Toward a framework for action research in information systems studies

Francis Lau
Department of Accounting and MIS, Business Faculty, University of Alberta, Edmonton, Alberta, Canada

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Abstract *Based on recent reviews regarding its use in information systems (IS) studies, this paper argues that action research is still not well recognized by IS researchers and mainstream IS journals especially in North America. To make the situation worse, existing criteria used to assess the quality of action research studies are found to be inadequate when applied to IS. In order to advance its understanding and use by IS researchers and practitioners, the IS action research framework proposed recently by Lau is refined and presented as a set of guidelines in this paper. The implications of this refined framework on IS research and practice are discussed.*

Introduction

Over the past two decades, there has been a growing number of IS publications that advocate the use of alternative approaches to understand the organizational, behavioral and social consequences of information systems planning, development, adoption and use (e.g. Banville and Landry, 1989; Jonsson and Gronlund, 1988; Lacity and Janson, 1994; Laughlin, 1987; Markus and Robey, 1988; Markus, 1994; Orlikowski, 1993). Amongst the pivotal milestones were the Harvard Business School colloquium on research methods held in 1984, and the two International Federation for Information Processing (IFIP) Working Group 8.2 conferences on qualitative research held in 1984 and 1990, respectively, where different approaches to understanding information systems and their implications for IS research and practice were presented and debated (Mumford *et al.*, 1985; McFarlan, 1985; Nissen *et al.*, 1991).

In particular, the 1997 IFIP Working Group 8.2 Conference on qualitative research probably best epitomizes the evolution and maturity of methodological pluralism in IS research through its diverse approaches that range from critical social theory, case study research, grounded theory, ethnography, action research to multi-method triangulation (see Lee *et al.*, 1997). One such method of inquiry to be explored further in this paper is action research, which has been used in social science since the 1940s to integrate theory with practice through an iterative process of problem diagnosis, action intervention, and reflective learning (Argyris *et al.*, 1985; Lewin, 1974; Reason, 1993).

Despite the increasing acceptance of qualitative IS research as demonstrated by the well attended 1997 IFIP conference, the literature review by Lau (1997) and the panel discussion by Baskerville *et al.* (1997) at IFIP on action research

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suggest that presently, as a method of inquiry, action research is still not well recognized by IS researchers and mainstream IS journals, especially in North America. More importantly, participants at the IFIP conference have expressed the need for a comprehensive action research framework similar to the case study research method proposed by Yin (1994), Benbasat *et al.* (1987), and Lee (1989) for IS.

This paper attempts to advance the understanding and use of action research in IS. First, the status of action research in IS is summarized based on the reviews from the IFIP conference. Second, existing criteria from the literature used to assess the quality of action research studies are reviewed and critiqued as to their adequacy in IS. Third, the IS action research framework proposed by Lau (1997) is refined to provide a set of guidelines for researchers and practitioners wishing to understand, review or conduct action research in IS. Last, the implications of this refined framework on IS research and practice are discussed.

The status of action research in IS

Methodology

Action research has been used in social science since the 1940s as a research method that combines theory with practice through change and reflection (Rapoport, 1970; Hult and Lennung, 1978; Susman and Evered, 1978). While the use of action research as a method of inquiry is undisputed, its epistemological basis as a research paradigm is open to question due to the different meanings that have been applied over time (Brown and Tandon, 1983; Peters and Robinson, 1984; Baburoglu and Ravn ,1992; Robinson, 1993; de Cock, 1994). For instance, Peters and Robinson (1984) suggest a weak and a strong version of action research depending on whether it is used as a research method or a theory of social science. Both versions share the characteristics of being change-focused, collaborative and an iterative process. However, the strong version also requires a commitment to an underlying philosophy of social science that is consistent with the researcher's tradition and beliefs.

Several streams of action research with different emphases and traditions have been reported over the years (Rapoport, 1970; Hult and Lennung, 1978; Reason, 1993). One frequently cited definition by Hult and Lennung (1978) is that action research assists in practical problem solving, expands scientific knowledge, enhances actor competencies, is performed collaboratively in an immediate situation, uses data feedback in a cyclical process, aims at an increased understanding of a given social situation, is applicable for the understanding of change processes in social systems, and is undertaken within a mutually acceptable ethical framework.

Participatory action research is a stream of action research that involves practitioners as both subjects and co-researchers. It emerged from the work with oppressed peoples in the Third World during the 1940s where they were encouraged to help themselves (Brown and Tandon, 1983; Reason, 1993). It has since been applied in a variety of organizational settings across Europe, North

America and Australia (French and Bell, 1990; Whyte, 1991; McTaggart, 1991). In participatory action research, participants solve problems for themselves by setting their own research agenda, collecting and analyzing the data, and controlling overuse of the findings.

Action science is another stream of action research pioneered by Argyris *et al.* (1985) that places its emphasis on understanding participants' behaviors as theories-in-use versus their beliefs as espoused theories, and the use of single- and double-loop learning for self-improvement (Argyris and Schon, 1989). The action learning stream stems largely from the work of Revans (1980, 1983a, 1983b, 1983c), Kemmis (1988) and Kemmis and Giovanna (1987) that advocate group participation, programmed instructions, spontaneous questioning, real actions, and experiential learning in different social and organizational contexts.

According to Checkland (1991) and Ngwenyama (1991), the most unique aspect of action research is in its iterative process of problem diagnosis, action intervention, and reflective learning by the researcher and participants. Within an IS context, Checkland (1991) suggests the need to include an intellectual framework to guide the effort, and to clarify such methodological details as the role of the researcher, the process of problem diagnosis, the nature of the intervention, the extent of reflection and learning intended, and whether there is new knowledge to be gained.

