to these values. We have developed a model that is consistent with these values. Model II (Figure 1.2), if it becomes an operative theory-in-use, decreases the counterproductive consequences of Model I, including the ultra-stable state of defences at all levels of the organization and throughout its different units. Participants intending to move toward Model II type organizations require Model II competencies and skills. Otherwise people will revert to Model I when the going gets rough.

For example, Perry (1984) describes an experiment to make a new plant more participative. After the early starts, the participants had to engage such issues as their competence to be participative as well as their commitment to accept personal responsibility for their errors. The team managing the intervention dealt with these difficulties by creating measurements, which would make performance responsibilities transparent. It was not long before the matrices became so complicated that they created a new top-down, 'I gotcha' culture. As one professional told me, *we soon realized that we were creating a world similar to the one Frederick Taylor made famous – a world that we were against.*

2. This leads us to the second reason. Ackoff (1999) has designed a new organizational structure intended to make organizations better at learning and at performing. He calls this new structure the circular organization. A core feature of this structure is a 'democratic hierarchy'.

The underlying governing values of democratic hierarchy are consistent with Model II. It is our prediction that progress would be made as long as the issues were single-loop. The moment double-loop issues arise (for example, sharing power, changing reporting relationships, holding people accountable with instruments that they design) we would predict difficulties. Ackoff (personal communication) confirms this prediction. Indeed, he put me in touch with two other intervention attempts at new structural arrangements consistent with the circular organization. In both cases, the interventionists warned that defences do arise, even when the CEO is an ardent champion and his immediate reports espouse genuine commitment (Goggin, 1974; Halal, 1996).

There is an important implication of these interventions. To the extent that structural arrangements (such as structures and compensation plans, etc.) are designed that represent non-trivial changes, they should not be implementable without the implementers having Model II skills and the capabilities to overcome defensive routines.

In the final analysis, when interventions are made to implement double-loop changes, the actions will include individual and organizational learning. Double-loop learning and effective implementation are tightly linked.

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