Chapter 13
On Integrating Action Research and Design Research

If we knew what it was we were doing, it would not be called research, would it?

– Albert Einstein

IS research has been criticized for having little influence on practice. One approach to achieving more relevance is to conduct research using appropriate research methods that balance the interests of both researchers and practitioners. This chapter examines the similarities between two methods that address this mandate by adopting a proactive stance to investigating information systems in organizations. These two approaches, action research and design research, both directly intervene in "real-world" domains and effect changes in these domains. We investigate these similarities by examining exemplars of each type of research according to the criteria of the other. Our analysis reveals interesting parallels and similarities between the two suggesting that the two approaches have much to learn from each other. Based on our analysis, we propose ways to facilitate integration of the two approaches that we believe will be useful for both and for IS research in general.

13.1 Introduction

The perceived lack of relevance of IS research for practice has remained a prevalent criticism especially in the last decade or so (Benbasat and Zmud 1999; Dennis 2001; Kock, Gray et al. 2002). The argument is that research must necessarily make a dual contribution to academia and practice. First, the research must add to existing theory in order to make a worthwhile scientific contribution (Davis 1971; Baskerville 2001). Second, the research should assist in solving practical problems of practitioners, problems that are either current or anticipated. Two research methods in the information systems field with this dual orientation are design research (Hevner et al. 2004) and action research (Baskerville and Meyers 2004; Davison et al. 2004). As the IS community becomes more accepting of these diverse research traditions

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(Boland and Lyytinen 2004), we need to understand not only how they can be understood within the spectrum of research methods in IS (Mingers and Stowell 1997) but also how the unique strengths of these research methods can be leveraged.

It is the premise of this chapter that design research and action research methods are closely related and can offer unique strengths to the IS research community. However, there has been a separation between the two approaches. This is perhaps attributable to action research having a significant research tradition (Susman and Evered 1978; Baskerville 1999) that design research currently lacks, in spite of significant progress made over the last decade (March and Smith 1995; Purao 2002; Hevner et al. 2004). We believe that the two approaches can significantly inform each other as there is a great degree of similarity and overlap between them, especially since they are both proactive in that they intervene rather than study a phenomenon after the fact (Cole et al. 2005; Järvinen 2007). A growing body of literature is recognizing these cross-fertilization possibilities between AR and DR. Researchers argue for similarity between the two (Järvinen 2007; Lee 2007; Figueiredo and Cunha 2007) as well as caution against fusion (Iivari 2007). Others suggest a middle ground stating that in some situations and contexts, the two may be integrated (Cole et al. 2005; Sein et al. 2007).

To substantiate our argument, we explore the areas of overlap between them, by examining exemplars of each type of research (design research and action research) according to the criteria specified for the other. Through this cross-application of research criteria, we explore implicit assumptions that action and design research approaches may have in common about epistemology, ontology, and, most importantly, axiology (values). Based on the analysis, we propose ways in which each can inform the other and outline a new integrated research approach that exploits the strengths of both of its precursors.

The rest of the chapter is organized as follows. In the next section, we briefly describe the two research approaches, design research and action research, and list the guidelines for each. We then use one research exemplar from each and apply to it the criteria of the other type. In the following section, we discuss implications of our analysis and offer an agenda for an integrated research approach.

13.2 The Research Approaches

13.2.1 Design Research

Design research (DR) consists of activities concerned with the construction and evaluation of technology artifacts to meet organizational needs as well as the development of their associated theories. Consequently, DR is concerned with artificial rather than natural phenomena (March and Smith 1995) and is rooted as a discipline in the sciences of artificial (Simon 1969). Designed physical systems are distinguishable from natural systems by virtue of their teleological causal component; physical systems are designed with fitness of purpose in mind, created to pursue certain ends and evaluated on the basis of conscious selection of alternatives

(Checkland 1981). An information system consists of technology, an associated social setting, and the rich phenomena that emerge from the interaction of the two (Lee 1999). These two research loci, technology and people, are characterized by Hevner et al. (2004) as two major approaches in IS research, behavior science, and design science (or the term used in this chapter, DR). Behavior science is concerned with theories that explain human or organizational behavior; DR is concerned with creating new and innovative artifacts. Thus, DR places axiological emphasis on utility by virtue of the purposeful nature of its phenomena of interest (artifacts). This utility-based goal of DR may at first glance appear to stand in contrast to the goal of behavior research which is truth or understanding. In fact, Hevner et al. (2004) consider these goals as complementary in that truth and understanding inform design and utility informs theory.