Use

A review of 30 IS action research field studies and discussion papers from different journal sources was conducted by Lau (1997) and reported at the 1997 IFIP conference. The review categories include the stream of action research adopted, publication source, IS area addressed, underlying assumptions, study design, research process, and presentation style. These categories were adapted from Benbasat (1985), and Hamilton and Ives (1982) when discussing IS research methods. Only the essential findings are included here; details of the original review can be found elsewhere (Lau, 1997).

Table I summarizes the streams of action research adopted in the 30 articles and the time periods over which they were published. While over half of the articles did not have their stream of action research declared, the number of articles with an explicit definition or description has increased during the 1991-95 period. This pattern suggests IS researchers have become more explicit in recent years with defining what they meant by the term action research. However, the table also shows few researchers have considered the use of participatory action research, action science or action learning. Only one of the 30 articles is published in a mainstream IS journal as defined by Holsapple *et al.* (1994), with five others in the 1985 and 1991 *IFIP Proceedings*. The remaining articles are from non-IS journals for business, education, engineering, health and public service. The IS areas covered the development and implementation of software, management and use of information and systems, and design of socio-technical systems.

Type	1971-80	1981-85	1986-90	1991-95
Action research	Gibson (1975)[c] Harris (1978)[a]	Mirvis and Lawler (1983)[a] Crowther (1985) Rickards (1985)[a] Sandberg (1985) Wood-Harper (1985)	Oakland (1986) Pava (1986)[a] Cassell *et al.* (1988) Ziegenfuss (1987)[c] Liu *et al.* (1990)[a]	Checkland (1991) Jonsson (1991)[c] Ngwenyama (1991) Nosek and Yaverbaum (1991)[a] Candlin and Wright (1992) Cassell and Fitter (1992) Jonsson and Solli (1993)[a] Badham *et al.* (1995) Fox (1995)
Participatory action research				Timpka *et al.* (1995)
Action science	Earl (1978)[b]	Covaleski *et al.* (1985)[b]	Calabrese and Acker (1987)[b]	Salmela and Ruohonen (1992)[b] Levine and Rossmoore (1993)
Action learning		Wood-Harper and Flynn (1983)[a]	Blennerhassett (1988)[a]	Ngwenyama (1993)[a]

Notes
[a] articles where the meaning of action research is not defined or explained;
[b] considered action science articles according to this review but were not declared as such by the authors;
[c] articles with questionable definitions for action research

Table I.
Streams of action research

In terms of underlying assumptions, over half of the 30 articles, mostly between 1986 and 1995, have made their tradition or perspective explicit, with an interpretive stance being the predominant view adopted. While most of the articles have cited action research as the only method used, some have combined it with other methods ranging from organizational ethnography, soft systems methodology, socio-technical system design, to evaluation research. More articles have reported the use of a single research site instead of multiple organizations, although this gap has narrowed over the last five years. The role of the researcher has also shifted from that of an expert to a collaborator, with participants playing an increasing role in the process.

Over the years, the proportion of articles with explicit theories, concepts or objectives as their intellectual framework (Checkland, 1991) has increased steadily. However, only a few articles in the last ten years have provided sufficient details on the specific interventions undertaken. There has been an increase in the number of articles during the last five years with some form of

generalization contributing to the creation of new knowledge in IS. However, the distinctions between local, tacit experience and generalized new knowledge are sometimes difficult to discern from the articles.

The most common style of presentation is that of the case report found in close to two-thirds of the articles. This is followed by ten essays and one scientific report. Several cases have been written as ethnographic fictions, where dialogues from participants are included as part of the interpretations. As a whole, while IS researchers have become more explicit in their action research method over the years, significant variations still exist in terms of the underlying assumptions, research approach and presentation style.

Impact

At the IFIP panel discussion on the impact of action research in IS, Myers (Baskerville *et al.*, 1997) suggested it is one method that has been totally ignored by IS researchers. This is based his review of four mainstream IS journals[1] from 1991 to 1995 and another by Orlikowski and Baroudi (1991) with 155 articles from 1983 to 1988. In Myers' review, only five articles have explicitly identified the use of action research as their method of inquiry. Myers argued that, if one measure of the impact of action research is its presence in academic journals, then the lack of publications would suggest action research is not yet accepted by the IS community.

In contrast, Avison and Nielsen (Baskerville *et al.*, 1997) presented from the same panel their years of experience with action research in a European context. Avison reviewed the evolution of Multiview over the years as a flexible systems development methodology based on the principle of action research. Nielson described their use of action research in information systems development practice to empower users and improve developer skills. Both attested that action research has had observable, significant and lasting effects since the 1970s on the systems development process within various organizational and social contexts in different European countries.

Several issues were identified from the IFIP panel discussion. First, while action research has been more widely accepted in Europe to enhance systems development practices, it is still not regarded seriously by IS researchers and academic IS journals as a research method, especially in North America. Some concerted effort among the IS community and journal editors is required to change this attitude if we are to advance action research in IS. Second, many of the action research projects and the lessons learned have been published in practitioner journals, reports and books, and in different languages not readily accessible to IS researchers. Thus, a greater degree of awareness is needed by the researcher on the different types of information sources available.

Third, many researchers have not made their action research design, process and outcome explicit, rendering it difficult to assess the quality of the studies reported. Thus, some type of framework to guide the researchers in understanding, conducting and reviewing IS action research studies is desperately needed. Fourth, it would seem that action research has been used

mainly as a philosophy of inquiry in Europe, whereas it is considered mostly a research method in North America. This orientation has influenced the way in which action research is described by European researchers, which is often embedded as an underlying assumption rather than being mentioned explicitly as a research method. Depending on their perspectives, IS researchers have to be clear in stating their action research approach as either a theory or a method.

