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Diversity in Information Systems Action Research Methods

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Abstract
Discussions of action research in information systems often proceed as if there were one definitive action research method. This paper describes and analyzes the different frameworks, assumptions and goals that characterise the diverse forms of action research. A more inclusive action research paradigm is delineated that offers a basis for validating a wider range of IS research. Acceptance of the full range of the diverse forms of action research may enable the information systems field to be more explicit about its research methodology, thereby enabling criteria to be improved and applied to a broader range of information systems research.

Introduction

Discussions of qualitative research methods in information systems (IS) are typically illustrated with case study research methods (Benbasat 1987, Lee 1989), ethnographic research methods (Agar 1986, Tanton & Fox 1987, Fetterman 1989), and action research methods (Kaiser & Bostrom 1982, Wood-Harper 1985). Discussions of these methods often proceed as if there were one definitive case method, ethnography method, or action research method. However, each of these terms reference a genre of research methods. While different forms of case study approaches have been explored (Yin 1989), and different forms of ethnography have been discussed (Agar 1986) we are only beginning to develop similar comparative studies of the various forms of action research methods (Lau 1997).

The discipline of information systems seems to be a very appropriate field for the use of action research methods. IS is a highly applied field, almost vocational in nature (Banville & Landry 1989). Action research methods are highly clinical in nature, and place IS researchers in an "helping role" within the organizations that are being studied (*cf.* Schein 1987, p. 11). It should not be surprising that action research is the "touchstone of most good organizational development practice" and "remains the primary methodology for the practice of organizational development" (Van Eynde & Bledsoe 1990, p. 27). Action research merges research and praxis thus producing exceedingly relevant research findings. Such relevance is an important measure of the significance of IS research (Keen 1991).

There is disagreement about the action research paradigm for information systems. Authorities variously define patterns or models of action research that are more or less exclusive. This disagreement not only reflects a broader social scientific disagreement over the paradigm, but also confusion about the IS action research tradition. This confusion arises in concerns about excluding certain IS research (*e.g.,* consulting) that "falsely" claims to be action research (Jonsson 1991), along with concerns about including traditional

action-based IS research (such as socio-technical inquiry) that is "implicitly" action research, but does not explicitly lay claim to fit the action research paradigm (Baskerville, *et al.* 1997). The issue revolves around definitional details about the term "action research" that may eventually help determine two related issues: agreement about establishing the validity of certain forms of action-based research; and the future exclusivity or inclusivity of the scholarly action-based literature in IS.

The two issues are related because the validity issues help determine whether research methodology and findings are sound enough for publication in scholarly journals. If researchers are able to present sound and convincing arguments for the validity of their findings, the chances for circulation of their ideas is greatly improved. By improving the inclusivity of the action research paradigm, we believe a broader range of research activities will fall under its validity criteria, and the openness of the IS scholarly literature will be improved.

We will show how different forms of action research have different models, different structures and different sets of goals. In the past, overly-exclusive definitions of action research created a problem in comparing the rigor and results of different action research studies which have adopted different action research approaches. The goals and success of a research project could be misinterpreted because the reader is unfamiliar with the particular form of action research being conveyed. Furthermore, highly practical segments of published research in the field of information systems simply ignore the research methods issue. Some of this research falls within the boundaries of an inclusive action research paradigm, and implicitly meets the criteria by which such research would be considered valid.

However, it is not just the readers who would benefit from an inclusive action research paradigm for IS. It is likely that many researchers conduct valid action research without fully understanding how their work fits one of the action research forms, or the philosophical assumptions that underlie the technique. This lack of understanding limits their ability to demonstrate the validity of their findings, and consequently limits the wider distribution of their knowledge.

The purpose of this paper is to describe and analyze the different models, structures and goals in the various forms of action research. This description extends the action research paradigm to embrace the diverse forms of research that involve purposeful researcher interventions within the uncontrolled social arena of the investigated phenomena. The contribution of this extension is the ability to classify and validate research findings from a segment of the IS literature that often arises from IS practice, the validity of which may be erroneously assumed to be unprovable.

The paper is organised into five sections. Following this introduction, the second section clearly defines the boundaries of research methods that may be considered part of the action research paradigm. Section three describes the intellectual genealogy of various streams of action research thinking, and positions information systems action research within this genealogy. The fourth section describes the essential characteristics of the various forms of IS action research. The fifth section discusses the implications of this description for research in the IS field.

Boundaries of an IS action research paradigm

We recognised that action research has particularly important implications for IS research. We also recognise that an inclusive boundary for action research may benefit the field of IS. In this section we will develop an action research paradigm or model through a set of characteristics that defines a more inclusive boundary for IS action research. This set differs in some important ways from the boundaries as defined by some authors in the social sciences. In particular, the characteristics below are oriented toward the process of action research, rather than the goals of the researcher (see the appendix for a detailed discussion of the differences between these characteristics and key characteristics from the social science literature).

Action research is a cognitive process that depends on the social interaction between the observers and those in their surroundings. The reactive process of stimulus-response provides a filter by which some of the myriad social actions can be connected into a causal model. When a certain action is taken in a particular social setting, a response is recorded. In its broadest sense, action research resembles the act of researchers conducting a highly unstructured field experiment on themselves together with others.

The term "participant observation" is being used in two senses in the literature. In one sense, it is claimed as a complete research method (discussed later in this paper). In a second sense, the term regards only research techniques for participatory data collection

within a qualitative research method like a case study or an ethnography. To avoid confusion, we will use the term "participatory observation" for the data collection technique, and "participant observation" for the research method.

The stimulus-action sequence is an alternative to passive observation because the filter for critical data about the event proceeds naturally from the event itself, and is not imposed *a priori* or *a posteriori* by the researchers. Passive observation of social settings places great demands on the observer because of the enormous complexity of social events. In any particular social setting, there are an enormous number of speech acts, gestures, movements and other clues with which the event might be interpreted. Some structure is necessary in order to filter these myriad clues to discover those that are relevant to the development of a theoretical framework. Passive observation filtering either requires an *a priori* framework, such as a classification scheme for speech acts, or an *a posteriori* framework, such as grounded theory categories. With action research, the filter is defined by the state change represented in the stimulus-reaction pairs. A certain action is taken in a social setting and the social setting changes state. Action research observes the social setting in motion after a defined event. This motion provides the filter for critical data in action research: things that changed after the event.

Unlike other experimental methods, however, action research rests in an interpretive philosophical framework (Susman & Evered 1978). The state-change data is only relevant to the particular social setting. The same stimulus in a different social setting may yield a different response because of the multivariate nature of human social interaction. Consequently the state-change response still must be interpreted in the social context. For the knowledge to be generalised in a broad theory, the impact of different social contexts must be considered. From a practical viewpoint, this means that the reader must have enough information about the exact social setting in which the stimulus-response was observed such that the stimulus may be revised or adjusted in order to make sense in the reader's own social setting.

In practice, the essence of action research is a simple two stage process Blum (1955). First, the *diagnostic stage* involves an analysis of the social situation. Hypotheses are formulated concerning the nature of the research domain. Second, the *therapeutic stage* involves change experiments. In this stage changes are introduced and the effects are studied.

To summarise, action research, in all its various forms, is characterised by (1) its multivariate social setting, (2) its highly interpretive assumptions about observation, (3) intervention by the researcher, (4) participatory observation and (5) the study of change in the social setting. Although the various forms of action research may distinguish themselves by imposing other additional characteristics, each form shares these five characteristics.

Historical Background of IS Action Research

The history of IS action research can be traced through four major periods. The first two periods, the origins and fragmentation periods, represent the early social science foundations of action research and are common to IS and other disciplines. It is in the latter two periods, the fragmentation and diffusion periods, that IS has begun to discover and apply the method. The periods overlap, but approximate dates for each period are assigned. Since various writings about action research may appear outside of their period, these dates are not firmly related to publication dates.

First Period: Origins (1940 - 1960)

The origins of the action research method developed when the calamities of World War II precipitated massive social changes in the research arena of the social sciences. Kurt Lewin (1947) is credited with developing the method at the Research Centre for Group Dynamics (University of Michigan) in order to study social psychology within the framework of field theory. However, another group working independently at the Tavistock Clinic (later the Tavistock Institute) developed a similar method as a sort of psychosocial equivalent of operational research (see Trist 1976 or Warmington 1980).

The Tavistock Institute dealt with psychological and social disorders caused by battlefields and prisoner-of-war camps. Previously to this war, these psychological syndromes had not been identified in such a large population of patients. Scientists did not understand enough about the complex causes of such `social illnesses' to formulate any confidence in any universal treatments. Each case appeared somehow "different". Hence, the idea of social action arose. Scientists intervened in each experimental case by changing some aspect of the patient's being or surroundings. Since scientist and therapist were one, the scientists were participants in their own research.

The effects of the actions were recorded and studied. In this manner, a body of knowledge was developed about successful therapy for the illnesses.