However, DR is rooted in pragmatism (see Haack (1976) for a discussion of pragmatism). For the pragmatist, truth and utility are indistinguishable – truth lies in utility. Thus, for DR, the relevance is evaluated by utility provided to the organization and developers. Thus DR must pass both the tests of science and practice (Markus et al. 2002). In other words, DR is not atheoretical tinkering or aimed simply at market acceptance (Purao 2002). It should incorporate theory in the development of the artifact as well as make a theory-building contribution. It should be stressed that the outcome of DR is not only systems. March and Smith (1995) identify four possible design outputs: constructs, models, methods, and instantiations. They further identify two basic activities: build and evaluate. Purao (2002), along with Dasgupta (1996), identifies outcomes that span the spectrum from instantiated artifacts to theoretical contributions. One suggested set of guidelines for conducting and evaluating DR (henceforth, "DR criteria") was proposed by Hevner et al. (2004) and consists of seven elements. These guidelines are summarized in Table 13.1.

Table 13.1 Design research criteria, adapted from (Hevner et al. 2004)

Criterion	Description
1. Design as an artifact	Design research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation
2. Problem relevance	The object of design research is to develop technology-based solutions to important and relevant business problems
3. Design evaluation	The utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation plans
4. Research contributions	Effective design research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies
5. Research rigor	Design research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact
6. Design as a search process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment
7. Communication of research	Design research must be presented effectively to both technology-oriented and management-oriented audiences

13.2.2 Action Research

Action research (AR) is fundamentally a change-oriented approach in which the central assumption is that complex social processes can best be studied by introducing change into these processes and observing their effects (Baskerville 2001). It is a well-established research approach introduced by Kurt Lewin in 1946 to address social system change through action that is at once a means of effecting change and generating knowledge about the change. Within the social science research spectrum, AR occupies a niche defined by focus on practical problems with theoretical relevance (Clark 1972). This unique position allows AR to produce highly relevant results while simultaneously informing theory (Baskerville 1999; Baskerville and Meyers 2004). AR views organizations as a configuration of interacting variables, some of which are highly interdependent; to introduce change into this configuration, one begins with several possible points of intervention and discovers that change may require manipulation of several variables (Clark 1972). Clark, drawing on Leavitt, discusses four salient interacting variables, none of which can be easily controlled for purposes of intervening for organizational change: *tasks*, *technology*, *structure*, and *people*. Each variable may have its own associated change strategies; however due to their high degree of interdependence it is unlikely that any one can be changed without impacting others.

There are several flavors of AR (Baskerville and Meyers 2004) and the epistemological perspective of the action researcher varies depending upon the flavor. The choice is a consequence of the social interventionist perspective of the approach. An action researcher becomes part of the study and interprets the inter-subjective meaning of the observations (Baskerville 1999). Further, the unique nature of each social setting requires consideration of the social values of organization members. Consequently, an idiographic method of enquiry is necessary for AR, i.e., a research approach operationalized through researchers incorporating subjects into their research as collaborators (Baskerville 1999).

Within the field of IS, collaborative mode of AR is strongly advocated (Checkland 1981; Baskerville 2001). Given that the goal of AR is the resolution of a practical problem while simultaneously contributing to scientific theory, a balance between the goal of the researcher (which is by nature epistemological) and that of the sponsor (which is by nature practical) must be maintained for outcome success. AR is, therefore, suited to social situations with which the researcher must be engaged. Researchers must be prepared to react to the research situation and follow it wherever it leads (Checkland 1981).

The description of Susman and Evered (1978) is the most prevalent form of CAR (Baskerville 1999), consisting of a five-phase cyclical process. The first phase, *diagnosing*, is aimed at identifying or defining a problem. The second, *action planning*, involves considering alternative courses of action for solving the problem. The third, *action taking*, consists of selecting a course of action. The fourth, *evaluating*, is aimed at studying consequences of action. The fifth, *specifying learning*, completes the loop by identifying general findings. The five phases are maintained and regulated by the researcher and a client system infrastructure. The

infrastructure consists of the research environment and the researcher–client agreement which defines authority for action specification and mutual responsibilities of clients and researchers.

