BRIDGING THE GAP BETWEEN INFORMATION SYSTEMS RESEARCH AND PRACTICE: THE REFLECTIVE PRACTITIONER AS A RESEARCHER

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Abstract

This paper reports on the experiences gained while combining practical information systems development work and scholarly research. The overall framework is a development of Donald Schön's notion of the reflective practitioner. The specific research problems are carved out of the development history of the Student Record System of the University of Helsinki. The analysis leads to the conclusion that this approach is effective in process-type studies of information systems implementation, as the data gathering is easier for someone who is inside the process.

Keywords: Theory of reasoned action, IS management, IS development, social process models.

1. INTRODUCTION

The aim of this paper is to report on and explore the possibilities of how a practicing information systems (IS) professional is able to describe and analyze her or his experiences in such a way that it makes sense to the professional and scholar communities, thus bridging the gap between these two camps. There is an urgent need for this kind of study. For example, one sub-track in this ICIS conference is devoted to the theme of creating relationships between practitioners and researchers. A panel at the 1990 IFIP Technical Committee 8 (Information Systems) Working Conference discussed the possibilities of encouraging practitioners to participate (Glasson 1991). Furthermore, some leading scholars see it as essential to capture the knowledge of practitioners for theory building (Benbasat et al. 1987, p. 370). This paper puts forward and defends the argument that the explicit and implicit assumptions of practitioners as well as the activity based upon them can be used for developing practice-oriented and scholarly acceptable theories of IS development.

Additionally, the paper proposes enlarging the set of IS development paradigms, originally outlined by Hirschheim and Klein (1989). "Paradigm" here means the most fundamental set of assumptions held by a professional community that allows its members to share similar perceptions and engage in commonly shared practices (Hirschheim and Klein 1989, p. 1201). The enlargement proposed in this paper is the addition and analysis of the "Reflective Practitioner" paradigm. Toward the end of this paper, the experience of what it means to be a reflective practitioner, and how this approach is similar to and different from other ways of IS research, will be discussed. As concrete examples, some pieces of the research already been published will be cited(cf. Section 4). Under what circumstances the approach is a viable, its strengths and weaknesses, the kind of problems it entails, and how it can be compared to some more established ways of doing IS research will be discussed.

The article is organized as follows. The authors' backgrounds and experiences will be introduced; this is essential because in this kind of research, the researcher herself or himself is the most important research instrument, hence our need to "situate" the researchers. The basic tenets of reflection in action as a research approach will be presented. After that, examples of concrete research projects will be briefly discussed. In order to put the approach in perspective, a comparison between organizational ethnography and reflection in action is presented. Ethnography is chosen as a yardstick because it is close enough to the proposed approach to make the comparison meaningful. At the same time, it has sufficient differences to help outline how the proposed method of doing research differs from the more established methods. The paper concludes by highlighting some points that are seen as essential for those who would like to analyze their own experiences according to the suggestions presented here.

2. BACKGROUND

The idea of using Reflection-in-Action as an IS research approach grew gradually during the dissertation work of the first author (Heiskanen 1994). The research work began in 1987 as a rather positivistic inquiry to the implementation process of a new student record system of the University of Helsinki. In the early 1980s, the first author was a senior analyst developing the software and later a project leader for the decentralization of the system functions to the departments of the University. During the process, he also became the Chief Information Systems Officer of the University. Gradually during the late 1980s and the early 1990s, the positivistic approach was replaced with a more hermeneutic or phenomenological view.

The second author became a part of this process as the dissertation inspector and opponent of the first author in 1993. His special experience in longitudinal research has close parallels with the first author's study of university systems over a period of more than a decade. The second author has published several studies of system development projects covering five to 15 years. Using this empirical evidence and careful interpretations, he has developed a social process model of IS design (Newman and Robey 1992; Robey and Newman 1996).

3. REFLECTION-IN-ACTION

The aim of this research is to investigate the possibilities of translating direct experience from practice into a form that makes sense to the academic audience as well. For this purpose, the notions of Reflection-in-Action, adopted from Schön (1983), are used. Mintzberg's (1979a) recommendation of a direct and descriptive research strategy will be followed. The research will rely on simple methods, tracing the flow of events and decisions in an organization. The approach is related to what Iivari, Hirschheim and Klein (1997) call the Professional Work Practice approach (cf. Andersen et al. 1990; Lanzara and Mathiassen 1985).

Schön (1983, p. 163) frames the work of design as a reflective conversation with the situation where the practitioners function as agents and experients.[1] Through their transactions with a situation, practitioners shape it and make themselves a part of it. Hence, the sense they make of the situation must include their own contributions to it. Yet they recognize that the situation, contrary to the intentions, may foil their projects and reveal new meanings.

The structure of the process is described by Schön (1983, pp. 129-132) as follows: The practitioners approach the practice problem as a unique case. They do not act as though they had no relevant prior experiences. On the contrary, they attend to the peculiarities of the situation at hand, seek to discover the particular features of the

[1]By "experient," Schön appears to mean an experimentor who is at the same time also a target or part of the experiment.

problematic situation, and, from their gradual discovery, frame the situation and design an intervention. The situation is uncertain and there is a problem in finding the problem. As the practitioners frame and reframe the problem, they suggest a direction for shaping the situation. The practitioners then take the framed problem and conduct an experiment to discover what consequences and implications can be made to follow from it. In order to see what can be made to follow from this framing, the practitioners try to adapt the situation to the frame. But the practitioners' moves also produce unintended changes that give the situation new meanings. The situation talks back and the practitioners reframe the situation once again. The process spirals through stages of appreciation, action, and re-appreciation. The situation comes to be understood through the attempt to change it, and changed through the attempt to understand it.