Lewin's work sought a general theory of how social change could be facilitated. His original model of action research included iteration of six phased stages, rather than the five now commonly assumed. The six stages were (1) analysis, (2) fact finding, (3) conceptualisation, (4) planning, (5) implementation of action, and (6) evaluation. A foundational stream of related work in action research follows Lewin and the Tavistock experience. This work generally arises in the field of organizational sociology and social psychology, although Blum (1955) published a discussion on the implications of action research for the more general scientific arena.

Second Period: Disputes (1960 - 1975)

After the initial period, the approach seems to have gone through a period of experimentation that disclosed some essential problems. The refereed material on action research of this period is dominated by the social science researchers who recognised problems and limitations with action research. The major problems identified with the use of the technique in social science concerned ethical dilemmas and the nature of research sponsorship in the post-war period.

Rapoport (1970) first explained the three dilemmas that severely inhibit the ethical use of the technique in practice. These include a goal dilemma between the practical problem-at-hand and the research question, bringing an ethical conflict to the research because this dual-goal environment sometimes conflicts. There is also a second dilemma between the roles of researcher and consultant in which one individual must serve. Sometimes these roles conflict, for example when consulting fees are paid to the researcher or editorial control over research reports passes to the client. A third ethical conflict is found in the concomitant value dilemma. The values that inhabit the client culture may conflict with those of the researcher. For example, clients may place a high value on quick, decisive action, whereas the researcher's academic culture may value lengthy abstract reflection before considering action.

A second major problem regarded the funding structure of social science research in the 1950s and 1960s. Peter Clark (1972) reasoned that research was being increasingly sponsored by public money. In response, leading researchers tended to seek projects that relied on "hard" quantitative data: projects that featured computer analysis and thereby attracted government attention. This post-war emphasis on professionalism and precise data collection methods led to a general decline in qualitative research skills. As a result, action research methods were seldom applied, and when these were used, they were often of marginal scientific quality due to the limited resources. Clark finds action research among the methodological "orphans" in post-World War II science.

A third problem arose in the increasing association with action research and organizational consulting. Edgar Schein was exposed to the technique in 1957 at the National Training Laboratories (Schein 1987) and began exploring the use of action research for developing solutions to group problems in organizations. His *Process Consultation* (1969) had an immense and positive impact on the field of organizational consulting. However, this may have only increased the perception among social scientists that action research was purely a practical method, and had little scientific significance.

The decline of action research appears to have been nearly complete by the mid-1970s. In Anton Clark's (1976) compilation of action research papers in organizational work, Sanford (1976) asks "What ever happened to action research?".

Third Period: Fragmentation (1975 - 1990)

In the late 1970s, action research regained some of its respectability, but also became more clearly fragmented in its forms and its applications. The main stream of action research work became more strongly related to the organizational sciences, Susman and Evered (1978) presented an encouraging evaluation of the scientific merits of action research in terms of post-positivist science. This was followed by a meticulously-developed definition of the important aims of the approach by Hult and Lennung (1980).

In this period, the work becomes more clearly fragmented along defined streams of ideas within the organizational sciences. The consulting stream that evolved out of Schein's early work continued through others, *e.g.*, the Lippitt brothers (Lippitt & Lippitt 1978—although Ron Lippitt was a student of Lewin and had first-hand knowledge of the original action research techniques), or Kubr (1986). In the field of medical practice, action learning (Burnard 1991, Pedler 1991) is discovered and becomes increasingly important as a mechanism to solve the educational crisis.

Two streams develop during this period that emphasize the relationship between reflection and action. One stream evolves from work by Argyris and

Schön (1978) in double-loop organizational learning, which also uses some of Lewin's basic concepts. Consequently, these ideas are quite coherent with the action research cycle. This stream continues with Schön's (1983) work in reflective practice and eventually reconnects with action research in a book by Argyris, Putnam and Smith (1985). Schein (1987) builds on both action science and his experience with process consultation in formulating his view of clinical field work. The second of these streams arises in Checkland's merger of action research and systems science in creating the concepts of systems thinking, and soft systems methodology (Checkland 1981).

During this period the information systems action research originates as a distinct application area for action research. Pioneering work includes Mumford's ETHICS, defined as an action-oriented socio-technical information systems development method (Mumford & Weir 1979, Mumford 1983a), and Wood-Harper's use of action research for the study of information systems development (Wood-Harper 1985).

Fourth Period: Diffusion (1990 -)

The various fragmented forms of action research now appear to be diffusing broadly across practical fields of study. The various forms are not merging so much as they are being applied appropriately for various useful research purposes. Action research publications are increasingly concentrating upon the results of action research studies rather than the abstract philosophy of action research. Handbooks (Stringer 1996) and research anthologies (Whyte 1991) are important milestones. A similar trend is noticeable in the information systems field. Checkland, for example, developed a more refined soft systems methodology couched among exemplars (Checkland & Scholes 1990). The practical domains of information systems action research are explored (Baskerville & Wood-Harper 1996), and many of the information systems action research journal publications are inventoried and classified (Lau 1997).

Figure 1 diagrams the IS-relevant streams of action research thinking through their four periods. The streams are shown vertically progressing from the origins at the top of the diagram downward through later periods toward the bottom. Five fragmented streams of development are leading to the present diffusion in the IS field (lower right). From left-to-right, the five streams are social and organizational science, organizational learning, process consultation, systems science, and information systems action research. The linkage down the diagram from Lewin does not imply exclusion of the influence of large bodies of other literature, nor does it always define a citation trail. These are simply chronological streams of related work. The systems science and consultation literature is not intended to represent a complete linkage of ideas, but are examples selected from the myriad important works. Somewhat distinctly in the systems and information systems developments, both Jackson's (1985) later versions of critical systems theory and Wood-Harper, Antill and Avison's (1985) multiview approach suggest methodological pluralism is more appropriate than action research alone. The action science work, perhaps because of its stronger rigor (Argyris & Schön 1991), is also beginning to directly influence information systems practice and research. Current consulting has been heavily influenced by the Schein concepts, but there is some overlap with current action research (see Bledsoe & Van Eynde 1990).

For the researcher and practitioner in information systems, action research appears to arise from these four distinct streams: the original "canonical" form of action research, management consulting, soft systems

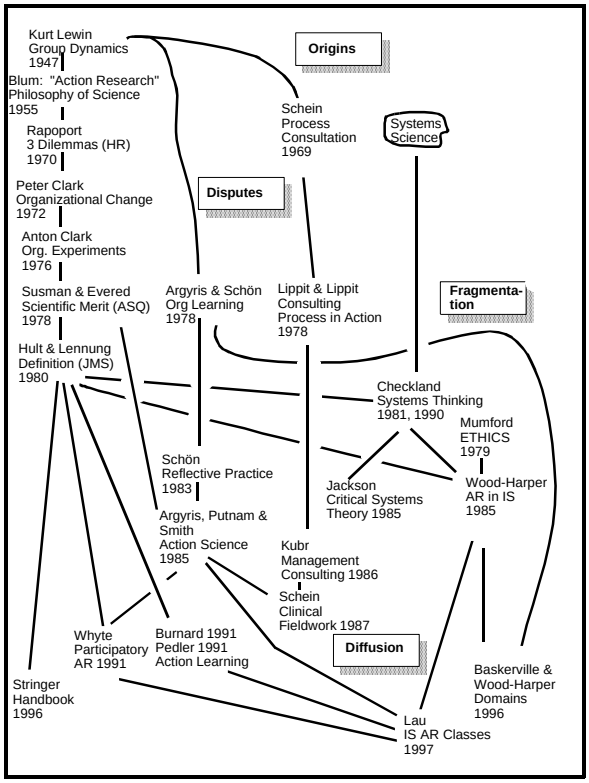

Figure 1. Genealogy of IS Action Research.

methodology, and organizational learning. The term action research is frequently mentioned in each stream, but in each, the term has slightly different contextual meaning. In addition, there are some methods that are quite similar to action research, such as prototyping and participant observation. Although these techniques did not explicitly develop from the original action research streams, they are sometimes called action research because of the strong similarities. As a practical consequence of these undeniable similarities, these techniques will be admitted in the following discussion as forms of IS action research.

Characteristics of action research forms

Each form of action research is distinguished by a wide variety of characteristics. At least four types of these characteristics are conducive to a comparative analysis. These are process model, structure, typical researcher involvement, and primary goals. To illustrate how each of these forms can be discovered "in the wild" in the action research literature, each form will be illustrated by one or more examples. Explicit forms are examples that openly identify the applicable action research form. Implicit forms are examples that do not openly identify the applicable action research form, indicating that the research approach falls within the boundary of action research (defined earlier) and possesses the characteristics described by the form. In these implicit examples, the authors could have (but have not) made claims to the action research paradigm as a foundation for the validity of their work.