One suggested set of guidelines for conducting and evaluating canonical AR (henceforth, "AR criteria") was proposed by Davison et al. (2004). Their proposed set of criteria for CAR is presented in Table 13.2.

Table 13.2 Canonical action research criteria, adapted from (Davison et al. 2004)

Criterion	Description
1. Principle of researcher–client agreement (RCA)	The RCA provides the basis for mutual commitment and role expectations
2. Principle of cyclical process model (CMP)	The CPM consists of the stages diagnosing, action planning, action taking, evaluating, and specifying learning
3. The principle of theory	Theory must play a central role in action research
4. The principle of change through action	Action and change are indivisible research elements related through intervention focused on producing change
5. The principle of learning through reflection	Considered reflection and learning allow a researcher to make both practical and theoretical contributions

13.3 Cross-Application of Criteria

To examine the similarity between AR and DR, we have applied the AR criteria developed by Davison et al. (2004) to an exemplar DR paper and applied the DR criteria developed by Hevner et al. (2004) to an exemplar AR paper. The exemplars selected for this cross-application were cited by other researchers as high-quality instances of their respective research approach. For the DR exemplar, we chose Markus et al. (2002). This study was reviewed by Hevner et al. (2004) and found to strongly adhere to the guidelines of DR as defined by them. For the AR exemplar, we chose Iverson et al. (2004), which, according to the editors of the September 2004 special issue of *MIS Quarterly*, demonstrates adherence to action research standards and serves as a model for future action research projects (Baskerville and Meyers 2004).

13.3.1 Applying Action Research Criteria to a Design Research Exemplar

The criteria for AR are applied below to the DR exemplar of Markus et al. (2004). This study presents the design and implementation of an IT system called *technology organization and people integration modeler* (TOP modeler) for the support of emergent knowledge process of organizational design.

13.3.1.1 Criterion 1: The Principle of the Researcher–Client Agreement

In the researcher–client agreement (RCA) document, both researchers and clients explicitly agree and commit to the AR approach and the research focus and participant roles are clearly defined. Additionally, the data collection methods, project objectives, and evaluation criteria are explicitly stated. For DR, we do not expect that an explicit agreement necessarily will be present; however, we do expect that motivational factors underlying this principle will be evident.

Although Markus et al. (2002) do not mention the existence of an explicit RCA or discuss details regarding the documentation of data collection methods, objectives, or evaluation criteria, there is evidence of the expected motivational factors that are consistent with this principle. The project was conducted with the active involvement of four companies each of which committed resources in the form of a full-time participant who was dedicated to the project for 3 years.

13.3.1.2 Criterion 2: The Principle of the Cyclical Process Model

The cyclical process model (CPM) is the five-stage model of change of Susman and Evered (1978). According to this principle, the research project should follow the CPM or researchers should justify any deviations from it. Under the CPM, the researcher conducts an independent diagnosis of the organization, plans actions based on that diagnosis, and then implements and evaluates those change actions. Following a change intervention, the researcher reflects on intervention outcomes and makes an explicit decision whether to proceed through an additional change cycle. For DR, we expect a similar iterative lifecycle process to be evident based on the design as a search process criterion of Hevner et al. (2004).

In the development of the TOP modeler, an iterative approach was followed in which functional prototypes were used in authentic use cases of organizational design analysis, rather than mock prototypes in hypothetical scenarios. This allowed Markus et al. (2002) to "intervene directly in the work process and observe which aspects of the system worked and which did not" (p. 196). During an 18-month period, over 70 functional prototypes were evaluated. Reflection was conducted on the outcomes of each prototype evaluation to determine what obstacles were encountered or what questions were raised. In fact, reflection was a specific role of the first author who avoided direct involvement with development, "providing psychological and emotional distance from the project for reflection and identification of lessons learned" (p. 186). However, this distancing is in contrast to the tenets of AR where the participation of the researcher in the intervention is required. Hence, reflection in terms of AR is implicit.

13.3.1.3 Criterion 3: The Principle of Theory

Theory plays a central role in AR, serving as a guide for research activities and as a means of delineating the scope of data collection and analysis (Davison et al.

2004). Theory may be present at the start of a project or develop in a grounded fashion. Typically, changes to theory take place during the reflection stage of AR and lead the project into an additional cycle (Davison et al. 2004). The principle of theory states that the problem domain and setting should be of interest to both the research community and client and that inferred problem causes, change activities, and outcome evaluation must be theory guided. For DR, we expect the same to apply.

