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A Review on the Use of Action Research in Information Systems Studies

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Abstract

This paper examines the use of action research in information systems (IS) studies reported in literature over the last twenty-five years. Thirty such field studies and discussion papers on information technology, system design/use or socio-technical systems were reviewed and compared with those from social science. Evolving patterns are noted among these IS studies in terms of their underlying assumptions, study designs and presentation styles. A contemporary IS action research framework is proposed as a conceptual foundation and practical guide for researchers and practitioners interested in action research for IS studies. Its implications in IS research and practice are discussed.

1 INTRODUCTION

Over the past twenty-five years, there has been a gradual shift from the predominately positivist view toward the use of alternative modes of inquiry in information systems (IS) studies. Among the pivotal milestones were the International Federation of Information Processing (IFIP) and Harvard Business School research colloquia held in 1984 at Manchester and Boston, respectively, where academics and practitioners discussed different approaches to understanding information systems and their implications in IS research and practice (Mumford et al. 1985; McFarlan 1985).

These range from theorem-proving, laboratory experiments and survey research within the traditional positivistic realm, to case studies and field experiments that are more descriptive in nature, to such interpretive and emancipatory forms of inquiry as phenomenology and action research. From both colloquia there was a recognized need for alternative theory assumptions and methods to address the diversity of contexts and processes in IS research, and that prior beliefs of researchers and participants can influence what is observed and deemed significant.

Since that time, there has been a modest but growing number of IS publications on the use of alternative theories and methods to explore the organizational, behavioral and social consequences of information systems planning, development, adoption and use (Banville and Landry 1989; Checkland 1989; Lee 1989; Lacity and Janson 1994; Markus and Robey 1988; Orlikowski 1992; Walsham 1995). Perhaps the collective writings from the 1990 IFIP WG 8.2 Conference best epitomize the pleas for methodological pluralism in IS research through diverse approaches that range from grounded theory, action research, argumentative reviews, critical social theory, cooperative design, to hermeneutics (Nissen, Klein and Hirschheim 1991). Other examples of such IS studies include the use of grounded theory to examine the adoption and use of CASE tools (Orlikowski 1993), critical approach to changing accounting systems within organizational contexts (Laughlin 1987), multimethod investigation of managers' use of email through the information richness theory (Markus 1994), and ethnographic descriptions of the effects of new technology on management accounting practices (Jonsson and Gronlund 1988). While some IS researchers have suggested the use of these alternative approaches as complementary to those of positivism, others have advocated their adoption as the emerging interpretive paradigm to replace the so-called prevailing "positivism rhetoric" (Walsham 1995).

One such alternative mode of inquiry to be reviewed in this paper is action research, which has been used in the field of social science since the 1940s as a research strategy that integrates theory and practice through change and reflection (Argyris, Putnam and Smith 1985; Lewin 1947; Reason 1993a). With the emergence of multiple research paradigms and methodologies in IS, there is a need for researchers and practitioners to gain a better understanding of the various approaches in terms of their epistemological stance, how they are used in IS research, and their influence on IS practice. Such writings are found lacking for action research in IS. In this paper, we describe the evolving patterns of action research in IS and social science based on an exploratory review of related literature over the last twenty-five years. We then propose a contemporary IS action research framework according to the emerging varieties of action research observed. The intent of this framework is to provide a conceptual foundation and a practical guide for researchers and practitioners wishing to understand, review or conduct action research in IS studies. Implications of this framework on IS research and practice are also discussed.

2 THE LITERATURE REVIEW PROCESS

2.1 Literature Sources

A review of the literature on action research published over the last twenty-five years was conducted. The literature sources consisted of journals, conference proceedings, monographs and textbooks from the areas of business, health, education, and social science. The keywords used were action research, action inquiry, action science and cooperative inquiry – based on the terms used by Reason (1993a). These were then combined with the terms information systems, computer, technology and software to identify those publications where information technology was involved in the study. Over 600 action research related articles were found initially and categorized as one of action research field studies in IS, action research field studies in other areas, discussion papers on action research in IS, general discussion papers and books on action research, or discussion papers on IS research methodologies that included action research. For this study, we focused mainly on IS related action research field studies and discussion papers. Selected articles on the epistemology of action research, exemplary cases from a special issue of *Human Relations*, and subsequent critiques of these cases were also included for comparison. Based on these constraints, seventy articles were retrieved in time for the review. Of the articles obtained, twenty are action research fields studies related to information systems, information management, socio-technical systems, or software design/use; ten are discussion papers on action research in IS. The remaining are three articles on IS research methodologies that included action research, five exemplary action research cases from social sciences, eight critiques of these cases, and twenty-four discussion papers on action research in general. To observe the evolving patterns of action research over time, the thirty IS articles were organized into four periods for the review: 1971-80, 1981-85, 1986-90 and 1991-95.

2.2 Review Criteria

To provide a meaningful comparison of the different IS action research studies unveiled, a set of review criteria was established from writings on the pedagogy of qualitative research paradigms and the epistemology of action research. These are described below.

Pedagogy of Qualitative Research

A comprehensive pedagogy for qualitative research is provided by Denzin and Lincoln (1993) where they describe it as a process with five distinct phases: (a) the researcher's view and tradition; (b) the theoretical paradigms and perspectives; (c) the strategies of inquiry; (d) the methods of data collection and analysis; (e) the art of interpretation and presentation. In particular, Denzin and Lincoln contrast different research paradigms according to their assumptions, criteria for evaluation, and type of narration used. For example, within the constructivist or interpretivist paradigm,

the assumptions are based on substantive-formal theories, the evaluation criteria are typically those of credibility, transferability and confirmability, with case studies and ethnographic fiction as the most common types of reporting used. Within this pedagogy, action research is regarded as a research strategy or approach along with others such as ethnography, phenomenology and grounded theory. Different methods of data collection and analysis are available to the researcher ranging from the interview to direct observation, to the analysis of artifacts, documents and cultural records, to the use of visual materials or personal experience. As such, when addressing action research we should be aware of the five research phases and as a minimum consider the researcher's tradition, perspectives and theories as the underlying assumptions, his/her strategy for inquiry and data collection and analysis as the study methods, as well as the style of presentation used.

Epistemology of Action Research

The epistemological foundations of action research have been debated over the years by researchers in social science (Rapoport 1970; Hult and Lennung 1978; Susman and Evered 1978; Brown and Tandon 1983; Peters and Robinson 1984; Baburoglu and Ravn 1992; Robinson 1993; de Cock 1994). While the use of action research as a strategy of inquiry is undisputed, its epistemological basis as a research paradigm is open to question due to the different meanings that have been attributed to the concept over time. For instance, Peters and Robinson suggest a weak and a strong version of action research depending on whether it is used as a research strategy 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.

Various types of action research with different emphases and traditions have also been described in literature (Rapoport 1970; Hult and Lennung 1978; Reason 1993a). Lewin is widely recognized as the originator of action research based on his work on group dynamics and bridging of social theories and practice. Perhaps one of the most comprehensive definitions of action research was provided by Hult and Lennung:

> 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 feedback 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.

Participatory action research is a form of action research that involves practitioners as both subjects and coresearchers. It emerged from the work with oppressed peoples in the Third World during the 1940s where they learned to help themselves (Brown and Tandon 1983; Reason 1993a), but 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 over use of the results and the whole process. Action science is yet another form of action research pioneered by Argyris, Putname and Smith (1985) that places the 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). Action learning stems largely from the work of Revans (1980; 1983a; 1983b; 1983c) that advocates group participation, programmed instructions, spontaneous questioning, real actions, and experiential learning within different social and organizational contexts.