Last, at the conference, Markus (1997) promoted the adoption of practical research to increase our awareness as researchers on issues that are relevant and important in IS practice. By nature of its practical problem-solving orientation and reflective learning for new knowledge generation, action research is well positioned to bridge the gap between theory and practice for IS researchers.

Criteria for assessing action research in IS

The need

Within an IS context, there have been few discussions on the criteria that should be used to assess the quality of action research studies. This notion is confirmed by the reviews reported in this paper that show that the use of action research in IS is still not well-established at present. Also, participants from the IFIP conference have called for a set of guidelines similar to those for the case study method by Benbasat *et al.* (1987) and Lee (1989), to help researchers and practitioners define and assess the quality of IS action research studies conducted and reported.

There are two aspects to these criteria that should be considered. The first involves the types of assessment criteria that are appropriate for action research, such as its assumptions, approach and reporting. The second is whether these criteria have been successfully achieved in the study. For instance, since practical problem solving is an essential feature of action research, it is important to ask whether the author has explicitly described the nature of the problem in the study. More importantly, has the author provided sufficient information to show that the problem had been resolved?

Existing criteria in the literature

Different assessment criteria have been described in the literature over the years for action research in social science and more recently in IS. This section describes four sets of criteria often cited or discussed in recent IS literature that may be used to assess the quality of IS action research studies (Baskerville, 1993; Baskerville and Wood-Harper, 1996; Baskerville and Wood-Harper, 1998; Candlin and Wright, 1991; Kock *et al.*, 1997; Lau, 1997).

Hult and Lennung (1978). An expanded definition of action research based on an earlier version from Rapoport (1970) is offered by Hult and Lennung within a social science context as follows. Action learning:

- simultaneously assists in practical problem solving and expands scientific knowledge through direct involvement in organizational change that can also result in better future decisions and actions;

- enhances competency of the respective actors through a learning process that is integral to the action research project;
- is performed collaboratively where the researcher and participants are mutually dependent on each other's skills, experiences and competency;
- takes place in an immediate situation where the researcher performs the activities within the system and follows the process of the social system under study;
- uses data feedback in a cyclical process aimed at increasing the understanding of the functioning of the system by the participants;
- leads to an increased understanding of the totality of a given social situation through studying its interconnections, interdependencies and the dynamics of a total system rather than isolated factors;
- allows one to understand change processes in social systems by deliberately having the researcher contribute to the introduction of a planned change in the process; and
- is undertaken within a mutually acceptable ethical framework where at a minimum the researcher should clearly state the value premises of his or her work.

Chisholm and Elden (1993). Five exemplary action research cases have been reported in a 1993 *Human Relations* special issue (Levin, 1993; Ledford and Mohrman, 1993; Engelstad and Gustavsen, 1993; Greenwood *et al.*, 1993; Brown, 1993). Chisholm and Elden (1993) identify these cases as emergent forms of action research with features that are distinct from the so-called classical forms previously reported in the literature. The criteria for distinguishing between the classical and emergent form of action research are as follows:

- Level of system engaged in the change process, which can be any one of the four conceptual system levels: group, organization, society (national) and international systems. The complexity increases from the group through succeeding levels, with the time dimension for research and change also becoming less defined at higher levels.
- Degree of formal organization of the research setting, which can vary greatly from highly organized systems to highly unorganized settings in terms of membership boundary, values, norms, roles, purposes and procedures.
- Extent of openness in the research process, which determines the degree of specifying in advance the actions to be taken and important features of the system to be studied.
- Goals and purpose of the research effort, in terms of intended outcome of the change efforts to improve organizational functioning within existing system parameters, or its restructuring, to one involving fundamental change in the culture of a system.

- Role of the researchers and participants being studied as to their involvement in planning and conducting the research, interpreting and communicating results, and learning from the process through discussion and writing.

Jonsson (1991). Within an IS context, Jonsson (1991) based his definition of action research on the one given earlier by Argyris *et al.* (1985). In addition, Jonsson advocates the use of either an interpretive or critical perspective to provide a philosophical basis for the research method adopted. The criteria he uses are as follows:

- Addressing problems of social practice and alternative ways of constructing it, allowing participants to reflect upon differences in meaning that arise and to negotiate them by choosing among competing hypotheses.
- Learning as a discovery that takes place during the project by the host organization, and conjectures to be induced by the researcher for further scientific treatment.
- Adherence to the natural process with no control of independent variables in order to challenge constraints of real-life conditions.
- Adoption of an interpretive or critical approach depending on the values of the researcher and the objectives of the project. The former involves interpretation of the social situations while the latter is to help the organization improve based on some personal conviction and beliefs.
- Multiple measures used to confirm the interpretations of available data as to their meaning.
- Need for discretion as certain issues may not be discussed within the organization.
- Clarity in access and exit points where the researcher negotiates the conditions under which the project is conducted; this is to ensure trust and mutual commitments from both parties can be maintained, with preliminary dates set in advance.
- Generation of inductive local theory where rich context-specific descriptions of concepts and models are generated for interpretation and description of the social phenomenon.

Checkland (1991). As a response to Jonsson's article, Checkland (1991) discusses the necessary structure of any action research study for it to be accepted as a legitimate alternative to positivistic hypothesis testing. These criteria are as follows:

- there is a real-world problem relevant to research themes of interest to the researcher;
- the respective roles of the researcher and participants are defined in the problem situation;

- inclusion of an intellectual framework by means of which the nature of research lessons can be defined and the method in which the framework is embodied;
- researcher involvement in unfolding the situation with a view to help bring about changes deemed improvements;
- rethinking of earlier stages by making sense of the accumulating experience through the declared framework and method, and revising changes; and
- point of exit for the researcher in order to review the experience and to extract lessons for learning in relation to the research themes and/or definition of new themes.