Theory played a central role throughout the TOP modeler development process. Using the theoretical framework of Walls et al. (1992) which characterizes IS design theory as consisting of a set of user requirements, a set of system features (or principles for selecting them), and a set of development principles, Markus et al. (2002) first defined the requirements for emergent knowledge processes (EKP) and then developed a kernel theory describing system features and development principles. However, contrary to their expectations, the researchers eventually discovered that the semi-structured decision-making design theories they were using were inapplicable to the problem of organizational design. Consequently, they were forced to re-conceptualize all three aspects of their kernel theory (requirements, features, and development processes). In the end a general design theory for EKPs emerged, which the researchers articulate in detail through a set of six combined design and development principles.

13.3.1.4 Criterion 4: The Principle of Change Through Action

This principle emphasizes the interconnectedness of the concepts of *change* and *action*. Absence of change could imply ineffectiveness of the intervention or the absence of a meaningful problem. Indications of adherence to this principle include motivation of both client and researcher to improve the problem situation, specification of the problem and its hypothetical causes based on diagnosis, and action planning based on these causes. For DR, we expect to see similar evidence of practitioner motivation for change, and change resulting from design outputs. Evidence of change should go beyond mere market acceptance of a design output (Purao 2002) and should reflect the improvement of a previously undesirable problem situation.

This principle is clearly evident in the development of the TOP modeler. First, client motivation, as discussed above, is present. Evidence of behavioral change is apparent at both the individual and organizational levels. Individual level changes include users learning about their organizations, achieving consensus on design issues, reassessing their business strategies, and clarifying business issues. Organizational level changes include the cancellation of the relocation of a plant operation based on weaknesses identified at the target plant as well as the postponement of an international joint venture based on strategic differences uncovered through use of the TOP modeler.

13.3.1.5 Criterion 5: The Principle of Learning Through Reflection

The principle of learning through reflection is a consequence of the dual nature of researcher responsibility to both clients and the research community. Reflection during the cyclical research process is necessary to maintain focus on the practical problems of the clients and their resolution while learning is necessary to advance knowledge toward the goal of making a theoretical contribution. Actions consistent with this principle include researcher-provided progress reports to clients, reflection on outcomes by both researchers and clients, and clear reporting of research activities and outcomes. For DR, we similarly expect evidence of outcome reflection and reporting on research results and implications.

Although Markus et al. (2002) do not explicitly discuss progress reports to clients, it is nonetheless clear that client awareness of TOP modeler development progress was high due to the participative iterative functional prototyping development process utilized. Research outcomes were clearly reported to the research community through (1) the articulation of the existence of an activity area (EKP) that had previously been under-theorized, (2) the demonstration that one process in the general class of EKP can be successfully supported with IT thus facilitating the development of further solutions in this class, (3) the articulation of how features of familiar system types can be effectively integrated to provide support in this domain, (4) the articulation of how development practices need to be modified to meet the needs of EKPs, and (5) setting an agenda for future research through the identification of principles that are subject to empirical validation.

Table 13.3 summarizes the findings from application of the AR criteria to the DR exemplar.

Table 13.3 Application of AR criteria to a DR exemplar

AR criterion	Evidence found in the DR Exemplar
1. The principle of researcher–client agreement (RCA)	No explicit RCA but clear evidence of motivational factors
2. The principle of cyclical process model (CPM)	Iterative design/evaluate process followed
3. The principle of theory	Theory played central role in artifact development and theoretical contribution was made
4. The principle of change through action	Behavioral change evident at both the individual and organizational levels
5. The principle of learning through reflection	No explicit evidence of progress reporting but evidence of strong client engagement; reporting of research outcomes

13.3.2 Applying Design Research Criteria to an Action Research Exemplar

The criteria for DR are applied below to the AR exemplar of Iverson et al. (2004). The research was part of a larger research program and the specific aim of the project was to improve the implementation of software process initiative (SPI) practices.

13.3.2.1 Criterion 1: Design as an Artifact

Although the focus of AR is an organizational change and not the creation of artifacts per se, we expect that intervention in the organizational domain will frequently be associated with the creation of artifacts, which may include outcomes such as documentation of new organizational processes.