Process model.
Three distinct process models characterise different action research forms. An *iterative* process model involves a repeating sequence of activities, typically cycling between action activities and problem diagnosis activities (Blum 1955). A *reflective* process model is necessarily iterative, but focuses less on problem diagnosis than on reflective analysis of theory-in-use versus espoused-theory. An espoused theory is one that an individual claims to be following. A theory-in-use is one that can be inferred from action (Argyris & Schön 1978). A reflective process model concentrates on the discovery of differences between the two theories. A *linear* process model does not involve iteration, but a single sequence of activities such as (1) engage, (2) diagnose, (3) unfreeze, (4) change, (5) freeze, (6) disengage.

This characteristic can be used as a taxonomy to organise the diverse forms of IS action research into three categories. We will use this taxonomy to organise the discussion of these forms in the paper below: iterative, reflective and linear IS action research methods.

Structure
Two distinctive forms of structural guidance are characteristic in different forms of action research. *Rigorous* structure is characterised by delineated stages, steps or activities carried out in a sequence or cycle, or selected according to rules or heuristics. *Fluid* structure defines activities very loosely, allowing substantial simultaneity or leaving the temporal location of various activities relatively undefined.

Typical researcher involvement.
Individual researchers can choose to be involved with their study subjects in highly independent and different ways. (As we have defined the boundaries of action research, the researcher must be involved as a participatory observer and in determining the interventions.) One of the following typical researcher involvements is characteristic of the literature on each form of action research. *Collaborative* involvement implies that the researcher is an equal co-worker with the study subjects. The study tasks are shared without distinction and the participants' backgrounds are assumed to be equally valuable. A *facilitative* involvement distinguishes the researcher as an expert among the study subjects. While the work is still cooperative, the tasks of the researcher and the subjects are quite distinct. The burden of solving the immediate problem setting rests with the study subjects. The task of the researcher is to facilitate or help the subjects with expert advice, technical knowledge or an independent viewpoint. However, the subjects are responsible for determining exactly what interventions will be created. An *expert* involvement also distinguishes the researcher as an expert among the study subjects, and still involves cooperation and distinct tasks. However, the burden of solving the immediate problem setting rests with the researcher. The researcher's decisions will determine to a large degree what interventions will be created. Choosing facilitative versus expert involvement involves reversing the tasks of the subjects and the researcher with regard to the immediate problem.

Some forms of action research allow the researcher to adopt different involvement roles depending on the problem setting. An example is Multiview, which

permits researcher to select their role as either doctor, facilitator, emancipator and social warrior depending on the setting (Avison & Wood-Harper 1990). Another example is prototyping, which exists in both facilitative (Connell & Shafer 1989) or collaborative forms (Gronbaek 1989).

Primary goals

The different forms of action research can be used with many different goals in mind. However, each form is characterised by certain primary goals in their common formulations. *Organizational development* involves a primary goal of improving the human organization. In this viewpoint, we consider the human organization to be embodied in the regular patterns of social interaction among the persons involved in the organization. Thus organizational development implies the development of social conditions of the organization. These conditions may include higher morale, structural efficiency, structural effectiveness, or better information flows. *System design* involves a primary goal of creating or modifying organizational systems. These systems are the structural artifacts that people create as a consequence of the human organization. For our purposes, system design usually involves a computer-based information system. But it might also broadly refer to an accounting system or an inventory system. *Scientific knowledge* implies a primary goal of contributing a generalisable understanding of the problem setting to the scientific literature in the field. The generalisability is necessary for practitioners to use the understanding in different settings, or for scientists to build further studies on the knowledge. *Training* involves a primary goal of individual learning from the study. This is an educational goal, where the primary reward is the improved understanding certain types of problem situations by a single researcher (or group of researchers) who undertake the study.

Forms of action research

Table 1 illustrates an analysis of the various forms of action research that appear in the IS literature. The columns in this table represent the distinguishing characteristics of these forms as described above. Each row in the table specifies the characteristics of one of the forms of action research. The left-hand column lists the name of the action research forms: canonical action research, information system prototyping, soft systems methodology, action science, participant observation, action learning, multiview, ETHICS, clinical field work, and process consultation. The right-hand column lists one example of IS published work that illustrates these characteristics. The marks in the cells of the table designate the presence of one of the characteristics in one of the forms of action research. Each of these forms is discussed below.

Iterative IS action research

The distinguishing characteristic of iterative action research is the overall repeating sequence of major activities such as diagnosis, action and learning. Most forms of action research will involve iteration at some level in the activities. However, iterative IS action research uses iteration as its primary organising principle, and the entire set of research activities is repeated until the practical problem is resolved. Forms of IS action research that exhibit this characteristic include canonical action research, soft systems, and prototyping.

Canonical action research

Action research, as it was originally formed, has been used with particular frequency to advance our understanding of information systems development (Baskerville & Wood-Harper 1996). Lewin's original six-stage form of action research involved distinct, iterative phases. Hult and Lennung (1980) define this form of action research concisely:

> "Action research simultaneously assists in practical problem-solving and expands scientific knowledge, as well as enhances the competencies of the respective actors, being performed collaboratively in an immediate situation using data feed back in a cyclical process aiming at an increased understanding of a given social situation, primarily applicable for the understanding of change processes in social systems and undertaken within a mutually acceptable ethical framework."

	Process Model			Structure		Typical Involvement			Primary Goals				Published IS Examples
	Itera-tive	Reflec-tive	Linear	Rigor-ous	Fluid	Colla-borative	Facili-tative	Expert	Orgztnl Devlpmt	System Design	Scintfc Knwldge	Train-ing	
Canonical Action Research	!			!		!			x		x		Baskerville 1992
Information Systems Prototyping	!			!		+	+			!			Kyng 1991
Soft Systems	!				!		!		x	x			Checkland & Scholes 1990
Action Science		!			!		!		x		x		Reponen 1992
Participant Observation		!			!			!			!		Jepsen *et al* 1989
Action Learning		!			!			!				!	Naur 1983
Multiview			!	!		+	+	+		!			Avison & Wood-Harper 1990
ETHICS			!	!			!		x	x			Mumford 1983
Clinical Field Work			!		!		!		x		x		Hammer & Champy 1993
Process Consultation			!	!				!	!				Coad & Yourdon 1991

*Key: **!** signifies a dominant characteristic, + (or) signifies characteristics that will dominate in different studies, x (and) signifies characteristics that may occur together in the same study.*

Table 1. Characteristics analysis of action research forms.

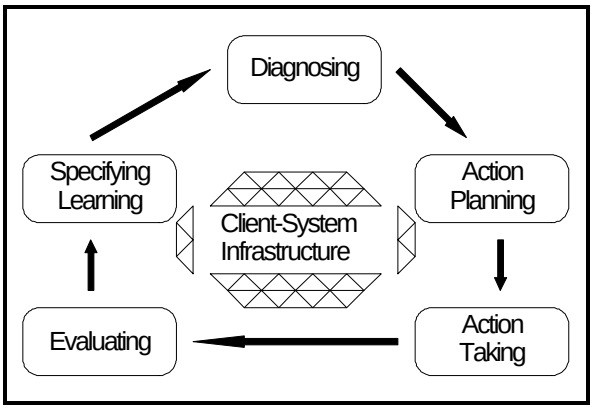

Figure 2. Canonical action research process model (Susman 1983).

Susman (1983) clearly describes a slightly revised version of this form as the five stages illustrated in **Figure 2**. Each stage is briefly described below.

The *client-system infrastructure* is the specification and agreement that constitutes the research environment. It provides the authority, or sanctions, under which the researchers and host practitioners may specify actions. It also legitimates those actions with the express expectation that eventually these will prove beneficial to the client or host organization. Considerations found within the agreement may include the boundaries of the research domain, and the entry and exit of the scientists. It may also patently recognise the latitude of the researchers to disseminate the learning that is gained in the research. This infrastructure should also define the responsibilities of the client and the researchers to each other. For example, the infrastructure will probably assume that the researchers will not purposely specify actions that are harmful to the organization.

A key aspect of the infrastructure is the collaborative nature of the undertaking, and this defines the typical involvement of the researcher (see **Table 1**). The research scientists work closely with practitioners who are located within the client-system. These individuals provide the subject system knowledge and insight necessary to understand the anomalies being studied. Peter Clark describes these practitioners thus:

> "For convenience it is useful to think of the practitioner as part of a set of actors who are oriented to solution of practical problems, who are essentially organizational scientists rather than academic scientists." (Clark 1972, p.65)

Diagnosing corresponds to the identification of the primary problems that are the underlying causes of the organization's desire for change. This involves self-interpretation of the complex organizational problem, not through reduction and simplification, but rather in a holistic fashion. This diagnosis will develop certain theoretical assumptions (*i.e.*, a working hypothesis) about the nature of the organization and its problem domain.

Researchers and practitioners then collaborate in the next activity, *action planning*. This activity specifies organizational actions that should relieve or improve these primary problems. The discovery of the planned actions is guided by the theoretical framework, which indicates both some desired future state for the organization, and the changes that would achieve such a state. The plan establishes the target for change and the approach to change.