Adequacy in IS

The four sets of criteria were appraised using ten of the reviewed articles by Lau (1997) from the 1991-95 period to determine their adequacy in assessing IS action research studies. These articles were judged as to whether the stated criteria have been explicitly mentioned, and whether there is adequate information to gauge if the criteria have been successfully achieved. The ten articles provided a reasonably diverse set of cases in that six of them are based on the action research stream, two on action science, and one each on participatory action research and action learning, respectively. The types of IS area also vary from the development of an expert system, to user training, to implementing a complex socio-technical system. Table II summarizes the assessment results where the articles are given a check-mark if a criterion is met, and a dash-mark if there is insufficient information provided.

Based on the criteria by Hult and Lennung, seven of the ten articles have met most of the assessment criteria except for the lack of information on cyclical feedback and the ethical framework used. The remaining three articles have revealed little in terms of increasing actor competency, collaboration, influencing an immediate situation, cyclical feedback and ethical framework. Similarly, the criteria by Chisholm and Elden have been satisfied for the same seven articles. While the remaining three have explicitly described most of the criteria, there is little information on how these criteria have been achieved. Also, there is no mention of the role of the researcher in any of these three articles. In contrast, only one of the ten articles has met all of Jonsson's criteria. Those that failed have not addressed at least two or more of these criteria, with the lack of information on approach, multiple measures, discretion and access/exit being the most common missing areas. Only three articles have come close to satisfying all of the criteria by Checkland except for their lack of details on exiting the study. The remaining seven articles have not included information on two or more criteria such as the role of researcher, change as improvements and rethinking of earlier stages.

As a whole, the four sets of criteria cover different dimensions by which action research can be assessed as a method of inquiry. For instance, while Hult

Existing criteria for assessment	Jonsson (1991)	Nosek and Yaverbaum (1991)	Candlin and Wright (1992)	Cassell and Fitter (1992)	Salmela and Ruohonen (1992)
Hult and Lennung (1978)					
Practical problem solving	√√	√√	√–	√√	√–
Expands scientific knowledge	√√	√√	– –	√√	√√
Enhance actor competencies	√√	√√	√√	√√	– –
Collaborative participants	√√	√√	√√	√√	– –
Influence an immediate situation	√√	√√	√–	√√	√–
Cyclical data feedback	– –	√√	√√	√√	– –
Totality of social situation	√√	√√	√–	√√	√√
Understanding change process	√√	√√	√–	√√	√√
Mutual ethical framework	– –	√√	– –	√√	– –
Chisholm and Elden (1993)					
System level of change target	√√	√√	√–	√√	√–
Degree of organization in setting	√√	√√	– –	√√	√–
Degree of openness in process	√√	√√	√–	√√	√√
Goals and purposes of research effort	√√	√√	√–	√√	√–
Role of the researcher	√√	√√	√√	√√	– –

(continued)

Table II.
Applying existing criteria to assess the quality of IS action research studies published in 1991-95

Table II.

Existing criteria for assessment	Jonsson (1991)	Nosek and Yaverbaum (1991)	Candlin and Wright (1992)	Cassell and Fitter (1992)	Salmela and Ruohonen (1992)
Jonsson (1991)					
Problems of social practice	√√	√√	√ –	√√	√ –
Learning as discovery	√√	– –	√√	√√	√ –
Natural process with no controls	√√	– –	√ –	– –	– –
Interpretive or critical approach	√√	– –	– –	√√	– –
Multiple measures	– –	√√	– –	√√	– –
Need for discretion	– –	√√	– –	– –	– –
Access and exit	√ –	– –	√ –	√ –	√ –
Inductive local theory generation	√√	√√	√ –	√√	√√
Checkland (1991)					
Real-world problem	√√	√√	√ –	√√	√ –
Role of researcher/subjects	√√	√√	√ √	√√	– –
Framework and methodology	√√	√√	√ –	√√	√ –
Changes as improvements	√√	√√	√√	√√	– –
Rethink earlier stages	– –	√√	√√	√√	– –
Exit	√ –	– –	– –	√ –	√ –
Extract lessons	√√	√√	– –	√√	√√

Note: The first √ is assigned if the criterion is explicitly addressed in the article; the second √ refers to having descriptions on whether the criterion has been successfully met or not

and Lennung have specified features of action research that made it unique such as problem solving, collaboration and cyclical feedback, both Jonsson and Checkland have focused on methodological issues that include declaring the approach, providing an intellectual framework, use of multiple measures, and the need to extract lessons. On the other hand, the criteria by Chisholm and Elden have served to distinguish between the classical and emergent forms of action research as to the intended level of change, degree of formal organization and extent of openness in the research process.

It would seem that each of these four sets of criteria, when used separately, is insufficient to assess the quality of IS action research studies. This is evident from the ten articles where many have met one or two sets of criteria while failing others (e.g. Badham *et al.*, 1995; Nosek and Yaverbaum, 1991). For several of the articles, even though the criteria have been explicitly mentioned, it is difficult to discern from the descriptions whether they have been successfully achieved (e.g. Candlin and Wright, 1992). Based on these findings, one may conclude that a unifying framework that draws on the combined strengths of these existing criteria is needed to advance the use of action research in IS studies.

A framework for IS action research

A unifying framework

This proposed IS action research framework is refined from an earlier model by Lau (1997). While Lau's model provides a descriptive view on features of IS action research studies based on his literature review, this refined framework is more prescriptive in defining the criteria by which these studies should be conducted and assessed. There are four dimensions to this framework: a conceptual foundation as its underpinnings; the study design to describe the methodological details; the research process of diagnosis, actions, reflection and general lessons; the respective role of the researcher and participants. For each of these dimensions, different assessment criteria are included to allow one to classify the conditions within these criteria and also to evaluate whether the criteria have been successfully achieved. See Table III for a summary of this framework.