Consistent with this definition are the two primary contributions of the exemplar AR study. These contributions were (1) an SPI risk management framework and process and (2) an approach to tailor risk management to specific contexts. These contributions are presented by the researchers as models and methods (similar to March and Smith 1995) in the form of figures and tables that are presented in a generic form and can be tailored to other risk management contexts. However, these were not stated explicitly as artifacts by the authors and hence it is our interpretation that artifacts were created in DR terms.

13.3.2.2 Criterion 2: Problem Relevance

The goal of DR is the solution of organizational problems through the development of technology-based artifacts. As we previously discussed, relevance is a sine qua non of AR. Consequently, one would expect to find clear evidence of problem relevance in an exemplar AR study, and this was the case with the exemplar under investigation.

The research was initiated in the IT department of a large Scandinavian financial institution and was part of a large-scale research program involving four organizations between 1997 and 2000. The aim of the program was to improve the software operation in the participating organizations due to difficulties experienced in achieving satisfactory results in software process improvement initiatives (SPIs). The specific practical problem addressed by the researchers was the question of how risk management can help SPI teams understand and manage their efforts.

13.3.2.3 Criterion 3: Design Evaluation

Measures of effectiveness of design artifacts, such as utility and efficacy, must be rigorously demonstrated via evaluation. For the AR exemplar, we expect to find evidence of evaluation of organizational interventions due to the prominent role played by the evaluation stage in the CPM.

The SPI approach developed in the exemplar AR study was evaluated according to the standard of utility to practitioners. Through several iterations, the SPI framework was utilized by practitioners and refined based on feedback until it reached a stable form that was acknowledged by practitioners as useful. There was no evidence, however, that specific evaluation criteria such as the one suggested by Hevner et al. (2004) or Purao (2002) were applied in a systematic manner to the research outputs.

13.3.2.4 Criterion 4: Research Contributions

DR should provide clear and verifiable contributions in the areas of design artifact, design foundations, and/or design methodologies. For AR, we expect evidence of similar contributions, specifically at the organizational level.

Iverson et al. (2004) discuss several theoretical contributions that result from their study. First, the SPI framework provides a comprehensive, structured understanding of risk areas and resolution strategies. Second, the approach to tailor risk management to specific contexts provided two contributions, a framework for understanding and selecting among the extant approaches to risk management and a process for tailoring risk management to specific contexts that builds on AR literature.

13.3.2.5 Criterion 5: Research Rigor

In both DR and behavioral science research, rigor is based on effective use of the extant knowledge base consisting of theoretical foundations and research methodologies (Hevner et al. 2004). Both DR and AR have their own respective quality criteria, adherence to which is constitutive of rigor. The rigor of the exemplar study is based on adherence to a set of AR criteria based on the canonical criteria of Davison et al. (2004).

Demonstration of this adherence consisted of visibility of the following concepts in the chapter: roles, documentation, control, usefulness, theory, and transfer. A more stringent test of rigor germane to the cross-application of criteria would be to apply the DR criteria as stated by Hevner et al. (2004). This is assessed by application of rigorous methods in the construction and evaluation of the designed artifact. The rigor in the study of Iversen et al. does not apply directly to the artifacts they construct. Instead, they lie in the logic and theoretical premise behind SPI and the collaborative research approach.

13.3.2.6 Criterion 6: Design as a Search Process

Because it is rarely feasible to identify optimal design configurations, the process of designing artifacts is fundamentally cyclical, characterized by a generate test cycle and constrained by available technology and resources to produce a solution in a satisficing manner (Simon 1969). We expect to find a similar search process in AR though the nature of constraints may be different. The cyclical process model of AR

is, in fact, fundamentally similar to this DR search process where the tasks *action planning/intervention/evaluate* are analogous to *generate/test*.

This search process was followed by Iversen et al. who performed four cycles of the CPM in which the risk management approach iteratively evolved from the initial prototype. The nature of constraints they encountered appears to be largely resource-based though this is not explicitly acknowledged in the chapter.

13.3.2.7 Criterion 7: Communication of Research

Research results must be communicated to both practitioners and researchers. For DR, sufficient implementation detail must be provided to practitioners to enable the construction of the artifact in a new context and articulation of the theoretical contribution must be provided to researchers. For AR, we similarly expect a high level of detail to be provided to enable the replication of a successful intervention in a similar organizational context.