According to this brief review on the epistemology of action research, it is necessary for the researcher to distinguish the type of action research used and its historical context from which the purpose, focus, theory and methods of the study are based. Within an IS context, Checkland (1991) also suggests the need for an intellectual framework to guide the research, 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 to be new knowledge to be gained.

2.3 Bases for Comparison

Based on the criteria presented above, we chose to review action research for IS in the following sequence. First, we examined the role of action research in IS over the past twenty-five years based on its extent of usage, the type of action research adopted and the IS area addressed. This was followed by a review on the explicitness of the research approach in terms of their underlying assumptions, study methods and presentation styles. Next, we analyzed the so-called diagnosis-action-reflection cycle that is the most unique aspect of action research by contrasting the respective components and how they are described in these articles. We then compared these IS articles with those selected from social science for similarities and differences. Finally, these findings were used as the basis to construct our contemporary IS action research framework and to discuss its implications on IS research and practice.

3 EVOLVING PATTERNS OF ACTION RESEARCH IN IS

3.1 Role of Action Research in IS

The role of action research in IS can be gauged from the number and patterns of such articles published, the types of action research adopted, the IS areas addressed, and the trends noted over the past twenty-five years from these three areas. Note that these parameters have been adapted from those used by Benbasat (1985) and Hamilton and Ives (1982) in their discussion of IS research methodologies.

IS Related Action Research Publications

The types of journals where the IS action research articles were published are listed in Table 1. Note that the journals in which these articles were published vary widely, with no apparent dominance from any single source. In fact, their subject areas span vastly different disciplines ranging from business, education, and health to social and public service. Of interest is that none of the articles appeared in such mainstream IS journals as the *MIS Quarterly*, *Information Systems Research*, *Communications of the ACM*, or *European Journal of IT*. Nor were there any articles in *Organization Science* and *Management Science*, often considered the alternate sources for many of the scholarly IS publications. Only one article was published in the *Journal of MIS* (Levine and Rossmoore 1993), with five others from the two IFIP Conference Proceedings in 1985 (Sandberg 1985; Wood-Harper 1985) and 1991 (Checkland 1991; Ngwenyama 1991; Jonsson 1991), respectively.

Types of Action Research in IS

Table 2 summarizes the types of action research adopted in the thirty articles. Less than half of these articles included a definition such as those provided in this review. Ten remaining articles cited action research in their paper but had minimal to no clarification on the approach used. For example, Jonsson and Solli (1993) described an action research project to investigate the effects of individually designed financial reports on managing costs in public organizations. While they reviewed the epistemological status of case studies, the use of action research as a strategy of inquiry was assumed understood by the reader and not explained. Of the two studies that cited action learning as the basis for their training (Blennerhassett 1988; Wood-Harper and Flynn 1983), neither offered a definition of what they meant by the term. Seven other articles defined action research in ways that seem to contradict our understanding of the types of action research presented. To illustrate, Gibson (1975) labeled his implementation project to deploy computer-based facility planning models into banks as action research but he equated it with participant observation, which is often associated with ethnographic studies.

Areas of IS Addressed

The IS areas addressed by the thirty articles can be grouped into four broad categories similar to those proposed by Galliers and Land (1987): IS theories and methods; systems development; use of information and/or systems; socio-technical systems. The category for IS theories and methods consists of two discussion papers on the epistemology of action research in IS (Checkland 1991; Ngwenyama 1991). The category for systems development includes eleven articles covering the areas of analy-

Table 1 Distribution of IS studies involving action research reported in the literature over the past twenty-five years and sorted by journal in alphabetical sequence.

Name of Journal	1971-80	1981-85	1986-90	1991-95	Total
Accounting, Organizations and Society	1	1			2
ASIS Annual Meeting		1			1
Computer Methods & Programs in Biomedicine				1	1
Education for Information				1	1
Engineering Management International			1		1
European Journal of Operational Research				1	1
Health Progress			1		1
Human Communication Technology Meeting			1		1
Human Relations			1		1
Human Systems Management				1	1
Implementing Operations Research and Management Science	1				1
Information and Management				1	1
Information Systems Research: IFIP 1991				3	3
International Journal of Operations and Production management				1	1
Journal of Accounting and Public Policy		1			1
Journal of Applied Behavioral Science	1		1	1	3
Journal of European Industrial Training			1		1
Journal of Management Information Systems				1	1
Journal of Occupational Psychology			1		1
Management Accounting Research				1	1
Organizational Change and Innovation				1	1
Research Methods in Information Systems		2			2
Technovation		1			1
The Computer Journal		1			1
Total	3	7	7	13	30

sis, design, development and implementation of information systems and decision support systems. Three of these studies (Earl 1978; Levine and Rossmoore 1993; Salmela and Ruohonen 1992) are based on action science with a focus on understanding conflicts among subjects brought on by the introduction of systems in organizations, while only one (Timpka, Sjoberg and Svensson 1995) explored collaboration between users and developers through participatory action research when designing complex systems. The remaining seven used action research mostly as a systems development methodology that provides reflection and learning with participants as users in place of conventional methods such as joint application design (Candlin and Wright 1992; Crowther 1985; Gibson 1975; Mirvis and Lawler 1983; Ngwenyama 1993; Wood-Harper 1985; Ziegenfuss 1987).

Table 2 Types of action research adopted.

Legends: "+" are articles where the meaning of action research is not defined or explaned; "*" are considered action science articles according to this review but were not declared as such by the authors; "?" are articles with questionable definitions for action research.

Type	1971-80	1981-85	1986-90	1991-95
Action Research	Gibson (1975)? Harris (1978)+	Mirvis and Lawler (1983)+ Crowther (1985) Rickards (1985)+ Sandberg (1985) Wood-Harper (1985)	Oakland (1986) Pava (1986)+ Cassell et al. (1988) Ziegenfuss (1987)? Liu (1990)+	Checkland (1991) Jonsson (1991)? Ngwenyama (1991) Nosek and Yaverbaum (1991)+ Candlin and Wright (1992) Cassell and Fitter (1992) Jonsson and Solli (1993)+ Badham, Couchman and Little (1995) Fox (1995)
Participatory Action Research				Timpka, Sjoberg and Svensson (1995)
Action Science	Earl (1978)*	Covaleski, Dirsmith and Jablonsky (1985)*	Calabrese and Acker (1987)*	Salmela and Ruohonen (1992)* Levine and Rossmoore (1993)
Action Learning		Wood-Harper and Flynn (1983)+	Blennerhassett (1988)+	Ngwenyama (1993)+

Trends for Action Research in IS

To observe the evolving patterns over the four time periods, the articles were sorted by the type of action research, type of study, appropriateness of the definition, and IS category. These are summarized in Tables 3a, 3b, 3c and 3d, respectively. One can see from Table 3a that the number of IS action research publications has increased steadily over the years, with the number of articles from 1991-95 almost double those of the previous five-year period. Similarly, Table 3b shows the number of IS action research field studies has increased dramatically during the last five years when com-

Table 3a The Number of articles published during the four periods by type. Note that four action science articles are suggested by this review only since they were not declared as such by the original authors.

Type	1971-80	1981-85	1986-90	1991-95	Total
Action Research	2	5	5	9	21
Action Science	1	1	1	2	5
Preparatory Action Research				1	1
Action Learning		1	1	1	3
Total	3	7	7	13	30

Table 3b The number of action articles published during the four periods by type of study.