Action taking then implements the planned action. The researchers and practitioners collaborate in the active intervention into the client organization, causing certain changes to be made. Several forms of intervention strategy can be adopted. For example, the intervention might be directive, in which the research "directs" the change, or non-directive, in which the change is sought indirectly. Intervention tactics can also be adopted, such as the recruiting of intelligent laypersons as change catalysts and pacemakers. The process can also draw its steps from social psychology, *e.g.*, engagement, unfreezing, learning and reframing.

After the actions are completed, the collaborative researchers and practitioners undertake the *evaluating* of the outcomes. This includes a determination of whether the theoretical effects of the action were realised, and whether these effects relieved the problems. Where the change was successful, the evaluation must critically question whether the undertaken action, among the myriad routine and non-routine organizational actions, was the sole cause of success. Where the change was unsuccessful, some framework for the next iteration of the action research cycle (including the adjustment of the hypotheses) should be established.

While the activity of *specifying learning* is formally undertaken last, it is usually an ongoing process. The knowledge gained in the action research (whether the action was successful or unsuccessful) can be directed to three audiences. First, what Argyris and Schön (1978) call "double-loop learning," the restructuring of organizational norms to reflect the new knowledge gained by the organization during the research. Second,

where the change was unsuccessful, the additional knowledge may provide foundations for diagnosing in preparation for further action research intervention. Finally, the success or failure of the theoretical framework will provide important knowledge to the scientific community for dealing with future research settings.

The action research cycle can continue, whether the action proved successful or not, to develop further knowledge about the organization and the validity of relevant theoretical frameworks. As a result of the studies, the organization thus learns more about its nature and environment, and the constellation of theoretical elements of the scientific community continues to benefit and evolve. Thus this original form of action research addresses two primary goals: organizational development and scientific knowledge (see **Table 1**).

The clearly defined nature of each stage in the process is characteristic of a rigorously structured action research form. Likewise, the form is clearly an iterative process model, and lacks the concern with action theories (theory-in-use versus espoused-theory) that characterises reflective process models. See **Table 1**.

An explicit example of canonical action research in the field of information systems can be found in Baskerville (1993). This paper describes the development of a theory of semantic database prototyping within a canonical action research project. The paper explicitly discusses the various canonical components and the theory evolution during action research iterative cycles.

Soft systems methodology

Action research has been linked closely to systems theory from its inception, although Susman and Evered (1978) make the seminal connections. These ideas recognise that human activities are systematic, and that action researchers are intervening in social systems. Peter Checkland's (1981) use of action research in connection with systems analysis is a landmark for the technique in the information systems research community. Checkland drew heavily from both systems science and action research, and his ideas have brought considerable attention to action research in the IS community (although his work is not as widely followed in the United States). Checkland not only used an action research approach extensively in developing his soft systems methodology, but action research concepts for gaining professional knowledge permeate the soft systems approach itself.

Although the term "reflection" inhabits the literature on soft systems methodology, this term is not being used in the narrow sense of theories-in-action. Rather, the term regards a period of abstraction, in which the essential components of social reality in the target systems world are captured and modelled. Reflection regards the ability of the abstract systems models to reflect the essential social reality, and embody the strong partition between the systems thinking elements of problem-diagnosis and real-world elements of action-taking.

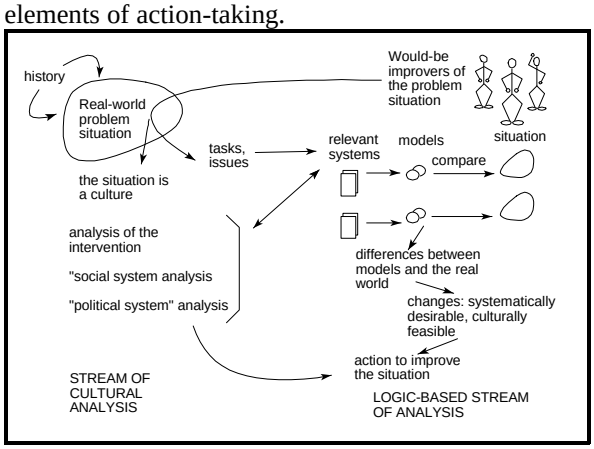

Figure 3. Contemporary soft systems methodology (Checkland and Scholes 1990)

The process model of soft systems is essentially iterative (see **Table 1**), although the description of the process is rather linear: "Changes implemented as a result of the use of SSM of course change the problem situation as originally perceived, and in the new situation the cycle of learning stimulated by the methodology can begin again. . . . [*sic*] It is in principle never ending, and ending a systems study is an arbitrary act." (Checkland & Scholes 1990, p. 30).

Soft systems methodology is also characterised by a well-defined structure. This structure consisted of seven iterative stages in the 1975 version, which were divided between real-world activities and systems thinking activities. This was replaced with a two-stream, iterative process model in the 1990 version, divided between a logic-based stream and a cultural analysis stream (see **Figure 3**). The logic stream consists of the comparison between relevant systems, models and the situation; determination of changes; and action to improve the situation. The cultural analysis

consists of analysis of the intervention, the social system and the political system. The determination of changes is dependent on systematic and cultural feasibility, and this stage interacts with the cultural analysis.

The typical involvement is characterized by a collaborative role, a "joint insider-outsider problem-solving team" tackling a messy problem situation (p. 60). There is at least one example of a facilitative soft systems study (the ICI case in Checkland and Scholes 1990), but this is regarded as not quite fitting the pattern.

The primary goal of soft systems is system design, but the term is used in the sense of human activity systems. Information systems (data manipulation systems) design and creation is one area in which soft systems can contribute models and instances of purposeful human activity systems. Consequently, the primary goals of soft systems methodology are characterised as both organizational development (human activity systems) and system design.

Checkland and Scholes (1990) detail several explicit examples of soft systems methods. Although some of these systems are broader than just IS, there are clear relationships drawn to the IS domain. Since the purpose of the detailed description is to illustrate soft systems methodology, the cases are explicit examples, and generally follow the defined form of this research.

Information system prototyping

The prototyping approach to systems analysis and design bears a striking resemblance to action research, although there is no strong intellectual heritage of action research in the development of prototyping. Even though some authorities may exclude prototyping as a form of action research, the technique exhibits qualities that fall within the boundaries we have established for forms of action research: (1) it moves the design process into the user's multivariate social setting, (2) it permits highly interpretive assumptions about observation allowing highly qualitative data, (3) it represents an intervention by the designer into the user work setting, (4) the designer is conducting participatory observation about the suitability of the design and (5) the designer is studying the impact of design changes in the user's social setting. It is difficult to exclude action research as an information systems development method (illustrated by prototyping, ETHICS, and soft systems), without excluding the widely accepted use of action research as an organizational development method. The arguments for including this form of action research in this taxonomy are compelling.

Unlike the fairly singular form of canonical action research, prototyping regards a fairly broad class of information system development techniques. Connell and Shafer (1989) identify several categories of prototypes within this class. There are "throw-away" design prototypes, *e.g.* mock-ups and user interface prototypes, that have limited functionality and precede the specification process. There are specification prototypes that provide a throw-away working model of an entire system prior to specification and construction. There are design-driven prototypes that provide a pre-finalisation "test drive" of a traditionally developed system. The classic prototyping approach is embodied in evolutionary prototypes that begin as design prototypes and cycle through iterative phases of prototype reconstruction and user evaluation until full functionality is achieved. The characteristic primary goal of prototyping as a form of action research is system design (see **Table 1**). In most versions, action theories are not considered, and this form of action research is characteristically iterative (see **Table 1**).

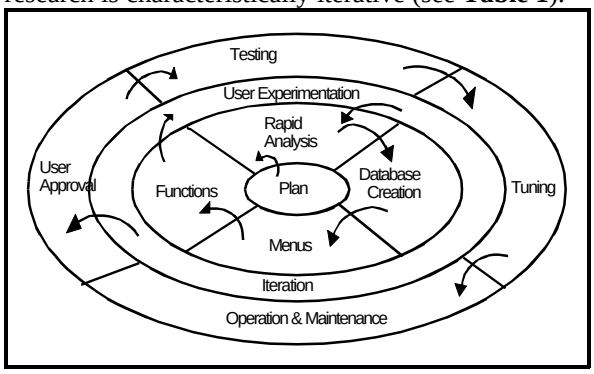

Figure 4. The Connell and Shafer (1989) evolutionary prototyping process.

In most cases, the prototyping form is also quite rigorous with defined stages or phases. For example, the Connell and Shafer version of the process (see **Figure 4**) involves ten clearly defined, iterative stages from project planning to operation and maintenance.

As a framework for research into application contexts, prototypes are usually a mechanism that allows designers to facilitate user validation of system designs (*cf.* Naumann & Jenkins 1982, Boar 1984, or Iivari & Karjalainen 1989). Prototypes surmount the esoteric nature of system design descriptions by presenting a working model of a specification, and allow the user to understand and comment on the

design. The tasks of the designer and the user are clearly defined by their backgrounds, and the responsibility for the usability of the design shifts to the user through the process.