Iverson et al. presented their results to both audiences through the publication of their research findings in *MIS Quarterly* (Iverson et al. 2004) as well as a book chapter targeting SPI practitioners (Iverson, Mathiassen et al. 2002). In each outlet, the authors were careful to articulate implications for stakeholders, researchers, and practitioners.

Table 13.4 summarizes the findings of the application of the criteria of DR to the AR exemplar.

Table 13.4 Application of DR criteria to an AR exemplar

DR criterion	Evidence found in the AR exemplar
1. Design as an artifact	Instantiation of SPI models and methods (implicit)
2. Problem relevance	Clear evidence of relevance due to high resource commitment by organizations involved
3. Design evaluation	Evaluation based on utility to practitioners
4. Research contributions	Several theoretical contributions present
5. Research rigor	Explicit discussion of adherence to canonical criteria and logic behind SPI
6. Design as a search process	Four CPM cycles executed before the risk management approach was evaluated as stable and usable
7. Communication of research	Results were communicated to both practitioners and researchers

13.4 A Way Forward

Our intent in this chapter was to examine similarities between AR and DR by adopting a novel approach: cross-application of research criteria. Our analysis reveals that the two research approaches indeed share important assumptions regarding ontology, epistemology, and, more importantly, axiology. First, the *ontology* to which

both research approaches subscribe assumes that the phenomenon of interest does not remain static through the application of the research process. In the case of AR, the organizational phenomenon undergoes change by virtue of the consultant–researcher engagement with the client to bring about desired changes. In the case of DR, an artifact comes into being through application of the research process. This is seen in the application of DR criterion 6 to AR and the application of AR criterion 1 to DR. Next, the *epistemology* that both research approaches subscribe to assumes a mode of knowing that involves intervening to effect change and reflecting on this intervention. In the case of AR, the intervention occurs in an organizational setting. In the case of DR, the intervention occurs by way of envisioning and constructing an artifact that will bring about the desired change in the organization. This is seen in the application of DR criterion 1 to AR and the application of AR criterion 4 to DR. Finally, the *axiology* that both subscribe to is evident in the manner in which both value the relevance of the research problem and emphasis on practical utility and theoretical knowledge simultaneously. This is seen in the manner in which DR criteria 2 and 3 and AR criterion 5 are applicable to one another.

The arguments above suggest that it may be possible to place AR and DR within a common meta-paradigm, pragmatism. It is intriguing, then, that in the information systems field, canonical expositions of the two research approaches (e.g., Baskerville 2001; Hevner et al. 2004) have taken no note of the other. For example, the process and criteria for design research do not take into account the rich tradition of similar work done on action research. Neither do the process nor do criteria for action research take into consideration writings about search processes and other mechanisms that design researchers use. Below, we suggest three specific possibilities where cross-fertilization of ideas from these two research traditions can lead to a more useful understanding of research approaches, criteria and outcomes.

13.4.1 Adding "Reflection" to Augment Learning from Design Research

One shortcoming in DR is the lack of a clear stage for "reflection" to specify learning. This requires reflecting on the outcomes to understand how they have contributed to the change sought, and why the success or failure is observed in the organizational settings. For DR, this can be especially problematic when the DR project is not carried out in a specific organizational context, for example, in the case of market-based development. The outcome of such a project may result in an artifact, which needs to be shown to have advanced both theoretical and practical knowledge. Current prescriptions about DR research, such as those by Hevner et al. (2004), suggest a useful set of criteria for this purpose, focusing primarily on the evaluation of DR outputs and less on reflection that may provide articulations of what has been learned. The perspective provided by an AR approach can be useful for the latter and may be incorporated as reflection on the outcome of the research process. A specific implementation may include interjecting an AR cycle at the last

stage of DR process. Alternatively, a DR project may be framed as an AR project if an organizational problem needs to be solved, and the action involves building a system (to the development of TOP modeler by Markus et al. 2002). In both cases, the two research cycles become intertwined in different ways.