Similar to the principles for interpretive IS field studies by Klein and Myers (1998), the use of these assessment criteria is left to the discretion of the researcher. It is probably dependent on the perspectives of the researcher, the nature of the problem, the type of journal targeted, the intended audience, and the "story" to be told. While it is difficult to provide a checklist for quality, in order to label an IS study as action research, one should demonstrate at least some elements of the framework presented in this paper.

To aid in discussing this framework, two recent IS action research field studies have also been included. The first is on managing an evolutionary prototyping project through risk analysis by Baskerville and Stage (1996). The second is about the effects of asynchronous groupware support on process redesign groups by Kock and McQueen (1998). Both articles are recent

Table III.
The unifying IS action research framework

Dimension and criteria	Classification	Evaluation
Conceptual foundation		
Aim/question	What is the research aim or question?	Is the research aim or question authentic and practical in addressing an immediate situation?
Assumptions	Is some form of theory, theme or concept included?	Is the theory, theme or concept authentic?
Perspective/tradition	Is it interpretive or critical, or one of the community, school, organization development traditions?	Is it authentic according to the paradigm adopted, e.g. are there multiple realities constructed in the study if interpretivism is used?
Stream	Is it one of the AR, PAR, AS or AL streams?	Is it consistent with the definitions of the respective streams?
Study design		
Background	Is there information on the environment being studied?	Does it give sufficient understanding of the total social situation?
Intended change	What is the nature and extent of planned change?	Is the intended change appropriate and adequate?
Site	Is it a single or multiple sites? What is type and level of organization involved?	To what extent are the site(s) and the organization involved? And is the level of involvement appropriate and adequate?
Participants	Who are the participants and what are their background?	Are the participants authentic?
Data sources	What types of data are collected for the study and how?	Are the data credible, dependable and confirmable?
Duration	What is the intended length of study in time duration?	Is there adequate time for problem diagnosis, action intervention, and reflective learning to take place?
Degree of openness	What is the extent of predefined or planned process?	Is the process conducted as planned or would it evolve over time? Is the degree of openness appropriate and adequate?
Access/exit	What type, level and extent of access to the organization is intended and is there a defined exit point from the study?	Is access/exit to the study considered appropriate and adequate?
Presentation	What is the reporting style - case report, ethnographic?	Does reporting provide sufficient information to judge its quality?

(continued)

Dimension and criteria	Classification	Evaluation
Research process		
Problem diagnosis	Is there a practical problem or need identified?	Is the problem and the process used to identify it authentic?
Action interventions	Are the planned and implemented actions identified?	Are the actions authentic, appropriate and effective?
Reflective learning	Are the reflections identified and explicit?	Has reflective learning taken place and is it trustworthy?
Iteration	Is there an iterative process planned as part of the study?	Is the iterative process appropriate in its extent and frequency of feedback to allow problem solving and reflective learning?
General lessons	Are there general lessons from the study?	How well do lessons contribute to local learning, new knowledge? Are they credible, transferable, dependable, confirmable?
Role expectations		
Researcher	What is the role of the researcher?	Is the researcher role appropriate and effective?
Participants	What is the role of the participants?	Is the participant role appropriate and effective?
Competency	What improvement in competency is planned for participants?	Has the competency of participants improved from the study?
Ethics	What ethical issues need to be addressed?	Are the ethical issues addressed satisfactorily?

Notes: AR-action research; PAR-participatory action research; AS-action science; AL-action learning

Table III.

publications in North American IS journals. The authors are accomplished action researchers in the IS community. As such, their articles serve well to illustrate how the framework can be used. See Table IV for a summary of the assessment on the two articles using the framework.

Conceptual Foundation dimension

The "Conceptual Foundation" dimension includes the research aim, theoretical assumptions, perspective/tradition, and stream of action research used. The research aim and theoretical assumptions are important in that they provide the intellectual framework advocated by Checkland (1991), while the perspective/tradition serves to clarify the researcher's philosophical stance as suggested by Jonsson (1991). The stream of action research distinguishes the intent of the study (Baskerville and Wood-Harper 1998; Lau 1997). The classification and evaluation criteria for this dimension are described below.

What is the research aim? Is it authentic and practical? A common aim of action research is to understand the meaning of certain social phenomena after an intervention, such as the consequences of introducing an information system in an organization (Checkland, 1991; Jonsson, 1991). Another aim may be to improve the social condition of a community through some specific actions. In either case, the research question/objective should be stated upfront even if it represents only a broad theme for the study that requires refinement over time. The question/objective must also address a genuine practical problem in an immediate situation.

Is the perspective explicit? Is it authentic according to the stance adopted? Action research may be interpretive, critical or even positivistic depending on the perspective of the researcher (Jonsson, 1991, Baskerville and Wood-Harper, 1998; Kock *et al.*, 1997). Alternatively, it may take on a school, organization or community development tradition according to one's background (Lau, 1997). Depending on the stance adopted, the reporting of the study must be consistent in reflecting that stance.

What action research stream is used? Is it described consistently? One may adopt the action research stream that focuses on changing practice, the action science stream for conflict resolution, the participatory action research stream for participant collaboration, or the action learning stream through experiential learning (Lau, 1997; Baskerville and Wood-Harper, 1998). Regardless of the stream chosen, the design and reporting of the study must be consistent with the way it is intended.

What theoretical assumptions are used? Are they authentic? Various theories, themes or concepts can be used to interpret and understand the social phenomena under study (Checkland, 1991). These assumptions provide the philosophical underpinnings from which one can make sense of the findings. With emergent action research, such assumptions are probably less well defined as they are expected to evolve from the process over time (Chisholm and Elden, 1993).