Type of Study	1971-80	1981-85	1986-90	1991-95	Total
Field Study	3	3	4	10	20
Discussion Paper		4	3	3	10
Total	3	7	7	13	30

Table 3c The number of articles published during the four periods by definition.

Definition	1971-80	1981-85	1986-90	1991-95	Total
Minimal/No Definition	1	3	3	3	10
Conflicting Definition	2	1	2	2	7
Proper Definition		3	2	8	13
Total	3	7	7	13	30

Table 3d The number of articles published during the four periods by IS category.

IS Category	1971-80	1981-85	1986-90	1991-95	Total
IS Theories and Methods				2	2
Systems Development	2	3	1	5	11
Use of Information/Systems	1	2	2	4	9
Socio-technical Systems		2	4	2	8
Total	3	7	7	13	30

pared with the previous periods. From Table 3c, the proportion of articles that including included a proper definition for the type of action research used has also increased during the last five years. From Table 3d, the IS categories with the most notable increase in the number of publications over the last ten years are in systems development and use of information and/or systems. The patterns of publications suggest that, over the years, action research has not received much attention as an alternative strategy of inquiry in IS. Even with the increasing trends noted, thus far only twenty IS action research field studies have been reported during the past twenty-five years, and only two articles are on the epistemology of action research in IS. These patterns suggest a vastly under-exposed qualitative research methodology awaiting potential exploration by IS researchers and practitioners.

3.2 Explicitness of the Research Approach

The explicitness of the research approach used in the thirty articles can be described in terms of the differences in their underlying assumptions, the methods of study adopted and the variation in presentation styles, as summarized in Table 4. These parameters have been adapted from the five research phases (Denzin and Lincoln 1993) that are considered pertinent when describing qualitative research in IS.

Differences in Underlying Assumptions

According to Denzin and Lincoln, the researcher's assumptions are often shaped by his or her tradition and perspective. Hult and Lennung suggest there are three traditions of action research spanning different disciplines: a school tradition that focuses on teaching and learning mostly in the field of education; a community development tradition that helps advance the cause of under-privileged groups; an organization tradition intended mostly for effective design and development of organizations. As shown under "Assumptions" in Table 4, nine articles did declare their tradition: six are from organization design and three from community development. Of the six organization design articles, only Badham, Couchman and Little (1995) and Salmela and Ruohonen elaborated on how their action research was shaped by the tradition. Conversely, all three of the community development articles have made explicit their ideologies in advancing the cause of under-privileged groups in industrialized countries.

In terms of the researcher's perspective, seven of the thirty articles were declared by the authors as interpretive, three as critical. By being interpretive, the researcher is engaged in social construction of reality where he or she attempts to understand the social phenomena within a naturalistic setting (Jonsson 1991). For instance, Covaleski, Dirsmith and Jablonsky (1985) used action research to gather empirical evidence on the interpretations of and meanings attached to the actors' espoused theories on budgeting practices with a newly computerized budgeting system versus their actual

Table 4 Underlying assumptions, study methods and presentation styles used in the articles.

Legends: AL–action learning; AR–action research; AS–action science; PAR–participatory action research; CAL–collaborative action learning. "+" under Authors identifies the article as a field study; "?" under Methods indicates the suggested researcher role; "*" under Assumptions and Presentation indicates the label is suggested only.

Author	Assumptions	Methods	Presentation
Gibson (1975)+	Post-positivistic*	AR, participant observation grounded theory. Interviews, surveys, document review, statistics, two year study, single site, researcher as expert	Ethnographic exploratory case
Earl (1978)+	Not indicated	AR, AS. No information on methods	Essay with three illustrative cases
Harris (1978)+	Not indicated	AR. Questionnaire, site visit interviews, three month trial, multiple sites, researcher as expert?	Scientific report
Mirvis and Lawler (1983)+	Post-positivistic*	AR. Study/control groups, interviews, focus groups, surveys, correlational analysis, one year study, single site, researcher as expert?	Ethnographic, explanatory case*
Wood-Harper and Flynn (1983)+	Not indicated	AL. Feedback	Descriptive case*
Covaleski, Dirsmith and Jablonsky (1985)+	Interpretive	AR, AS. Interviews, observations, review of archival information, analysis of system, 3.5 year study, multiple sites, researcher as expert?	Ethnographic, explanatory case*
Crowther (1985)	Post-positivistic*	AR. Hypothesis testing, theory development, simulation	Essay
Rickards (1985)	Not indicated	Participative motivation as AR	Essay
Sandberg (1985)	Community development, critical	Socio-technical design, AR, praxis research. Continuing dialogue, scientific reflection proposed.	Essay

Table 4 (continued)

Author	Assumptions	Methods	Presentation
Wood-Harper (1985)	Interpretive, objective idealism	Multiview methodology, AR, hermeneutic analysis.	Essay
Oakland (1986)	Not indicated	AR. Observation.	Essay
Pava (1986)+	Organization design	AR, social technical system design. Survey, one year study, single site, researcher as collaborator?	Essay, illustrative, explanatory case
Calabrese and Acker (1987)+	Interpretive	AR, AS. Interviews, focus groups, > five year study, single site, researcher as expert?	Explanatory case*
Ziegenfuss (1987)	Not indicated	AR as data collection method.	Essay
Blennerhassett (1988)+	Not indicated	AR, AL. Interviews, participant observation, questionnaire, pre/post comparison over one year, single site, researcher as collaborator?	Descriptive case*
Cassell et al. (1988)+	Community development	AR. Discussion groups, interviews, surveys, site visits, content analysis, 18 month pilot, multiple sites, researcher as collaborator	Explanatory case
Liu et al. (1990)	Organzation design	AR; no other details.	Essay
Checkland (1991)	Interpretive	AR, soft system methodology.	Essay
Jonsson (1991)+	Interpretive	AR. Interviews, site visits, observations, four years for first case and one year in second case, single sites, researcher and collaborator.	Essay with two illustrative cases

Ngwenyama (1991)	Critical	AR, AL. Participant observation, audio/video taping, interviews, action experiments, participant written cases proposed. Theory-in-use models, ladders of inference and cognitive maps as data analysis tools.	Essay

Table 4 (continued)

Author	**Assumptions**	**Methods**	**Presentation**
Nosek and Yaverbaum (1991)+	Organization design	AR. Interviews, surveys, three year study, single site, researcher as expert?	Explanatory case
Candlin and Wright (1992)+	Not indicated	AR, joint system design. Structured interviews, feedback to clients and sponsors, < one year study, single site, researcher as expert.	Explanatory case*
Salmela and Ruohonen (1992)+	Organization design	AR, longitudinal study. Interviews, review of documents and feedback seminar, two year study, multiple sites, researcher as expert?	Ethnographic, explanatory case
Jonsson and Solli (1993)+	Interpretive	AR, AS. Observations, interviews, review of reports, study over one year, multiple sites, researcher as expert?	Ethnographic, explanatory case
Levine and Rossmoore (1993)+	Post-positivistic,* interpretive	AS. Interviews, role-play, document analysis, observation, site visits, three month study, single site, researcher as expert.	Ethnographic, explanatory case
Ngwenyama (1993)+	Not indicated	AR, holographic organization theory, communicative action theory, AL, CAL. Diaries, audio records and notes of post-development discussions, six week study, single site, researcher as collaborator.	Essay, illustrative, exploratory case
Badham, Couchman and Little (1995)+	Organization design, critical	AR, organizational ethnography, longitudinal study, multiple sites, researcher as collaborator	Essay with two illustrative cases
Fox (1995)	Organization design	Socio-technical system design, AR	Essay

Timpka, Sjoberg and Svensson (1995)+	Not indicated	PAR, action design. Interviews, project diaries, field notes, participant observation, video recordings, five year study, single site, researcher as collaborator	Explanatory case

behaviors as theories-in-use routines. Of the three critical articles identified, two are essays on the role of action research in IS and its influence on automating the work-force, respectively (Ngwenyama 1991; Sandberg 1985). The third is a field study (Badham, Couchman and Little 1995) to introduce team-based manufacturing through radical action to help participants control their own situation.