In other forms of prototyping, the roles of the users and designers are less distinct. Prototypes are precisely intended to improve user-designer communications (Mason & Carey 1983), and they are successful because prototypes are more effective *linguistic artifacts* (Pelle Ehn 1989). In some forms, this communication through prototyping has enabled fully collaborative involvement by the designers and users (Gronbaek 1989). As a consequence, the typical involvement of the researcher may be seen to be either facilitative or collaborative. This relationship is denoted in **Table 1** by the presence of a "+" in the collaborative and facilitative characteristics.

While there are many instances of prototyping in information systems practice, the impact of these are rarely described in terms of explicit action research. For an example of research that implicitly fulfils these characteristics, while making no specific claims on action research for its validity, see Kyng (1991). Kyng provides a concise description of two collaborative prototyping projects involving group support systems for a large-scale civil engineering project.

Multiview

Wood-Harper, Antill and Avison (1985) describe a contingency method for information systems development that is expanded in Avison and Wood-Harper (1990). Multiview is a flexible framework which provides an alternative to choosing between different methodologies. The techniques and tools available within the framework are chosen and adjusted according to the particular problem situation. It is a blended methodology drawing from a number of major methodologies, but contrasts because not all steps apply to all situations.

Multiview has a rigorous structure, despite its contingent components. There are five stages in the framework: (1) human activity analysis, (2) information analysis, (3) socio-technical analysis and design, (4) human-computer interface design, and (5) technical design. The overall framework is linear in nature.

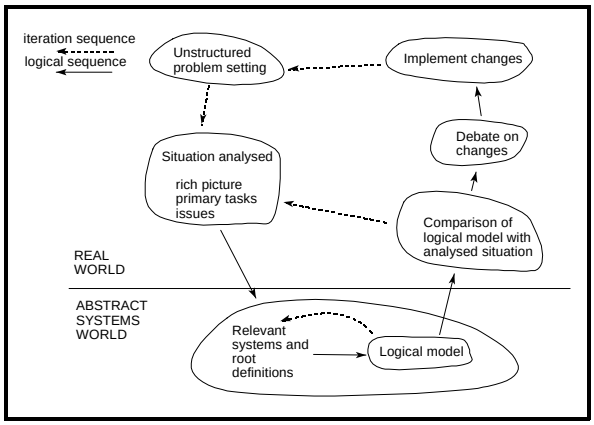

Figure 5. Multiview abstract systems thinking (Avison and Wood-Harper 1990).

Multiview is included among the action research forms because Checkland's soft systems methodology strongly influences the human activity analysis stage of multiview, and no alternative tools for this stage are suggested. Within this multiview human activity stage, Checkland's original seven-stage iterative action research technique used to build the conceptual, or human activity model (see **Figure 5**).

The typified involvement of the researcher in multiview is suggested to be variable, and Burrell and Morgan's (1979) framework is used to define four researcher roles: (1) technical expert (functionalist, doctor), (2) facilitator (interpretative, teacher), (3) agent for social progress (radical structuralist, warrior), and (4) change catalyst (radical humanist, emancipator). Consequently the typical involvement of the researcher in multiview could be selected from among the typical collaborative, facilitative or expert roles (this is designated in **Table 1** as "+" in each column). The primary goal of multiview is systems design.

Wood-Harper, Antill and Avison (1985) and Avison and Wood-Harper (1990) describe explicit examples of IS development projects that use this form of action research. Similarly to the soft systems examples above, the purpose of the descriptions is to illustrate the method, so the various characteristics are generally followed and explicitly described.

Reflective IS action research

The important characteristic of reflective IS action research is its focus on the distinction between theory-in-use versus espoused-theory. All action research is

reflective in the sense that action is typically followed by a stage in which the researchers reflect on the evaluation of the results and learning from the effects of the action. However, for our purposes, the term "reflective" is applied here in a more specific sense: What is critical in reflective action research is the actors' discovery of where their behaviour is unexplained by their own understanding. Diagnosis and iteration are implied by this search for an understanding of this distinction, but iteration is no longer an end in itself. There are three forms of IS action research which meet this criterion. These forms are all three widely used outside of information systems, and all three are generally fluid in their structure. These forms include action science, participant observation, and action learning.

Action science

Argyris, Putnam and Smith (1985) openly seek to distance their work from earlier, "corrupt" forms of action research by using the term *action science*. These authors believe that during the disputes period action research progressively became separated from theory building and testing, and that the method became further corrupted by positivist attempts to impose the rigor of more traditional scientific experiments into action research projects. From their viewpoint, the effect disconnected theory from reality, and rendered the resultant findings irrelevant.

Action science builds on work by Argyris and Schön (1978) in double-loop organizational learning and Schön's (1983) work in reflective practice. The theories-in-action perspective is characteristic of action science, however, the technique is also characterised by a fluid structure, compensating for the "corrupting" effects of positivist rigorous structures. Instead, action science seeks rigor in high standards of practical knowledge, which is defined as contextual precision within social reality. "Contextual" means that practical knowledge is relevant to its purpose and norms. Technical knowledge without a chosen end is not practical, and consequently has undefined rigor. Action science is defined by the elements "epistemology of practice" and "empirical testing of practical knowledge".

Epistemology of practice involves three concepts. The first concept regards the problem setting. The problem always involves a means-end deliberation, and a situational "frame" for practical knowledge. The second concept is tacit knowledge, which involves the unconscious categories, schemas, patterns and other rules that form knowledge. Often tacit knowledge can only be inferred from skilful action. The third concept involves making tacit knowledge explicit by a cycle of reflecting and acting. This cycle involves the double-loop learning process: a single loop of means-end rationality (epistemology of practice) and a double loop in which this rationality is framed by a problem setting (action science epistemology). This double loop may, for example, set a different problem frame for the single loop.

Empirical testing is the second defining element of action science. This embraces the experimentation through intervention in order to test rule-governed human iteration and the discovery of tacit knowledge. Data collection focuses on talk as a window on practical reasoning, and its validity is threatened by contextual problems (like laboratory-style controls, ambiguity in interpretations or a variety of defensive routines such as face-saving behaviour). Validity is improved by intersubjective agreement. Action science also recognises two types of claims, dispositional attributions (*e.g.*, tendencies of certain individuals toward certain forms of behaviour), and causal responsibilities (*e.g.*, taking a particular action will lead to a particular result).

The domination of concepts like epistemology and empirical testing imply that the primary goal of action science is scientific knowledge. However, the emphasis on the double loop is aimed at breaking away and replacing old cognitive frames. Consequently the dual aims of organizational development and scientific knowledge are intertwined as goals in action science (see **Table 1**).

The researcher is involved clearly in a "helping" mode in action science. The aim of the researcher is to facilitate the explication of tacit knowledge (theories-in-use) and thus enable the subjects to break out of inappropriate frames (associated with espoused-theories). Both the researchers and the subjects are involved in the learning processes, but the role of the researcher in action science is quite distinct from the role of the subject (see **Table 1**).

An explicit example of the use of action science in the study of information systems is found in Reponen (1992). This paper describes an action science case involving the development of a framework for IS strategy formulation. The research is carefully developed from the action science framework, and the reflective principles are generally followed.

Participant observation

Classical natural science typically places a high value on uninvolved and dispassionate observations. In modern social science such detached views are sometimes clouded with a thick cultural bias that ignores key elements of social reality. For example, early Western European anthropologists historically characterised other cultures as "primitive". Participatory observation is a key element in removing such cultural bias. Participatory observation requires that the researcher become directly involved as a participant in peoples' daily lives. This involvement is a strategy for gaining access to the interior, seemingly subjective aspects of these lives by becoming a member or insider in their world (Jorgensen 1989, p. 21).

Participatory observation can be used as the central organizing principle for a research method (*i.e.* Jorgensen's "participant observation", 1989) or as a data collection technique for possible use within other types research designs, for example, case study methods, ethnographic methods, or action research methods. In culturally immersive research methods like action research and ethnography, participatory observation is "crucial to effective fieldwork" (Fetterman 1989, p. 45). In research methods that admit detached observations (like case studies), participatory observation is viewed as an optional data collection technique (Yin 1989).

Participant observation as a methodology is fluid in structure, chiefly because it is difficult to control human interaction in social settings. The process of participant observation "may seem unsystematic; in the beginning it is somewhat uncontrolled and haphazard" (Fetterman 1989). It is characterised by a reflective process model, which values the explication of both the researcher's and subjects' cognitive frames, for example when a researcher's encounter with the subjects cannot be understood with the researcher's frame (Agar 1986). See **Table 1**.

Not all research involving participatory observation can be regarded as action research. When the participating researcher intervenes to precipitate change and then studies the effects of the intervention, the similarities are too strong to be ignored. Participant observation is so broadly defined, and can be structured in so many different ways that it is difficult to characterise the primary goals and typical involvement of the actual study. However, the general tone of most studies that report the results of participant observation methods, and most discussions of the participatory observation technique, reflect a primary interest in the scientific knowledge that is gained from the study. To this degree, the researcher is typically seen as an authoritative expert, immersed among the subjects in order to create a reliable window onto their culture. Any collaborative or facilitative role by the researcher with regard to the subjects' immediate problem setting is not typically featured in these studies. The primary goal appears to be scientific knowledge, and the typical involvement is that of an expert (see **Table 1**).