Table IV. Assessment of the two articles using the proposed IS action research framework

Dimension and criteria	Baskerville and Stage (1996)	Kock and McQueen (1998)
Conceptual foundation		
Aim/question	A new approach to manage prototype development with risk management	Use of asynchronous groupware to improve process redesign groups
Assumptions	Complex social processes cannot be reduced for meaningful study	Introduction of groupware must be accompanied by group process changes
Perspective/tradition	Post-positivistic? Theory underlying change should be validated by extent of success in solving the problem	Interpretive? Based on group perceptions; identification of causal relationships between variables
Stream	Implicit participatory action research	Implicit participatory action research
Study design		
Background	The need and challenges in managing prototyping projects	Total quality and business process re-engineering by groups in organizations
Intended change	Development of a computer-based client management/ reporting system	Introduction of asynchronous groupware to facilitate group process redesign
Site	A non-profit organization providing counseling services in USA	Two organizations from 18 sites in New Zealand
Participants	A collaborative team with a counselor, a secretary; staff from center as users	Seven process redesign groups with 47 staff ranging from 5 to 15 per group
Data sources	Risk factors identified, resolution strategies, actual prototype	Participant observation, interviews, electronic group discussion transcripts
Duration	Not specified on paper	Up to five weeks/group over nine months
Degree of openness	Defined team scope, process and deliverables	Three group redesign stages: definition, analysis, redesign
Access/exit	Under contract to deliver a computer system; exit after 2nd prototype	Implicit for the duration of the process redesign groups over nine months
Presentation	Illustrative case with end-note to describe action research	Case study with emphasis on method, results, implications on lessons learned

(continued)

Table IV.

Dimension and criteria	Baskerville and Stage (1996)	Kock and McQueen (1998)
Research process		
Problem diagnosis	Problem in manual administration of clients and counseling sessions	Need to improve business processes in the organizations
Action interventions	Conducted risk analysis, devised resolution strategies, developed and refined prototypes	Used asynchronous groupware and MetaProi methodology to improve group process productivity and quality
Reflective learning	Iterations of risk analysis, resolution strategies improved understanding and prototype solution	Described improved group productivity and outcome quality through the use of asynchronous groupware
Iteration	Two risk analysis, 3 prototype cycles	Definition, analysis and redesign stages
General lessons	Risk analysis helps user-developer communication, managing scope and project schedule	Groupware increased group productivity, had competing effects, and organizational implications
Role expectations		
Researcher	Experts facilitated development and refinement of the risk factors	Facilitated group processes, collected and analyzed research data
Participants	Team helped develop risk factors, define process and deliverables	Groups took part in meetings; provided data through surveys, interviews, etc.
Competency	Staff can use risk analysis framework to manage projects	Increased group productivity, perceived outcome quality with groupware
Ethics	A contract with deliverables defined; team involved in decision making	Not discussed in paper

Study Design dimension

The "Study Design" dimension describes the methodological details of the study as advocated by Chisholm and Elden (1993), Checkland (1991) and Lau (1997). It is also one area which Myers and Nielsen (Baskerville *et al.*, 1997) have acknowledged as being most deficient in current IS action research publications. The design details include the background of the study, the intended change, research site, participants, data sources, duration, degree of openness, access/exit and presentation. The classification and evaluation criteria for this dimension are discussed below.

Is there background information? Does it provide sufficient understanding? An overview of the research context can help the readers understand the social context in which the study takes place. This should include background information on the organization involved, the nature and extent of its problem/need, and how the respective organization and participants are coping with the situation. There has to be sufficient information provided to ensure an understanding of the social situation being addressed (Checkland, 1991).

What is the intended change? Is it appropriate and adequate? What makes action research unique is the planning and implementation of change in the social situation being studied. Depending on the form of action research adopted (i.e. classical vs emergent), the details of this change may or may not be defined in advance (Chisholm and Elden, 1993). Within an IS context, the intervention can range from a specific software, to user training, to a complex socio-technical system (Baskerville and Wood-Harper, 1996; Lau, 1997). The change has to be appropriate, adequate, practical and intended to address the problem/need within the immediate situation.

What is the research site? Is the involvement appropriate and adequate? A given study may involve one or more sites, a single or multiple organizations, with varying levels of formal structures. With emergent action research, several organizations spanning multiple sites with ill-defined structures are likely the norm (Chisholm and Elden, 1993). Despite such variations, it is essential to describe the type and level of organization(s) involved. The extent of involvement by the organization(s) must also be revealed in order for the readers to gauge whether it is appropriate and adequate for the study (Lau, 1997).

Who are the participants? Are they authentic? The profiles of the participants such as their background, characteristics, perspectives, culture, roles and expectations within the organization should be reported as part of the study. More importantly, these participants must be authentic in that they are the ones with the need or are directly affected by the problem, as well as benefiting from the intended changes to address that problem or need (Lau, 1997; Reason, 1993).

What are the data sources? Are the data credible, dependable and confirmable? Various types of data can be used in action research from interviews, observations, document review, focus groups, surveys to role play. The inclusion of different data sources can increase their confirmability

through such techniques as triangulation (Lau, 1997; Reason, 1993). It is important to describe what types of data are being used, how they are being systematically collected and analyzed, and why these data sources are considered dependable.

What is the study duration? Is it adequate for change to occur? The duration of action research studies in IS can vary, depending on the research aim, approach used and resources available (Lau, 1997). As with most organizational change, the more complex the organizations and interventions, the longer it would take to adopt the change and observe the impact (Chisholm and Elden, 1993). It is important to give the readers a sense of the duration of the study. Also, this length has to be adequate to allow the appropriate diagnosis, action and reflection to take place.