In implementing a new strategic financial information system, Levine and Ross-moore claimed to be interpretive by emphasizing their insight on human behaviors and conflicts caused by automation. However, their approach follows more of a post-positivistic stance (Denzin and Lincoln 1993) with their desire to develop and test theories and to subject their findings to the criteria of falsifiability and generalization. In total, four articles are considered post-positivistic in this review with their focus on traditional theory development and testing, but were not declared as such by the authors.

Methods of Study Adopted

While most of the thirty articles cited action research as their strategy of inquiry, eleven also combined it with one or more alternative strategies that range from organizational ethnography, longitudinal study, soft systems methodology, socio-technical system design, to evaluation research. These are summarized under "Methods" in Table 4. Only a few of these articles elaborated on their combined research strategies. For example, in adopting a longitudinal action research design, Salmela and Ruohonen described their study process to include ongoing interviews and feedback seminars with participants to compare findings over a two-year period. Of the twenty IS field studies listed, sixteen included information on their research sites, subjects, background, and methods of data collection. Only seven involved multiple departments/units as their site; twelve others were conducted within a single organization, while one was unspecified. The length of these field studies ranged from three months (Harris 1978; Levine and Rossmoore 1993) to five years (e.g., Timka, Sjoberg and Svensson 1995) with one to two years as the most frequent duration cited (e.g., Blennerhassett 1988; Jonsson and Solli 1993). Different data collection methods were used with varying levels of details provided – interviews, participant observation, questionnaires, focus groups, site visits, field notes, document review and video-recording. Only three articles mentioned their analytical methods, being one of correlational analysis (Mirvis and Lawler 1983), content analysis (Cassell et al. 1988) or tabulation of quantitative results (Gibson 1975). Less than one half of the field studies explicitly mentioned the respective roles of the researcher and participants, which ranged from having the former as an expert resource (e.g., Candlin and Wright 1992) to the latter as collaborators and coresearchers (e.g., Badham, Couchman and Little 1995).

Variation in Presentation Styles

Considerable differences are also noted in the style of presentation among these thirty articles. As seen under "Presentation" in Table 4, the most common form of reporting is case study found in nineteen of the articles. This is followed by ten essays and one scientific report. Based on Yin's classification (1994), case studies may be exploratory, descriptive or explanatory depending on the research question, the extent of control over actual behavioral events, and the focus on contemporary versus historical phenomena. Of the nineteen case studies reported, twelve are considered explanatory where they explain the causal links in real-life interventions and effects. Two cases are descriptive in that they describe an intervention in detail and the real-life context in which it occurred. Two others are exploratory in nature where the intervention being investigated has no clear single set of outcomes. The remaining five are essays with brief cases included for illustrative purposes only. It should be noted that our categorization of the types of case studies reported is only suggested, as many authors did not make any distinction of the type used in their paper.

Six of the case studies are written as ethnographic fiction, where dialogues from participants are included as part of the interpretation. However, none of the authors acknowledged the use of ethnographic writing in their paper. Perhaps our best example is the study on social use of financial information by Jonsson and Solli, where extensive quotes from participants and events are included, some of which they referred to as organizational story-telling. The most unique form of reporting is that of a play put together by participants for stakeholders on the needs of unemployed people (Cassell and Fitter 1992).

Trends in the Research Approach

The patterns of assumptions, study methods and presentation styles for the thirty articles over the four time periods are summarized in Tables 5a, 5b, and 5c, respectively. In Table 5a, if one were to include the community development tradition as critical based on their similar ideological stance, to regard the organization design articles as interpretive in nature, and to distinguish those publications that are considered post-positivistic by this review, then the number of articles where the underlying assumptions were mentioned has increased steadily during the last five years. From Table 5b, one can see that the use of one or more departments and/or units within a single organization as the study site is more common than those spanning multiple organizations, although this gap appears to be narrowing within the last five years. On the other hand, the role of the researcher has shifted over the years from that of an expert resource to a collaborator, with the participants playing an increasing role in the research process. In terms of the length of the field studies reported, both short-term studies of less than one year and longitudinal studies of three years or more are noted within the last five years. As for the presentation style, one can see from Table 5c that the methods of reporting for action research in IS have remained largely the same over the years, with case study still being the preferred method of presentation. There is, however, an increase in the

number of illustrative and ethnographic case studies reported in the last five years. As a whole, the action research approach adopted in IS has become more explicit and open over the years.

Table 5a The number of action research articles published during the four periods by underlying assumption. Note: "Critical" includes articles with community development tradition, while "Interpretive" includes the organization design tradition; articles listed as post-positivistic are suggested by this review only and not declared as such by the original authors.

Assumption	1971-80	1981-85	1986-90	1991-95	Total
Not Indicated	2	2	2	3	10
Post-positivistic	1	2		1	4
Interpretive		2	3	5	10
Critical		1	1	3	5
Total	3	7	7	13	30

Table 5b The number of action research articles published during the four periods by study design. Note that two thirds of the researcher roles cited are suggested only and not declared by the original authors. Legend: N/A–not applicable or unknown.

Design		1971-80	1981-85	1986-90	1991-95	Total
Study Site	Single	1	2	3	6	12
	Multiple	1	1	1	4	7
	N/A	1	4	3	3	11
Researcher Role	Expert	2	2	1	4	9
	Collaborator		1	3	6	10
	N/A	1	4	3	3	11
Length of Study	< 1 year	1			3	4
	1-2 years	1	2	3	2	8
	≥ 3 years		1	1	3	5
	N/A	1	4	3	5	13

Table 5c The number of action research articles published during the four periods by style of presentation. Note that the ethnographic style is only suggested by this review and not declared by the original authors.

Presentation Style	1971-80	1981-85	1986-90	1991-95	Total
Scientific Report	1				1
Essay		4	3	4	10
Case Study					
Illustrative	1		1	3	5
Exploratory				1	1
Descriptive		1	1		2
Explanatory			2	3	5
Ethnography*	1	2		3	6
Total	3	7	7	13	30

3.3 Diversity in the Research Process

According to Checkland (1991) and Ngwenyama (1991), the most unique aspect of action research as a strategy of inquiry is in its iterative process of problem diagnosis, action intervention, and reflective learning by the researcher and participants. These are summarized in Table 6 for the thirty articles and discussed in detail below.