An example of published IS research that implicitly adopts an action-oriented participant observation method is found in (Jepsen, Mathiassen & Nielsen 1989). This paper describes the use of group diaries in the analysis phase of a systems development project. While the authors do not claim to be following any specific research method, the research they describe falls within the boundaries of action research (defined earlier) and exhibits the characteristics of this form of research.

Action learning

Action learning, also called experiential learning (Burnard 1991), is a pedagogical technique used for improving student learning in highly applied fields which involve social settings. Action learning has been particularly important in fields with clinical settings. For example, action learning has been used for training purposes in nursing and psychology. Action learning is real-world apprentice-style experience typically interspersed with more passive educational pedagogy, such as classroom or laboratory work.

Pedler (1991) describes action learning as essentially a two-phase process of theory-in-action followed by reflection on the experience. To a large degree, the techniques represent theories-in-action concepts applied with the primary goal of individual learning rather than scientific knowledge or organizational development. Like action science, action learning involves a reflective process model, operating with very fluid structures, but for the primary purpose of training (see **Table 1**). The rigorous attention to data is another feature shared characteristically by action science and action learning. The researcher's reflection and understanding is improved by writing (with incumbent structuring of the knowledge) about the experience. However, the experience does not necessarily involve learning on the part of the subjects, the involvement of the action learner is one of an expert who is using their theoretical knowledge to improve the subject's condition while gaining empirical experience that exposes the researcher's misperceptions about carrying the theory into practice (see **Table 1**).

As an example of IS research that explicitly uses this form, see Wood-Harper and Flynn (1983). This work establishes the importance of methodology in defining objective reality for the field of IS development by focusing on the learning that arises when analysts use different methods in practical cases. Another example of IS research that uses implicit action learning is found in Naur (1983). Naur describes a research exercise that can be characterised as action learning. He studied the software design and development process by engaging in such activities as keeping a detailed diary describing exactly how he carried out the project. Naur makes no explicit claims to action learning for validity, however, this work falls within our action research boundaries and could be validated using this form of research.

Linear IS action research

Linear forms of IS action research are characterised by an overall process that is not planned to be iterative, *i.e.*, the activities are not programmed to be repeated until a result becomes settled. This linear process does not necessarily imply that a specific set of steps is delineated in the method, but only that the process will progress steadily from initiation to conclusion. Examples of IS methods that represent linear action research include ETHICS and multiview. Other forms that are represented only implicitly in information systems include clinical field work and process consultation.

ETHICS

Mumford's ETHICS (Effective Technical and Human Implementation of Computer Systems) is a strong participatory methodology intended to produce effective, socially compatible information systems (Mumford 1983a). The ETHICS methodology enables researchers to place correctly balanced emphasis on technical requirements and human needs. ETHICS maintains a perspective that includes job satisfaction and quality-of-work-life issues through the strict mechanism of end-user participation in design. Major elements of the ETHICS approach include the use of a facilitator in design teams to explain technical issues and elicit human needs impacts from the people who will be involved in operating the system. The approach is organised into seven phases: (1) diagnose user needs and problems, (2) delineate efficiency, effectiveness, job satisfaction and quality goals and objectives, (3) develop alternative designs that meet the objectives, (4) select the most appropriate design, (5) design detailed hardware and software requirements, (6) implementation, (7) evaluation.

ETHICS traces its roots to the Tavistock work in action research and socio-technical design through the groundbreaking work of its founder, Enid Mumford. The ETHICS process generally follows a linear model from diagnosis to evaluation, although certain phases (such as diagnosing user needs and delineating goals and objectives) may iterate across several design teams in order to reach agreement on needs and compatibility in objectives. The phases provide a rigorous structure for organizing the design activities. The researcher is typically engaged as a facilitator, particularly in user group meetings where there may be a strong need to overcome the intimidation of technology and misperceptions about the importance of social needs in the workplace. ETHICS is oriented toward developing both the information system and the workplace design in balance, although some design studies provide excellent sources for developing an understanding about the importance of social issues in IS design. An explicit example of the latter is a book length description of the effectiveness of engaging secretaries in the design of a new office system (Mumford 1983b).

Clinical field work

Edgar Schein (1987) contrasts the clinical perspective in field work from other ethnographic techniques. This clinical perspective regards very highly trained professionals who get involved in a helping role with individuals, groups, communities or organizations. This highly trained "helping" role implies that the typical involvement of the researcher is facilitative (see **Table 1**).

The study subjects typically initiate and drive a clinical enquiry, seeking help with an immediate problem. The client expects to pay fees. An action-change study model then operates which is conceptually normative (improve the problem situation) and narrowly focused on certain detailed data regarding a particular problem. The study is validated by an improvement in the problem situation as a result of the actions. The achievement of this validity means that the study is primarily motivated by both organizational development and scientific knowledge (see **Table 1**).

Schein contrasts this type of study with ethnography, which is typically initiated and driven by the researcher without fees. It operates with a study model that seeks to understand the client system without perturbing it, and achieve a completeness of description such that the total situation can be

understood by the reader. Validation in ethnography rests on replicability and internal consistency in the data. The roles of clinician and ethnographer may become intertwined in settings where the situation demands the researcher switch roles. For example, an ethnographer may become drawn into action (thus becoming a clinician) or the clinician may be unable to effect action (thus becoming an ethnographer).

A clinical method of inquiry is highly situational, and a concrete set of steps or stages is not prescribed. The structure therefore seems very fluid. The ideal process model is typically linear (see **Table 1**), derived from the ethical obligation only to suggest actions that improve the client's problem situation. Schein emphasizes the importance of researcher training, skills and sense of responsibility (p. 21), and brings focus on the ethical and legal responsibility to avoid malpractice. There is no framework for iterative experimentation and review, nor is a theories-in-action model found in the description.

A segment of the IS published literature could be validated as action research on the basis that it meets the criteria we have defined for the clinical field work form. However, rarely will this work make explicit claims for validity on this basis. An example of the kind of work that implicitly meets this definition may be found in Hammer and Champy's (1993) reengineering studies. This work reports the discovery of the major facets of reengineering through fieldwork in a clinical mode of enquiry. The work arose across a number of cases in which the authors were actively engaged in helping develop new techniques that would allow companies to survive in a harsh competitive climate. Their work falls within the defined boundary of action research, and exhibits the characteristics of this form.

Process consultation

This clearly defined approach to organizational development by the temporary introduction of an outside consultant has had an important impact in the practical realm of management consulting. Edgar Schein (1969) drew heavily on his training in social psychology and his experience as a consultant in developing the approach. There are seven stages, defined less as a temporal sequence than as logical areas in which the consultant must work (p. 78). These stages are (1) initial contact with the client organization; (2) defining the relationship, formal contract, and psychological contract; (3) selecting a setting and a method of work; (4) data gathering and diagnosis; (5) intervention; (6) reducing involvement; and (7) termination.

The structure is relatively rigorous, and the process model is, in general, linear. (The six-stage iterative model of action research is preserved as the primary model for group problem solving—one component of the diagnosis stage.) On the surface, the typical involvement might seem facilitative, much like the helping role of the clinician above. However, a deeper analysis reveals a subtle, but important difference. The process consultant must transfer values and skills to the client in order to enable the client to accomplish continued self-helping problem solving. The values include increasing attention for human concerns over task concerns, for human processes over organizational structures, for long-term effectiveness over short-run output, and for perpetual diagnosis over generalisations and principles (p. 123). The client must also be helped to develop the skills necessary to diagnose and resolve interpersonal, group and organizational problems. The primary goal is not merely helping the client (facilitative), but teaching the client how to self-help (expert). For process consulting, the typical involvement is essentially that of an expert, and the primary goal is organizational development. See **Table 1**.

There do not appear to be many explicit examples of this kind of this kind of work published in the scholarly IS literature. However, the Coad and Yourdon work on object-oriented analysis (1991) describes how they helped several organizations develop the personal and group skills necessary to convert to object-oriented thinking in their software projects. These vignettes approximate the sort of linear, expert, self-help process consulting projects that Schein suggests. This work offers an implicit example that could have been validated as action research assuming a process consultation form of enquiry.

Discussion

In the introduction, we have raised the promise of a more inclusive boundary for IS action research. We then defined boundaries for the IS action research paradigm, discussed the common genealogical foundations of the various forms of action research, and then discussed the distinguishing characteristics of ten different forms, pointing to explicit or implicit examples in the published IS literature. This work raises six related arguments.