13.4.2 Concretizing Learning from Action Research by Adding "Build"

While canonical AR incorporates a specific learning by reflection stage, the outcomes of AR have been difficult to carry forward without a tangible artifact. Owing in part to this intangible nature, cumulative learning from AR projects has remained a matter of concern. In discussing this problem, Braa, Monteiro et al. (2004) propose that knowledge is shared through networks of organizations and not as an explicit artifact of individual AR projects. (It is revealing that their solution, using networks, was itself through an AR project.) In short, while all AR studies generalize their findings into abstractions and concepts, contributions toward theory building are rare (notable exceptions include the soft systems methodology). One way to concretize or formalize learning is to frame the output of AR as a DR artifact, such as prototypes, frameworks, or models (March and Smith 1995). It can also be argued that the nature of the theoretical contributions from DR is more an embedded artifact, while for AR it is generalizable change processes. In our exemplar, the enhanced SPI is such an artifact. Converting the outcomes of an AR process into an artifact then can serve as the theoretical premise for the next cycle of action research. One specific approach to doing this would involve amplifying the AR *action taking* phase by including the building of a design artifact.

13.4.3 Envisioning an Integrated Research Process

The two possibilities outlined above are indications of the overarching finding based on our analysis: that the "essence" of the two approaches may, indeed, be similar or have much in common. Carrying the idea further would, then, involve a new synthesized research process that would fully integrate the two approaches: design research and action research (see Fig. 13.1). As a preliminary conceptualization, we offer the following four-stage model. The first stage can be problem definition, corresponding to the first step in both, problem definition in DR and diagnosing the problem in AR. In the synthesized approach, this stage would include both perceived problems as a design researcher may conceptualize them or reported problems as an action researcher may start with based on a client engagement. It would be preferred that there is a possible generalizable design solution that can form a basis for a solution for a specific client concern. The second stage is intervention, similar to the "build" stage of DR and a combination of the action planning and action taking stage of AR. The synthesized research process requires both, the construction of an IT

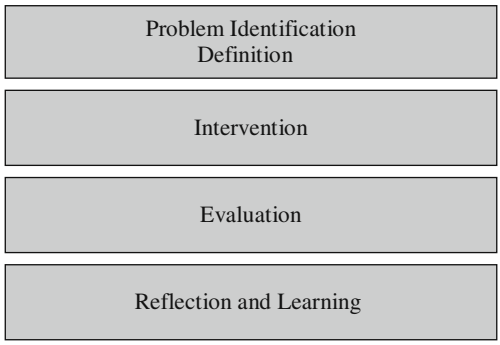

Fig. 13.1 A synthesized research approach

artifact and intervening to change the organization preferably used simultaneously so that the design can accommodate to problems encountered in practice. The third stage is evaluation and incorporates the criteria that are germane to both approaches. The final step would be reflection and learning, which abstracts knowledge to make practical and theoretical contribution to the field.

The proposed research approach would satisfy the call for more relevant information systems research and it can be seen to be in the core of the discipline. Furthermore, the proposed approach clearly distinguishes IS from computer science and organizational science.

We can already see possible instantiations of this integrated approach. Lindgren, Henfridsson et al. (2004) use a canonical action research approach to develop design principles for a competence management system. Their research involved developing prototypes and has the characteristics of a DR approach. It is possible that without cross-fertilization between the two approaches, this research would become part of the AR literature only and remain outside the ken of the DR literature. Clearly, the stress on relevance, problem solving, and intervening to learn are values inherent to both AR and DR. The last point, intervening to learn, also takes a proactive stance to IS research. Not only are we rigorously studying and understanding IS phenomena, we are also stressing relevance at the same time by solving practical problems and constructing reality (Simon 1969). This paradigm has the promise of alleviating a common criticism leveled at academic research that it is carried out in a vacuum and with little influence on practice.

13.5 Conclusions

In this chapter we have analyzed two modes of proactive research: design research and action research. By evaluating a representative example of each by the criteria of the other we have revealed the natural compatibility between these two approaches to scientific inquiry. Furthermore, we showed that the process models of both approaches are similar to a degree that we can form a common process model for them and outlined an integrated approach for combined AR–DR research

programs. The contribution of our chapter is thus twofold. First, as these research approaches are compatible, they can inform each other. Especially design research can gain from the more mature body of evaluation and other criteria of performing action research. Second, as both approaches have common starting points and goals, we can perform research in organizations in a manner where we choose between design research and action research only in the stage of the research where we plan the intervention; in other words we can do a late binding of the change action, based on the needs of the situation. Delving deeper into the essences of the two approaches remain on our future research agenda. Specific aspects that need to be examined include their epistemological roots and possible reasons why the two approaches have evolved independently. We believe that our contributions and findings call for further research into possibilities of dynamic co-operation between DR and AR projects.

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