Choice of Problems and Issues

Under "Problem" in Table 6, one can see that the scope of the problems addressed among these articles vary widely, ranging from the lack of welding expertise within an engineering firm (Candlin and Wright 1992) to the need for an action-oriented change strategy in high-technology and production management for an entire country (Oakland 1986). Despite such diversity, the nature of these problems can be categorized as one of improving the development of organizations and communities through collaborative actions and reflections, overcoming resistance to change by reconciling between espoused and in-use theories held by participants, or training users to enhance the level of their information and systems knowledge. While all ten discussion papers described particular concepts such as socio-technical system design as their proposed framework, only twelve of the twenty field studies included the use of theories, concepts or research themes to guide the problems being investigated. Six of these articles contain theories on human behaviors or organizational/community improvement when introducing new systems (Cassell et al. 1988; Jonsson and Solli 1993; Jonsson 1991; Mirvis and Lawler 1983; Pava 1986; Badham, Couchman and

Table 6 Problems, actions, and reflections described in the articles. "+" under Author indicates a field study; "*" under Problem identifies articles where theories or concepts are cited; "**" under Action identifies articles with specific interventions; "?" under Reflection identifies articles with general reflections cited.

Author	Problem	Action	Reflection
Gibson (1975)+	Improvement for election of branch bank sites	Develop and implement a computer-based planning model; monitor its usage by staff	Implementation affected by staff attitude. Actions interfered with observation; results difficult to replicate and generalize?
Earl (1978)+	Inability to accommodate organizational learning	Used prototyping to design systems	Double-learning can break down barriers.
Harris (1978)+	Staff improvement to enhance patient satisfaction	Staff designed and conducted questionnaire, reviewed feedback.	Staff improved service, evaluated outcomes and offered guidelines
Mirvis and Lawler (1983)+	Lack integrated system on staff feedback/performance; lack public reporting of work life*	Staff participated in development of system; managers encouraged to use data; firm published indicators	System use affected by managers; public reporting created problems; required commitment?
Wood-Harper and Flynn (1983)+	How analysis and design is viewed with objective realism	Tried methods on practical cases with experienced and novice analysts	IS evolution needs methodology, intentions, assumptions of analyst
Covaleski, Dirsmith and Jablonsky (1985)+	Need budgeting system for information reporting and use*	Implemented system after extensive consultation with users	Traditional and emergent theories of budgeting influenced users?
Crowther (1985)	Problems in systems analysis	Focus on change in people and value through experiment	Checklist of viewpoints on analysis for third world countries
Rickards (1985)	Different approaches to addressing innovation	Participative thinking proposed; use of process consultants/facilitators	Participative approach deals with ill-defined problems; learned knowledge through experience

Table 6 (continued)

Author	Problem	Action	Reflection
Sandberg (1985)	Limited union role in planning socio-technical systems	Independent union actions to build up competence, mobility, negotiation	Need for praxis and centralized research on technical choices
Wood-Harper (1985)	How analysis and design is viewed with objective idealism	Tried methods on practical cases with experienced and novice analysts	IS evolution needs methodology, intentions, assumptions of analyst
Oakland (1986)	Improve high technology production management and resource utilization	Joint collaboration, emphasis on practice, shared values, change agent	Need action research with measurements on a dynamic system that changes when studied
Pava (1986)+	Improve socio-technical system design, e.g., customer support*	Conducted business, technical, social analysis; provided recommendations	Customer support improved; update to socio-technical system design concept/method proposed?
Calabrese and Acker (1987)+	Access, socio-technical aspects of online catalog systems	Users participated in development of an electronic journal delivery system	New organizational relationship is part of innovation/reinvention?
Ziegenfuss (1987)	Research needed to deal with major issues in healthcare	Develop research information system to collect data on service, patient characteristics, cost outcome	A see and learn approach needed for learning in continuing organizational development
Blennerhassett (1988)+	Senior civil service managers had little experience with IT*	Interviews/workshops conduct to define learning contents; different learning methods used**	Evaluated effects with managers positive on learning, attitude, behavior, organizational effects
Cassell et al. (1988)+	Information poverty in unemployed community*	Group defined needs and evaluation framework; trained on computers; collaborated between three sites**	Increased self-confidence, effectiveness dependent on ability of sites to adapt needs

Liu et al. (1990)	Technology affected organization of work and character of social relations	Organize open process with explicit collective learning and qualitative objectives	New organizational programs for organization design and action research needed

Table 6 (continued)

Author	Problem	Action	Reflection
Checkland (1991)	Humans can act to change phenomena investigated	Declare an intellectual framework for action research	Alternative to positivistic research with explicit methodological framework
Jonsson (1991)+	Information overload, lack of control in social welfare units and automobile production*	Group solved problems within control; managers trained to design reports; interviewed on use of information	Managers/groups increased control through dialogue, action and problem solving?
Ngwenyama (1991)	Use of critical social theory in IS research and practice	Use action science with action experimentation, hypothesis testing	Dialectic needed between practice oriented research and critical theory
Nosek and Yaverbaum (1991)+	Managers to improve decision making on IS development	Six planning/implementation phases; strategy, prototyping, interviews, feedback, development, training	Product judged successful; advantages and obstacles identified?
Candlin and Wright (1992)+	Improve welding knowledge through an expert system	Client defined problem, initiated actions, researcher collected/ clarified information**	Need to formulate theory on system as testable proposition in prototyping
Cassel and Fitter (1992)+	Gap between waged/ unwaged in computer resource/skills	Provided IT resources for unwaged in their local community	Feedback at operational, strategic and policy levels
Salmela and Ruohonen (1992)+	Contradiction in managing units, inadequate expertise and change in work conditions*	Document review and interviews to find contradictions, new system proposed to management**	Changes identified/ proposed; follow-up?
Jonsson and Solli (1993)+	Financial management and professionalism incompatible*	Managers trained on accounting and cost report design; monthly talk with controllers on financial performance**	Meaning, explanation and trust needed to understand actions?

Levine and Rossmoore (1993)+	Obsolete systems prevented new market, products and services*	Management redefined mission, strategy to develop new system	Staff acted on theory-in-use; conflict on whether project was strategic or technical?

Table 6 (continued)

Author	Problem	Action	Reflection
Ngwenyama (1993)+	Lack inventory, customer order tracking information*	End-user teams developed systems, conducted discussions for learning	Needed policies on standards, roles, incentives, commitment?
Badham, Couchman, and Little (1995)+	Automation effects on unions; need for human-centered work organization*	Work groups formed to involve users; created flexible systems, network to transfer knowledge/experience	Defined problems/ needs, provided recommendations
Fox (1995)	Need to consider technical and social systems of an organization for effective organization design	Conduct systems scan, technical analysis, social analysis, quality of working life and interpersonal/group deliberation considerations	Staff seek more meaningful empowerment, greater productivity and viability in organizations
Timpka, Sjoberg and Svensson (1995)+	Hypermedia systems complex requiring collaboration*	Participatory design/ evaluation of system through action design method	Need for codevelopment, respectful attitude for hierarchy?

Little 1995), while three are on conflict resolution (Covaleski, Dirsmith and Jablonsky 1987; Levine and Rossmoore 1993; Salmela and Ruobonen 1992). Three others are on enhancing user knowledge based on communicative action theory (Ngwenyama 1993), a content-centred learner model (Blennerhassett 1988), and organizational learning (Timpka, Sjoberg and Svensson 1995), respectively. The remaining eight field studies are mostly based on some stated objectives to solve certain practical problems, such as the need for a new form of systems analysis in third-world countries proposed by Crowther (1985) taking into account the lack of scarce resources and access to technology.