What is the degree of openness? Is it appropriate and adequate? The so-called classical form of action research is more defined in terms of its aim, design and interventions. In contrast, the emergent form is more open with few assumptions and predefined actions at the outset (Chisholm and Elden, 1993). The extent of this openness should be described upfront and justified to give a rationale for the approach chosen. This also allows one to gauge whether such openness is appropriate and adequate for the social phenomena being studied.

What type of access/exit is involved? Is it appropriate and adequate? In action research, mutual trust is required for the researcher to gain access to the organization and interact with its participants. The level of access depends on the extent to which the researcher is involved with the situation and its change process. The researcher also needs to be explicit with the point of exit from the organization in order to extract meaningful lessons. To be effective, both the access and exit points should be declared in advance. These access/exit points should also provide adequate time for the researcher to study the situation at the appropriate level (Checkland, 1991; Jonsson,1991).

What is the presentation style? Does it provide sufficient information? The common way to present IS action research studies is through a case report that is either exploratory or descriptive in nature (Lau, 1997). One may also adopt an emic view as an insider or include direct passages from participants as a form of ethnographic writing, or take on an etic view using an impartial style of narration. An important determining factor is the targeted publication source, which often imposes a certain theme, writing style and page limit. The dimensions and criteria in this framework should provide a good basis for the type and amount of information to be included to be meaningful to the readers.

Research Process dimension

The "Research Process" dimension refers to the sequence of steps by which action research is conducted. These steps are what make action research distinct from other methods of inquiry (Baskerville and Wood-Harper, 1996; Hult and Lennung, 1978; Kock *et al.*, 1997; Lau, 1997; Mansell, 1991; Wood-Harper, 1992). Generally, the steps should include one or more iterations of problem diagnosis, action interventions and reflective learning. This is then

followed by exiting from the study and extraction of general lessons. The classification and evaluation criteria for this dimension and how they are addressed in the two example articles are discussed below.

Is there a practical problem or need? Is it authentic? Action research should address the practical problem or need of individuals, organizations or communities (Baskerville and Wood-Harper, 1996). Such problem/need should be identified through a systematic process involving the participants (Kock, 1997; Reason, 1993). The nature of this problem/need must be clearly defined early on, even if it is only at a broad level (Chisholm and Elden, 1993). To be authentic, the problem/need has to be relevant and genuine within an immediate situation that affects the participants.

Are the interventions identified? Are they authentic, appropriate and effective? Once a problem or need has been diagnosed, interventions should be planned and implemented preferably with the help of participants (Reason, 1993). The process of planning and implementing the interventions may be *ad hoc* or follow a methodology such as socio-technical systems design (Fox, 1995). The interventions may also be staged over time with successive refinement depending on reflections from earlier attempts (Checkland, 1991). It is important to describe the interventions used. These interventions should be authentic and appropriate in that they are intended to address the problem/need. The outcome of the interventions should also be reported as to whether they have been effective or not.

Is there reflective learning? Is it trustworthy? There should be a distinct step by which reflections can take place to allow one to learn from the change instigated (Jonsson, 1991; Checkland, 1991). This learning is often in the form of local tacit experience from the participants. Once obtained, it should be used as feedback to the next iteration of change. Such reflections and the process involved should be made explicit in the study. These reflections should be trustworthy in that they are genuine and represent the collective experiences of those involved.

Is there an iterative process? Is it appropriate to allow learning? There should be an iterative process by which problems are diagnosed, interventions are planned and implemented, and reflections can take place. This is most important in emergent action research where the actions are not well defined at the outset, requiring periodic improvement over time (Chisholm and Elden, 1993). As such, this iterative process needs to be made explicit, allowing genuine problem solving and reflections to occur in an appropriate fashion (Checkland, 1991).

Are there general lessons learned? Do they contribute to new knowledge? Aside from practical problem solving, action research should contribute to new knowledge from the situation being studied. Such lessons may be in the form of local, tacit knowledge based on experience of the participants, or generalized knowledge such as new theories and concepts (Hult and Lennung, 1978;

Jonsson, 1991). It is important to make these lessons explicit. Furthermore, the lessons should be credible, transferable, dependable and confirmable to be considered a contribution to new knowledge.

Role Expectations dimension

The "Role Expectations" dimension addresses the capacity and expectations of the researcher and those taking part in the study. It is one aspect of action research that is necessary to clarify how the respective individuals and organizations are involved (Checkland, 1991; Chisholm and Elden, 1993; Hult and Lennung, 1978; Jonsson, 1991; Kock, 1997). The nature of involvement includes the respective roles of the researcher and participants, the level of participant competency before/after the study, and ethical issues for the organization and its participants. The classification and evaluation criteria for this dimension and how they are addressed in the two articles are described below.

What is the researcher role? Is it appropriate and effective? In classical action research, the researcher would usually serve as an expert, providing leadership to guide the organization and its participants. In more emergent form of action research, the researcher would assume the role of a facilitator, collaborating with the participants in various aspects of the study from its initial design, to data collection, to interpretation of the findings (Chisholm and Elden, 1993). The role of the researcher should be made explicit in the study. It should also be appropriate and effective for the form of action research adopted.

What is the participant role? Is it appropriate and effective? To be effective, action research should engage the participants in the change process. The extent of engagement is dependent on the form of action research adopted. In one extreme, the participants could take full control of the study as co-researchers, diagnosing problems, planning and implementing the interventions, and leading the process for reflection and extracting the lesson. A less intense form of involvement is to collaborate with the researcher, allowing him/her to facilitate the entire process (Baskerville and Wood-Harper, 1996; Reason, 1993). The role of the participants should be well defined in the study. Their role should be authentic, appropriate and effective in helping to solve the problem and extract learning from the experience.