1. IS rights to an action paradigm.
Is it necessary for IS to adopt action research exactly as defined in the older social science literature? We argue against this restriction, and instead propose adapting this paradigm in order to make it more suitable for the IS discipline. The IS discipline, whether labelled as information systems, informatics, datology, computing, computer science, or systems science is a highly empirical, professional research setting. IS researchers are expected to ground their models, algorithms and theories in professional practice. An inclusive paradigm for action research improves our selection of research vehicles for applying our theories to practice. An exclusive paradigm is less suitable and less rewarding for our field. In particular, including more practitioner-oriented forms such as process consultation, prototyping, and clinical field work, opens vehicles by which enlightened practitioners can participate in the scholarly literature. This inclusion addresses the difficulty of scholarly editorial boards who currently maintain a dual standard review system that separates academic authors and practitioner authors.

2. Validity in IS action research.
How do we validate work in the IS action research paradigm? We have claimed that an inclusive paradigm makes action research validity measures available to wider forms of action research. A detailed discussion of action research validity measures is beyond the scope of this paper. There are some indications from the broader social science literature, particularly in Susman and Evered (1978), Rapoport (1970), and Gummesson (1988). While further work will be needed to determine detailed criteria for the IS paradigm, seven criteria are likely to surface. The boundary characteristics aid in identifying five possible validity criteria: (1) The research should be set in a multivariate social situation. (2) The observations are recorded and analysed in an interpretive frame. (3) There was researcher action that intervened in the research setting. (4) The method of data collection included participatory observation. (5) Changes in the social setting were studied. In addition to these five characteristic criteria, at least two more important criteria arise from the basic premises of the Lewin and Tavistock experience: (6) The immediate problem in the social setting must have been resolved during the research. (7) The research should illuminate a theoretical framework that explains how the actions led to the favourable outcome.

The first five criteria follow the arguments in the boundaries section above. The last two criteria, however, correspond to criteria arising in other forms of qualitative research. Criterion 6 corresponds to internal validity in action research. Unlike other forms of qualitative research, such as case studies or ethnography, action research is primarily validated by its relief of the immediate social problem setting. Action research is a goal-directed field research methodology, and its goal achievement is central to the validity of actions directed toward this goal. Criterion 7 corresponds to external validity in action research. This criterion is shared with case research, in the sense that the understanding or learning developed by the researchers from the action results must be generalised to a theory that has potential for use in other problem settings. This "generalisation to theory" (Yin 1989) can be seen as a substitute for the statistical generalisation found in quantitative studies. The theory should help explain why certain actions resolved the problem setting and why certain actions failed to resolve the problem setting. This theory component has important value to practitioners who may face problem settings with similar characteristics; and to researchers who can use the theory as a linking tool between existing action research evidence and further empirical results. Theory enables action research to advance both IS practice and IS research.

3. Necessity for intellectual heritage.
Is it necessary for all forms of action research to share the same intellectual genealogy? Of the ten forms discussed in this paper, nine can be traced, directly or indirectly, back to the roots of Lewin's action research and the Tavistock Institute. One form, prototyping, emerged along totally separate lines, from the roots of manufacturing product design and industrial engineering. Prototyping shares all of the distinguishing characteristics of action research, and is a frequent cohabitant of IS action research (*e.g.*, Baskerville & Stage 1996, Iivari & Karjalainen 1989). Genealogy alone is not likely to define an action research form, but is there something about prototyping that makes it seem less acceptable than ETHICS, Soft Systems, or Multiview (which can draw their roots back to early action research)?

4. Research-practice distinctions.
The fourth issue is closely aligned with this prototyping question. How do we distinguish between "ordinary" IS development practice and action research? What prevents authors from developing systems and then "faking" the results to the scholarly community as

action research. This issue is an old problem among action researchers and the validity criteria above are certainly helpful in making the distinction. However, part of the problem lies in misperception. Enlightened practice often seeks to be scientific, and it is desirable that professionals, intent on high-quality IS design, may engage in the same sort of investigative practices as those used by scholars intent on understanding situated IS phenomena. In other words, quality IS analysts and designers may properly execute "internal" action research to meet the ends of the development project. In most cases, however, the designers will be too unfamiliar with action research to properly execute a project with the necessary rigor, and will fail to meet all of the action research criteria suggested above.

In a normative sense, however, practitioner action research ought to be encouraged. If the rigor of internal practitioner research projects, undertaken in support of systems design, can be improved to the degree necessary to satisfy action research criteria, then the frequency of practitioner publications in scholarly outlets may also improve. The IS discipline's position should not exclude prototyping as a research method, but rather include those prototyping projects that qualify (under the criteria suggested above) as action research. Similarly, qualified practitioner work using process consultation, clinical fieldwork, and other forms of validated action research would become publishable. However, the path to this Utopian future is blocked by certain practicalities, including graduate-level practitioner education and a revised priority scheme in many IS development organizations. It is much more likely that publishable research studies will continue to result from the collaboration of trained researchers and enlightened practitioners, rather than from practitioners alone. Under the supervision of trained researchers, properly executed action research may take the form of prototyping, clinical fieldwork, process consultation, *etc*. and meet the criteria suggested above.

5. Selection of proper form

How do we decide which form of action research is correct for a particular situation? While a detailed normative framework is beyond the scope of this paper, early indications can be guided by the characteristics detailed in Table I. The researcher will need to determine the primary goals of the research project: organizational development, system design, scientific knowledge or training. The researcher involvement will be determined by the knowledge and skills of the researcher and potential research team collaborators in the problem setting. Where the knowledge and skills of the team collaborators is low, the researcher will need to act as an expert or facilitator (assuming the knowledge and skills of the researcher are adequate). Where the knowledge and skills of the collaborators is high (or the knowledge and skills of the researcher are low), the involvement may shift to collaborative. The research structure will depend on the social setting. For example, if a legal contract is involved in the research infrastructure, a more rigorous structure with clear deliverables may be desirable. The process model may similarly depend on the social setting. If the problem or task is clear at the outset, a linear process may work best. If the problem is ill defined, an iterative process could be desirable. If the social-setting focus is on learning-oriented outcomes, a reflective model may be determined.

6. Explicit methodology

Is it necessary for authors to explicitly declare their research method in every scholarly publication? This is a particular problem for IS action research, because empirical articles are frequently published in IS that are unclear about their research method. Many articles are participatory observation and action based, especially with regard to IS development, yet authors couch their results as case based. This obscurity seems to suggest that many researchers are confused about action research, especially about what qualifies as action research and the degree to which their work meets the criteria of action research. This obscurity may also reflect the orientation of journal referee panels toward a relaxed view of case research, while enforcing a strict view of action research. It might also reflect a degree of ignorance of research methodology on the part of referee panels. A substantial portion of the action research published in the IS field may have been mischaracterised as case research, and critical aspects of the validity of this research thereby left unpublished. In many cases, a wider boundary on the IS action research paradigm would have enabled these authors to build a stronger claim for the validity and generalisability of the results of their research. This improved claim could have increased the impact on practice and further research. By adopting such a wider boundary at this time, future research may thus be enabled to strengthen validity claims and improve dissemination of the ideas to other researchers and practitioners.

Appendix: How IS action research boundaries differ

The boundaries of the IS action research paradigm defined in this paper parallels the published characteristics of action research in the social science literature. However, this literature is dominated by the canonical form of action research, and tends to emphasize action research characteristics based on goals and objectives rather than characteristics based on the process. Our boundaries differ in the following ways, following Hult and Lennung's (1980) six major characteristics of action research:

1 Action research aims at an increased understanding of an immediate social situation. This goal is very similar to our first process-oriented characteristic, although we emphasize the complex and multivariate nature of this social setting in the IS domain.

2 Action research simultaneously assists in practical problem solving and expands scientific knowledge. We extend this goal into two important process characteristics: first, there are highly interpretive assumptions being made about scientific observation; second, the researcher intervenes in the problem setting.

3 Action research is performed collaboratively and enhances the competencies of the respective actors. We focus on the narrower process of participatory observation implied by the collaborative goal. Enhanced competencies (an inevitable result of collaboration) is relative to the previous competencies of the researchers and subjects, and the degree to which this is a goal and its balance between the actors will depend upon the setting. The competencies goal may help to determine the form of action research: seen as a primary goal in some settings (*e.g.*, canonical or clinical forms); seen as a byproduct in other forms (*e.g.*, process consultation and prototyping).

4 Action research is primarily applicable for the understanding of change processes in social systems. This characteristic is adopted explicitly in defining the IS action research boundaries.

5 Action research uses data feed back in a cyclical process. We did not adopt this characteristic. The empirical nature of action research data is implied by participatory observation. The cyclical process, while characteristic of some action research forms, cannot be justified as a critical defining characteristic of all action-based research. It is feasible that the outcome of the first (and only) iteration will be satisfactory. Some action-based research forms may assume this first outcome will usually be satisfactory.

6 Action research is undertaken within a mutually acceptable ethical framework. We did not adopt this characteristic. We agree completely with this platitude, and strongly feel that *all* research should adopt a mutually acceptable ethical framework regarding human subjects. Accordingly, we note that this characteristic does not distinguish action research from any other form of acceptable social research.

References

Agar M (1986) *Speaking of Ethnography*. Sage, Newbury Park, California.