General Versus Specific Interventions

As seen from "Action" in Table 6, the types of actions proposed or implemented in these articles also vary tremendously, ranging from a specific intervention (e.g., Jonsson and Solli 1993), to a series of related tasks (e.g., Badham, Couchman and Little 1995), to that of an action-oriented learning or systems methodology (e.g., Wood-Harper and Flynn 1983). In some instances, the actual interventions implemented are not explicitly defined since they are assumed understood through the problem diagnosis and proposed solutions described by the authors (e.g., Calabrese and Acker 1987; Mirvis and Lawler 1983). This is particularly true with

the ten discussion papers, where the need for action interventions is expressed at the conceptual level only and not further elaborated. Only five studies provided sufficient details on the action interventions implemented. For instance, Jonsson and Solli described their main intervention as the monthly accounting talks with managers from six social agency units where the duration, intensity and scope of such talks increased over time as the managers became more confident in using the cost information within a social context. In studies where action research is used as a systems development methodology, the interventions generally consist of defining user requirements, conducting systems analysis, and designing the new system with the collaboration of participants as the intended users (e.g., Candlin and Wright 1992; Nosek and Yaverbaum 1991).

Extent and Level of Reflections

The most important aspect of action research is the reflection phase of the study process, seen under "Reflection" in Table 6, where the researcher and participants engage in collective interpretation of the findings and contemplate what can be learned from the experience. Such reflection may be iterative in nature depending on the problem and interventions involved, but should always be conducted in a way that Checkland (1991) refers to as "methodologically explicit" in order for the results to be coherent and potentially transferable. Of the twenty field studies, those that are full-length case studies (fifteen in total) included a fair amount of details on lessons learned. On the other hand, while the five essays with illustrative cases are descriptive in conveying their theories or general experiences, there were few reflections that were directly from the case cited.

Finally, as part of reflection and learning, there is also an expectation of new knowledge to be generated as a by-product of the research process. For some researchers, this form of new knowledge represents local or tacit experience of the participants that can improve the practice of the organizations involved (e.g., Badham, Couchman and Little 1995). With others such as Agyris, Putnam and Smith and Ngwenyama (1991), this process should result in the development of new theories and knowledge that can be generalized and validated. In-depth discussions of generalized knowledge are noted in twelve of the twenty field studies. One such example by Covaleski, Dirsmith and Jablonsky (1985) on the role of traditional and emergent budgeting theories in understanding budget-related behaviors from a computerized state geriatric accounting system. From the resulting behaviors as manifested through an interplay of the participants' espoused views and in-use routines, Covaleski, Dirsmith and Jablonsky generalized on the shortcomings of double-loop learning and advocated "a triple-loop level of accounting for how accounting is to be accounted." As for the remaining field studies, most have included discussions of their experiences based on local tacit knowledge gained through the problem-action-reflection cycles in their study. Admittedly, the differences between local, tacit experience and generalized new knowledge are sometimes difficult to discern from these articles.

Table 7 The number of action research articles published during the four periods by research strategy. Legend: N/A–not applicable or unknown.

Strategy	1971-80	1981-85	1986-90	1991-95	Total
Framework					
Theories/Concepts		2	3	7	12
Objectives	3	1	1	3	8
Discussion papers		4	3	3	10
Problem					
Improve Conditions		4	6	6	18
Overcome Conflicts	2	1		2	4
Enhance User Knowledge	1	2	1	4	7
N/A				1	1
Action					
Specific Interventions			2	3	5
Related Tasks/Methods	1	4	2	6	13
N/A	2	3	3	4	12
Reflection					
Local Knowledge	1		2	3	6
Generalization	1	4	1	6	12
N/A	1	3	4	4	12

Trends in the Research Process

Table 7 summarizes the action research strategy in terms of the type of framework, problem, action and reflection from the thirty articles over the four time periods. One can see from "Framework" of Table 7 that the proportion of articles with explicit theories, concepts or objectives has increased over the last five years. While the most common problems addressed are still to improve the condition of organizations and communities as seen from "Problem," there has been an increasing number of studies that deal with overcoming conflicts and enhancing user knowledge during the last five years. From "Action," one can see that, over the years, the majority of the articles either did not reveal their actions or have described them as a series of related tasks or a systems methodology. Only five articles within the last ten years have provided sufficient details on the specific interventions undertaken. As for "Reflection," there has been an increase in the number of articles during the last five years with some form of generalization that contributed to the creation of new knowledge in IS. Overall, while the use of action research in IS has matured over the years, more

theoretical and empirical studies on different IS problems with explicit methodological details are needed to enrich our understanding of the action research process.

3.4 Comparison of Action Research in Social Science

A special 1993 issue of *Human Relations* containing five exemplary action research cases and six critique articles of these cases in a subsequent issue were compared with the IS articles for similarities and differences in terms of their methodologies. By doing so, we hope to gauge the current status of action research in IS relative to that in social science.

Exemplary Action Research Cases and Critiques

To introduce these exemplary cases, Elden and Chisholm (1993) first reviewed the characteristics of classical action research as having purposes and value choice; a real-world contextual focus; change based data and sense making; participation in the research process; knowledge creation and diffusion. In contrast, the five exemplary cases represent divergent forms of action research that are different in the level of system engaged in the change process; the degree of formal organization of the research setting; the extent of openness in the research process; the goals and purpose of the research effort; the role of the researchers. Overall, these emergent varieties of action research are far more complex in terms of their multi-level focus that spans organizations, communities and regions, the use of a variety of self-design and participatory methods, as well as the duration of studies that are typically staged over a four to five year period. While the cases by Levin (1993), Ledford and Mohrman (1993b and Engelstad and Gustavsen (1993) have emphasized on the development of large regional and national networks as new forms of organization for economic and work reform, the work of Greenwood, Whyte and Harkavy (1993) and of Brown (1993) is more focused on the direct participation of those affected as coresearchers and their engagement in knowledge diffusion and organizational learning.

Six critiques with contrasting viewpoints on the exemplary cases were published in a subsequent issue of *Human Relations*. While Bartunek (1993) and Ledford and Mohrman (1993a) praise the conceptual contributions of these cases and the need for such exemplars, others are more critical on their lack of details, the extent of participant engagement, and the notable absence of any effort to validate the new knowledge generated (Mangham 1993; Reason 1993b; Heller 1993; Gustavsen 1993). However, these reviewers also acknowledged the difficulty of having to condense such complex longitudinal studies into a mere twenty pages of writing, and the need for publishing these cases.

Classical Versus Emergent IS Action Research

In comparison, the patterns of evolution as seen in the thirty IS action research articles are somewhat different. For example, many of these IS studies would fall under what Elden and Chisholm refer to as classical action research with their focus on a specific problem within an organization or community through the use of a single study site where the researcher played the role of an expert in the process. Instead of dealing with increasingly complex problems and issues spanning multiple levels of communities and regions as suggested in the emergent approach, many of the recent IS action research field studies have focused on systems development and use of information and/or systems in organizations and communities, where the appropriate and effective use of a specific system within a particular socio-technical context is investigated. This difference is probably due to the fact that many of the technological solutions reported are intended for specific problems within an organization or community. It is from within such specific settings that the social interpretation of the meanings and effects of the technologies are constructed and determined, respectively. Nevertheless, there has been a small but increasing number of IS studies over the last ten years that are of the emergent variety described through their use of multiple organizations, participants as collaborators, and longitudinal design of three or more years in duration. In particular, four of these IS articles have addressed socio-technical systems and technological innovations in ways that are close to the multi-level focus cited in the exemplary cases (Oakland 1986; Liu et al. 1990; Badham, Couchman and Little 1995; Fox 1995). Interestingly, even though there has been an increased recognition in the collaborative nature of the research process, only one of the thirty IS articles has formally adopted the term participatory action research. Conversely, the use of action science to resolve conflicts in organizations, while inferred in at least four of the IS articles, is not mentioned anywhere in the special issue of *Human Relations*. Such contradictions suggest a need to reconcile the different types of action research that exist to explore their potential integration as new forms of action research not previously attempted.