What competency improvement is planned? Has competency improved over time? An important part of action research is to improve the competency level of participants in dealing with their practical problem through the change process instigated. This increased competency may refer to the participants' performance in certain areas as a result of the intervention, or heightened awareness of the problem through reflections on how to cope with it effectively. The questions are whether there is any effort to improve the competency of the participants, and whether their level of competency has indeed improved. For instance, adequate computer training should be provided to participants designated as members of a virtual work group.

What ethical issues are there? Are they addressed satisfactorily? One needs to address several ethical issues when planning and conducting an action research study. These relate to the nature of the problem selected and the effect of an intended change on the participants. Such ethical principles as "do no harm", or the value premise of "improving conditions for the under-privileged" should be made explicit by the researcher especially if one is dealing with controversial subjects like downsizing an organization (Hult and Lennung, 1978; Rapoport, 1970). Another discretionary aspect is to ensure the confidentiality of the organization and participants involved when conducting the study and reporting its findings. These ethical issues should be made explicit and be addressed in a satisfactory manner in the study.

Assessing the Baskerville and Kock articles

The recently published articles by Baskerville and Stage (1996) and Kock and McQueen (1998) are considered good IS action research studies in that they have incorporated most of the elements mentioned in this framework (see Table IV). For instance, the research aims and underlying assumptions are well defined in both articles. The aims and assumptions are authentic in that they both address an immediate problem within the organization (i.e. use of risk management in prototyping and groupware in process redesign, respectively). On the other hand, neither is explicit in its perspective or tradition. The Baskerville article is considered post-positivistic with its suggested use of theory validation through successfully solving the prototyping problem. The Kock article is more interpretive with its use of group perceptions to determine factors that improve group productivity and quality. While both studies are referred to as action research by their authors, the extent of participant collaboration suggest they are closer to the participatory action research stream.

The study designs for the two articles are explicit, appropriate and adequate in most respects. Both contain sufficient information on the backgrounds, intended changes, research sites, participants, data sources and degrees of openness. While the Baskerville study is through a contract with specific deliverables, the Kock study is more implicit in its points of access/exit. The Kock article is very systematic in presenting its approach, findings and implications, including the study duration. On the other hand, the Baskerville article emphasizes more the concepts related to risk factor analysis and prototyping, and only describes the action research study as a short illustrative case.

The two articles have included detailed descriptions of the action research process used in the studies. Both have been contextualized according to their problem situations. For instance, in the Baskerville study, the iterative problem-action-reflection process is deployed as a series of risk analysis and prototyping stages. Similarly, the Kock study employed the MetaProi methodology to improve the group redesign processes through a specific set of

definition, analysis and redesign stages. Both studies offer lessons learned as specific findings and general implications that can be considered new knowledge.

In terms of role expectations, the two articles are explicit and appropriate in defining the roles of the researchers and participants. In both studies, these roles are considered effective as both the researchers and participants are intimately involved with the situations being addressed. The participants also appear to have increased their competencies in risk analysis when managing projects in the Baskerville study, and improved their process redesign productivity and outcome quality in the Kock study. Neither article referred to any ethical issues, although the Baskerville study did mention that participants were involved in decision making that affected their system.

Implications

The use of action research in IS can be a rewarding experience yet a challenging one at the same time. For those aspiring to make a difference in IS, action research provides a unique opportunity to bridge theory with practice, allowing one to solve real-world problems while contributing to the generation of new knowledge. This overcomes much of the criticisms by Keen (1991) that IS as a self-defined community has become overly preoccupied with theories, methods and publication to have any significant influence in the field where major IS decisions are made. From this paper, it is clear that action research can provide the type of pragmatism needed in IS research through its focus on change and improvement in practice. At the same time, action research can contribute to new knowledge on the consequences of IS through intellectual reflection and learning from the changes instigated. With the increasingly complex role of information technology as a key enabler of social change that can lead to new forms of practices, organizations and communities, the use of an action-oriented methodology should improve our understanding of such social phenomena through "doing" and learning through "experience".

The IS action research framework proposed in this paper can provide a set of guidelines for both insiders and outsiders to recognize and engage in good IS action research studies. In particular, for those wishing to engage in IS studies using action research, this framework provides an extensive set of criteria and questions that should be taken into account when designing, conducting and publishing a study. For others wishing to understand or review IS action research studies reported in the literature, this framework can serve as a comprehensive checklist with its repertoire of criteria and questions to critically assess the quality of a given study.

A number of suggestions to improve the use of action research in IS have been made at the 1997 IFIP conference – a framework being one of them. Other suggestions that should also be taken into account include: an increased awareness of different literature sources; adoption of a practical research orientation; and further dialogue on action research as a theory or method of inquiry in IS. While the framework in this paper provides a conceptual

foundation by which an IS researcher/practitioner can understand, conduct and assess action research in IS, these other suggestions can also enrich the process of learning beyond the traditional academic boundary and contribute to theory and practice in IS as a whole. Detailed discussion of these suggestions can be found elsewhere (Avison *et al.*, 1998) and is beyond the scope of this paper.

If social change is context-bound as suggested by Walsham (1993), then the creation of relevant knowledge should be "a direct result of local dialogue, where action research will become a central research strategy" (Sandberg, 1985). As such, action research in IS should not be assessed according to existing evaluation criteria for IS research that is aimed more at positivistic approaches by statistical means using a restricted set of variables. With the proclaimed emerging interpretivist rhetoric in IS by Walsham (1995), such intensive methodologies as action research will undoubtedly assume a more important role in years to come. Hopefully, our framework can provide an initial pedagogy for a contemporary form of IS action research as part of the intensive IS research methods to be further refined over time.

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