Argyris C and Schön D (1978) *Organizational Learning: A Theory of Action Perspective*. Addison-Wesley, Reading.

Argyris C and Schön D (1991) Participatory action research and action science compared. In *Participatory Action Research* (Whyte W Ed), pp 85-96, Sage, Newbury Park New Jersey.

Argyris C, Putnam R and Smith D (1985) *Action Science: Concepts Methods and Skills for Research and Intervention*. Jossey-Bass, San Francisco.

Avison D and Wood-Harper A (1990) *Multiview: An Exploration in Information Systems Development.* McGraw Hill, London.

Banville C and Landry M (1989) Can the field of MIS be disciplined?. *Communications of the ACM 32* (1) 48-61.

Baskerville R (1993) Semantic database prototypes. *Journal of Information Systems 3* (2), 119-144.

Baskerville R and Stage J (1996) Controlling prototype development through risk analysis. *MIS Quarterly 20* (4), 481-504.

Baskerville R and Wood-Harper AT (1996) A critical perspective on action research as a method for information systems research. *Journal of Information Technology 11*, 235-246.

Baskerville R, Meyers M, Nielsen PA and Wood-Harper T (1997) Panel—The impact of action research on information systems. In *Information*

Systems and Qualitative Research (Lee A, Liebenau J and DeGross J Eds), p 69, Chapman & Hall, London.

Benbasat I, Goldstein D. and Mead M (1987) The Case Research Strategy in Studies of Information Systems. *MIS Quarterly 11* (3), 369-386.

Bledsoe J and Van Eynde D (1990) The changing practice of organisation development. *Leadership & Organization Development Journal 11* (2), 25-30.

Blum F (1955) Action research—A scientific approach? *Philosophy of Science 22* (1), 1-7.

Boar B (1984) *Application Prototyping: A Requirements Definition Strategy for the 80's*. Wiley, New York.

Burnard P (1991) *Experiential Learning in Action*. Avebury, Aldershot.

Burrell G and Morgan G (1979) *Sociological Paradigms and Organisational Analysis*. Heinemann, London.

Checkland P (1981) *Systems Thinking Systems Practice*. Wiley, Chichester.

Checkland P and Scholes J (1990) *Soft Systems Methodology in Practice*. Wiley, Chichester.

Clark A (1976) *Experimenting with Organizational Life: The Action Research Approach*. Plenum, New York.

Clark P (1972) *Action Research and Organizational Change*. Harper & Row, London.

Coad P and Yourdon E (1991) *Object-Oriented Analysis 2nd Ed*. Yourdon, Englewood Cliffs.

Connell J and Shafer L (1989) *Structured Rapid Prototyping: An Evolutionary Approach to Software Development*. Yourdon, Englewood Cliffs.

Ehn P (1989) Playing in reality. In *Proceedings of the 12th IRIS: Information Systems Research Seminar In Scandinavia Part I* (Bodker, S Ed), pp 129-147, Aarhus University DAIMI PB-296-I, Arhus Denmark.

Fetterman D (1989) *Ethnography Step by Step*. Sage, Newbury Park.

Gronbaek K (1989) Extending the boundaries of prototyping: Towards cooperative prototyping. In *Proceedings of the 12th IRIS: Information Systems Research Seminar In Scandinavia Part I* (Bodker, S Ed), pp 219-238, Aarhus University DAIMI PB-296-I, Arhus Denmark.

Gummesson E (1988) *Qualitative Methods in Management Research*. Studentlitterature Chartwell-Bratt, Lund Sweden.

Hammer M and Champy J (1993) *Reengineering the Corporation: A Manifesto for Business Revolution*. Harper-Collins, New York.

Hult M and Lennung S-Å (1980) Towards a definition of action research: A note and bibliography. *Journal of Management Studies 17* (May), 241-250.

Iivari J and Karjalainen M (1989) Impact of prototyping on user information satisfaction during the is specification phase. *Information & Management 17* (August), 31-45.

Jackson M (1985) Social systems theory and practice: The need for a critical approach. *International Journal of General Systems 10*, 135-151.

Jepsen L, Mathiassen L and Nielsen P (1989) Back to the thinking mode: diaries for the management of information systems development projects. *Behaviour and Information Technology 8* (3), 207-217.

Jonsson S (1991) Action research. In *Information Systems Research: Contemporary Approaches and Emergent Traditions* (Nissen H-E, Klein HK, Hirschheim R Eds), pp 371-396, North-Holland, Amsterdam.

Jorgensen D (1989) *Participant Observation: A Methodology for Human Studies*. Sage, Newbury Park.

Kaiser K and Bostrom R (1987) Personality characteristics of MIS project teams: An empirical study and action research design. *MIS Quarterly 6* (4), 43-60.

Keen P (1991) Relevance and rigor in information systems research: Improving quality confidence cohesion and impact. In *Information Systems Research: Contemporary Approaches & Emergent Traditions* (Nissen H-E, Klein H and Hirschheim R Eds), pp 27-49, North-Holland, Amsterdam.

Kubr M (Ed) (1986) *Management Consulting: A Guide to the Profession 2nd Ed.* International Labour Office, Geneva.

Kyng M (1991) Designing for cooperation: Cooperating in design. *Communications of the ACM 34* (12), 65-73.

Lau F (1997) A review on the use of action research in information systems studies. In *Information Systems and Qualitative Research* (Lee A; Liebenau J and DeGross J, Eds), pp 31-68. Chapman & Hall, London.

Lee A (1989) A scientific methodology for MIS case studies. *MIS Quarterly 13* (1), 33-50.

Lewin K (1947) Frontiers in group dynamics II. *Human Relations I* (2), 143-153.

Lippitt G and Lippitt R (1978). *The Consulting Process in Action*, University Associates, San Diego California.

Mason R and Carey T (1983) Prototyping interactive information systems. *Communications of the ACM 26* (5), 347-354.

Mumford E (1983a) *Designing Human Systems For New Technology: The ETHICS Method*. Manchester Business School, Manchester.

Mumford E (1983b) *Designing Secretaries* Manchester Business School, Manchester.

Mumford E and Weir M (1979) *Computer Systems in Work Design: The ETHICS Method*. Associated Business Press, London.

Naumann J and Jenkins A (1982) Prototyping: The new paradigm for systems development. *MIS Quarterly 6* (3), 29-44.

Naur P (1983) Program development studies based on diaries. In *Psychology of Computer Use* (Green T, Payne S and van der Veer G Eds), pp 159-170, Academic Press, London.

Pedler M (1991) *Action Learning in Practice 2nd Ed*. Gower, Brookfield Vermont.

Rapoport R (1970) Three dilemmas of action research. *Human Relations 23* 499-513.

Reponen Tapio (1992) Action research in information systems strategy formulation and implementation. In *Action Research in Management Information Systems Studies* (von Hellens Liisa Ed). Turku School of Economics and Business Administration Series A-3, Turku Finland.

Sanford N (1976) Whatever happened to action research? In *Experimenting with Organizational Life: The Action Research Approach* (Clark A Ed), pp 11-18, Plenum, New York.

Schein E (1969) *Process Consultation: Its Role in Organizational Development*. Addison-Wesley, Reading.

Schein E (1987) *The Clinical Perspective in Fieldwork*. Sage, Newbury Park.

Schön D (1983) *The Reflective Practitioner: How Professionals Think in Action*. Basic, New York.

Stringer E (1996) *Action Research: A Handbook for Practitioners*. Sage, Newbury Park New Jersey.

Susman G (1983) Action research: a sociotechnical systems perspective In *Beyond Method: Strategies for Social Research* (Morgan G, Ed), pp 95-113. Sage, Newbury Park.

Susman G and Evered R (1978) An assessment of the scientific merits of action research. *Administrative Science Quarterly 23* (4), 582-603.

Tanton M and Fox S (1987) The evaluation of management education and development: participant satisfaction and ethnographic methodology. *Personnel Review 16* (4), 33-40.

Trist E (1976) Engaging with large-scale systems. In *Experimenting with Organizational Life: The Action Research Approach* (A Clark Ed), pp 43-75. Plenum, New York.

Van Eynde D and Bledsoe J (1990) The changing practice of organization development. *Leadership & Organization Development Journal 11* (2), 25-30.

Warmington A (1980) Action research: Its methods and its implications. *Journal of Applied Systems Analysis 7*, 23-39.

Whyte W F (1991) *Participatory Action Research*. Sage, Newbury Park New Jersey.

Wood-Harper T (1985) Research methods in information systems: using action research. In *Research Methods in Information Systems* (Mumford E, Hirschheim R, Fitzgerald G and Wood-Harper T, Eds), pp 169-191, North-Holland, Amsterdam.

Wood-Harper T, Antill L and Avison D (1985) *Information Systems Definition: The Multiview Approach.* Blackwell Scientific, Oxford.

Wood-Harper AT and Flynn DJ (1983) Action learning for teaching information systems. *The Computer Journal 26* (1), 79-82.

Yin R (1989) *Case Study Research: Design and Methods*. Sage, Newbury Park.