Differences in Methodological Details

The methods of study and reporting for the thirty IS articles and the five exemplary cases are also worthy of discussion. For instance, the basic concept of action research is assumed understood in all five cases and not explained. Their description of the research process and findings is mostly through detailed exposition on different phases of the studies over time, which consisted of a series of problem diagnoses, action interventions and reflective learning cycles. The writings are mostly in the form of condensed essays with no dialogue from the participants. Such patterns are notably different than the thirty IS articles. For example, many of the IS articles reported the use of multiple research strategies and data collection methods. Instead of the condensed style of writing as seen in the five cases, many of the IS articles have also adopted a case study approach where multiple dialogue passages are presented. Perhaps the most significant difference is the emphasis in IS to be explicit with the theoretical assumptions and research approach. This reflects the immature

status of action research in IS relative to social science, where it is better understood and accepted. Perhaps such emphasis is pertinent for the emerging interpretivism rhetoric (Walsham 1995) in IS as there can be multiple research paradigms and methodologies requiring clarifications for the untrained. Where the two disciplines share a similar problem is in the length of their publications, which is typically restricted by the journals. This can present a conflict especially in extended IS studies where the tradition of action research writing is narrative in nature, requiring detailed descriptions of the events being reported.

4 A CONTEMPORARY IS ACTION RESEARCH FRAMEWORK

Based on the characteristics of action research in IS seen over the past twenty-five years and the emerging varieties of exemplary action research observed in social science, a contemporary IS action research framework that integrates the so-called classical and the emergent approach is proposed. The intent of this framework is to provide a conceptual foundation and a practical guide for researchers and practitioners interested in understanding, reviewing or conducting action research for different areas of IS. An argument is put forth in that neither the epistemological status of action research nor its methodological details are well-established in IS at present. There are also variations of the classical and emergent forms of action research in IS similar to those observed in social science as demonstrated from the thirty IS articles. To advance the use of action research in IS, an integration of the two forms is needed as the contemporary approach to address the increasingly complex role of information systems, technological innovations and socio-technical systems in groups, organizations and societies. Such integration can take on combinations of features from the narrowly focused classical action research and the more open emergent approach depending on the context of the study, its research focus, the involvement of the participants, and the expected outcome.

There are four distinct dimensions to this proposed framework: (a) the type of action research used and its focus; (b) one's tradition and beliefs as the underlying assumptions; (c) the process involved including its research theme, the level of organization involved, the extent of change intended and the researcher role; (d) the style of presentation adopted. For each of these dimensions, a range of options exists for the researcher or practitioner to adopt a unique strategy along a continuum that spans the classical action research at one end to the emergent approach at the other. Also included are reference sources from the thirty IS articles to be used as representative cases to illustrate the concepts involved. The components for this framework in terms of its four dimensions, the contrasting classical-emergent approaches, and their reference sources are shown in Table 8 and elaborated below along with its intended usage.

Table 8 A proposed contemporary IS action research framework.
Legend: C–classical, E–emergent.

Dimension		Classical	Emergent	Reference Source
Type and Focus	Action Research	Change information system related practice, create new information system related knowledge from experience	Change social practice with a socio-technical system or a technological innovation, create new general knowledge from experience	C–Mirvis and Lawler (1983) E–Badham, Couchman and Little (1995)
	Action Science	Resolve conflict in the use of a specific information system	Resolve conflict within a socio-technical system or technological innovation	C–Covaleski, Dirsmiith and Jablonsky (1985) E–Levine and Rossmoore (1993)
	Participatory Action Research	Participants as col-laborators to change practice or resolve conflict related to a specific information system	Participants as col-laborators to change social practice, resolve conflict in a socio-technical system or technological innovation	C–Pava (1986) E–Timpa, Sjoberg, and Svensson (1995)
	Action Learning	Provide experiential learning for users of a specific information system	Provide experiential learning for users of a socio-technical system or technological innovation	C–Wood-Harper and Flynn (1983) E–Blennerhassett (1988)
Assumpt ions	Interpretive	Social construction of reality for use of a specific information system	Social construction of reality in a socio-technical system or technological inno-vation	C–Covaleski, Dirsmith and Jablonsky (1985) E–Badham, Couch-man and Little (1995)
	Critical or Community Development	Improve human conditions through actions and a specific information system	Improve human conditions through actions and socio-technical systems or technological innovation	C–Cassell et al. (1988) E–Badham, Couch-man and Little (1995)
	School or Organization Design	Improve effectiveness with a specific information system	Improve effectiveness with a socio-technical system or technological innovation	C–Pava (1986) E–Fox (1995)

Table 8 (continued)

Dimension		Classical	Emergent	Reference Source
Process	Research Theme	Start with an IS theory, concept or objective as the intellectual frame-work, with research process largely predetermined	Start with a theory or objectives but open to change; process and theories evolve over time	C–Covaleski, Dirsmith and Jablonsky (1985) E–Badham, Couch-man and Little (1995)
	Level of Organization	Involve a single group or organization with well-defined purpose, structure, process and boundary	Involve multiple groups, organizations and communities with loosely defined purpose, structure, process and boundary	C–Jonsson and Solli (1993) E–Badham, Couch-man and Little (1995)
	Extent of Change	A specific IS problem from which a specific action, set of tasks or a methodology is implemented; change within existing context	A complex socio-technical problem from which a set of related actions or tasks is implemented; change includes underlying context	C–Jonsson and Solli (1993) E–Badham, Couch-man and Little (1995)
	Researcher Role	Researcher as expert, participants as subjects	Researcher as collaborator, participants as co-researchers	C–Mirvis and Lawler (1983) E–Timpka, Sjo-berg and Svensson (1995)
Presentat ion	Case Study –Full Length	Study on development or use of a specific system; may be explor-atory, descriptive or explanatory	Study on a socio-technical system or innovations; may be exploratory, descriptive or explanatory	C–Covaleski, Dirsmith and Jablonsky (1985) E–Cassell and Fitter (1992)
	Case Study –Illustrative	Discuss development or use of one or more specific information systems; include field studies for illustration	Discuss introduction of one or more socio-technical systems or innovations; include field studies for illustration	C–Jonsson and Solli (1991) E–Badham, Couch-man and Little (1995)
	Essay– Episte-mology and/or Usage	Discuss action research as a mode of inquiry for information systems	Discuss action research as a mode of inquiry for socio-technical systems and innovations	C–Checkland (1991) E–Ngwenyama (1991)

4.1 Type and Focus Dimension

As seen from the "Type and Focus" dimension in Table 8, the type of action research adopted by the researcher/practitioner would influence the focus of the study as one of change in practice, conflict resolution, participant collaboration or experiential learning. Under the classical approach, the study would typically involve the development or use of a specific information system to solve a particular IS related problem. In the emergent approach, the study is more likely to introduce a complex socio-technical system or a technological innovation that includes different information systems and processes leading to fundamental changes in social practice and its underlying context. The development of a human resource information system by Mirvis and Lawler is an example of classical action research where the effects of a system on an organization and its staff are explored. In contrast, the instigation of a complex team-based manufacturing system by Badham, Couchman and Little in the manufacturing industry is an illustration of the emergent approach that changes the culture of an industry as a whole through the introduction of a technological innovation. For action science, participatory action research and action learning, their corresponding reference sources have also been identified in Table 8 for both the classical and emergent approaches.

4.2 Assumptions Dimension

From the "Assumptions" dimension, one may adopt an interpretive or critical perspective based on the beliefs of the researcher/practitioner, or choose from one of the community development, school/organization design traditions. Within our framework, the community development tradition and critical perspective are considered equivalent according to their ideological stance, whereas the school and organization design traditions have similar beliefs except for their intended settings. Under the classical approach, the focus is on the social meanings of a specific system and/or its use to improve human condition or organizational effectiveness within a firm. The respective reference sources are the interpretation of a budgeting system for a state geriatric department by Covaleski, Dirsmith and Jablonsky, the ideological stance by Cassell et al. to implement computers in a community center for self-improvement of the unemployed, and the introduction of a customer support system by Pava to improve the effectiveness of a computer firm. In the emergent approach, the interpretation of social change and desire for improvement are much more complex with the introduction of a socio-technical system or a technological innovation. Examples of this latter approach include the use of socio-technical analysis as a method to improve organization design by Fox, and the combined interpretive and critical perspectives in team-based manufacturing as technological innovations by Badham, Couchman and Little. In both studies, the nature of the problems, actions and reflections are more far-reaching than those described under the classical approach.

4.3 Process Dimension

In the "Process" dimension, the research theme refers to the inclusion of theories, concepts or objectives as the intellectual framework to guide the research process. Under the classical approach, such themes are usually predetermined and well-established by the researcher with only minor changes or refinement expected. An example is the budgeting behaviors of staff within an organization described by Covaleski, Dirsmith and Jablonsky, where the accounting and budgeting theories are well laid out at the beginning of the study. The emergent approach is much more open in that usually only a broad theme is stated, with the research agenda subjected to change as the research progresses. This is illustrated with the team-based manufacturing study by Badham, Couchman and Little, where the intended outcome of the project is stated only as broad objectives. In terms of the level of organization and the extent of change involved, the classical approach typically is concerned with a single group or organization such as the social service units of a government department (Jonsson and Solli 1993) where their financial management is improved through the introduction of an information reporting system with little change to the organization. In the emergent approach, the level of organization usually would involve multiple groups, organizations or communities. The extent of change would go beyond the current practice resulting in a fundamental shift within the underlying organizational context as in the creation of team-based manufacturing cells as new forms of organizations by Badham, Couchman and Little. The role of the researcher and participants in the study under the classical approach would have the researcher as the expert, as in the study by Mirvis and Lawler on the introduction of a human resource information system and its effects on staff. On the opposite end is the hypermedia development project by Timpka, Sjoberg and Svensson as the emergent approach whereby the researcher is a collaborator in the research process, with the participants taking control of the research agenda, process and outcomes as partners, collaborators and coresearchers.

4.4 Presentation Dimension

In the "Presentation" dimension, the researcher/practitioner may choose to write the action research report as a case study or essay regardless of the approach adopted. For case studies, they may be full-length or illustrative in style with or without direct quotes from the participants. Depending on the research objective, the study may be exploratory, descriptive or explanatory in nature. For essays, they may be on the epistemology of action research in IS and/or its usage within a given IS context. In classical action research, these cases or essays would refer to specific information systems, whereas, in the emergent approach, typically one or more complex socio-technical systems or technological innovations are involved. Examples of full-length and illustrative case studies in classical action research are the deployment of a budgeting system by Covaleski, Dirsmith and Jablonsky and the two short cases on social use of information by Jonsson and Solli, respectively. Those for the emergent

approach include the full-length case on introducing computers to the unemployed by Cassell and Fitter and the illustrative case to automate the tax department by Badham, Couchman and Little. For essays on the epistemology of action research in IS, the article by Checkland (1991) is more classical with its focus on information systems research and practice, while the one by Ngwenyama (1991) is more of the emergent variety with an emphasis on value-laden change in social practice through the deployment of socio-technical systems.

4.5 Intended Use of the Framework

The contemporary IS action research framework presented above provides researchers and practitioners with a comprehensive scheme to consider when contemplating action research in IS. To illustrate, when planning an IS study, one may choose a particular type of action research such as action science with conflict resolution as the focus. Depending on the organization and participants involved, the research may take on a critical perspective aimed at empowering the employees at the workplace in a classical sense through the deployment of an integrated information system. However, an emergent process may be adopted where the research theme and extent of change are only loosely defined at the outset to evolve over time, with the participants playing an active role in the research and influencing its outcome. This is just one hypothetical example of how an IS study can take on features from both the classical and emergent approaches to become a hybrid, contemporary form of action research in IS.

Our proposed framework can also provide researchers/practitioners with the pertinent criteria to judge what may constitute good action research in IS. For novices or outsiders wishing to understand its use as a strategy of inquiry in IS, the framework allows one to systematically examine a given study along the four dimensions to review how action research is used. For those interested in conducting action research in IS, the framework provides an comprehensive template to guide the study design, the research process and its reporting. The framework outlines an initial pedagogy for a new, contemporary form of action research in IS that can be refined over time by experienced researchers and practitioners as the insiders.

5 IMPLICATIONS ON IS RESEARCH AND PRACTICE

The use of action research in IS can be a rewarding experience yet a challenging one at the same time. For those who aspire to make a difference in the field of 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 criticism by Keen (1991) that IS as a self-defined discipline has become overly preoccupied with theories, methods and publication to have any significant influence on the business community where major IS decisions are made. From this review, 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 of 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 organizations and communities, the use of such an action-oriented methodology should improve our understanding of real-world problems through "doing" and experiential learning through "afterthought." In particular, our proposed contemporary IS action research framework can serve as a practical guide for both insiders and outsiders to recognize and engage in good action research in IS.

For those interested in intensive IS research methodologies, action research presents an alternative mode of inquiry to the traditional positivistic approach in studying IS. With its emphasis on change that is process oriented by nature, action research can be a very effective way to collect a rich set of qualitative data from the field not available otherwise. Using this research approach, new ways of research design need to be derived taking into account such issues as the research context, its practical focus, the role of the participants, the intended outcome, and the need for theory contribution. 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 emerging interpretivism rhetoric in IS research, such intensive methodologies as action research will undoubtedly assume a more important role in years to come. Hopefully, our proposed framework can provide an initial pedagogy for a new contemporary form of IS action research as part of the intensive IS research methodologies to be refined over time.

6 CONCLUSION

At the 1995 ICIS Conference in Amsterdam, Baskerville (Lee et al. 1995) outlined the criteria for acceptable IS action research to include: a real need for change; theory-based iterative problem-solving; genuine collaboration with participants; and honesty in theorizing research from reflection. The literature review and the contemporary IS action research framework presented in this paper provide a useful foundation and guide for researchers and practitioners in ways that are consistent with the aforementioned criteria. Specifically, the articles included in this review provide a rich historical account for those wishing to understand the use and evolution of action research in IS studies over the past twenty-five years. Also, the suggested framework provides a comprehensive template for use when reviewing or conducting IS studies based on such an approach. Looking ahead, the major challenges in IS action research will be the need for a better understanding of this strategy of inquiry within an IS context, increased use of this contemporary form of action research in

the field, and the ability of researchers and practitioners to recognize and publish such exemplars in mainstream IS journals.

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