Schön criticizes "technical rationality" (Chapter 3), according to which professional practice consists of the application of standardized scientific knowledge that is instrumental for problem solving. In contrast, Schön sees practitioners as involved in personal relationships, situations demanding action, and value conflicts. In this practice, the practitioners develop knowledge that is often tacit and spontaneous and some of this becomes routine. In order to break these routines, the practitioners need the Reflection-in-Action. They criticize their means and ends and become researchers in the practice context. They will develop a practice-oriented theory or rationale according to which they explain the situation and choose their acts.

The word "theory" has here a special meaning because, according to Schön (1983, pp. 273-274), practitioners do not consider that they have formed a satisfactory account of phenomena in any practice situation until they have framed it in terms of their overarching theory, in terms of a rationale according to which they explain the situation and choose their acts. So theory has two intertwined meanings, first in action design and then in "after-the fact" explanations and interpretations.

An overarching theory does not give a rule that can be applied to predict or control a particular event, but it supplies language from which to construct particular descriptions and themes from which to develop particular interpretations. Sometimes the overarching theory can be adopted from a research tradition. In one piece of previous work (Heiskanen et al. 1996), the notions of transaction cost theory could be used. On another occasion (Heiskanen and Similä 1992), the research could build on a specific earlier work (Pettigrew 1972) on how the control of information flows between organizational actors, gatekeeping, is present in specific IS development projects. Sometimes the theory means a certain view of the situation at hand. This was the case (Heiskanen 1993) when the decentralization strategy of the Student Record System in the University of Helsinki was interpreted according to one of the Morgan's (1986) organizational metaphors. Often the theory is more related to the particular situation of practice, leading to more of an intelligent explanation than a scholarly theory.

The experience gained through the research is that practitioners reporting to an academic audience should take care of three points: theoretical sensitivity, number of phenomena observed, and amount of scrutiny in data recording and processing (Heiskanen 1995).

Theoretical sensitivity (cf. Strauss 1987) means the scope of theoretical concepts the practitioner is aware of and is able to use when trying to understand his or her daily encounters with organizational life. Theories do make a difference in observation (Weick 1985, p. 113). **Number of phenomena observed** means the breadth of observations the practitioner is able to grasp in the light of her or his theoretical knowledge. However, the mere observation is not enough; it must be combined with recognition and reflection. The observed phenomena make up the sand out of which the practitioner/researcher is panning golden nuggets for research, according to the metaphor by Jarvenpaa (1991). **Amount of scrutiny in data recording and processing** means the adoption of the typical methods

employed by ethnographers such as making field notes, taping interviews that are later transcribed, and gathering organizational documents (Bernard 1989).

The dilemma of reflective practitioners is how to divide their resources between the three activities described above. They may lack resources for gathering data only for research purposes and may, for example, feel uncomfortable interviewing their coworkers in great detail. Tedious procedures in data recording and reduction are not their specialty. The practitioner in a way filters observations and reduces the data when they are conceived. If poorly performed, recording may become biased. On the positive side, the practitioner is more likely to be able to immediately recognize when something important is happening. The research databases of this approach are not typically ordinary research corpuses, but more probably collections of organizational documents. For example, the whole database of cases for the present research consists of some 40 folders of organizational documents and authors' notes.

The reflective practitioner approach can be related to the well-known classification of IS development paradigms suggested by Hirschheim and Klein. They see that the IS field can be divided into four areas by using two dichotomous dimensions: order-conflict and subjectivist-objectivist. In the order-conflict dimension, the order view emphasizes organizational stability, integration, consensus, and functional coordination. The conflict view emphasizes change, conflict, disintegration, and coercion. In the subjectivist-objectivist dimension, the objectivist sees that the methods adopted from the natural sciences can be applied to the study of human affairs. The subjectivist position denies the appropriateness of natural science methods for studying the social worlds.

Hirschheim and Klein give the following names to their four classes: functionalism (order, objectivism), social relativism (order, subjectivism), radical structuralism (conflict, objectivism), and neohumanism (conflict, subjectivism). These classes can be mapped to Schön's view of the professions, although Schön's classification is not as clear cut as that of Hirschheim and Klein, who maintain that their four paradigms are "archetypes—highly simplified but powerful conceptions of an ideal or character type" (1989, p. 1202). Schön finds three different general approaches to professions: technical rationality, the radical criticism of technical rationality, and the reflective practice. To put it simply, technical rationality appears to be like functionalism, and the reflective practice seems to resemble neohumanism. The radical criticism of the technical rationality seems to have features common with the radical structuralism.

4. REFLECTIONS-IN-ACTION: EXAMPLES OF RESEARCH PROJECTS

For this section, concrete examples of research have been chosen to illustrate the approach. All of them have been carved out of the development process of the Student Record System of the University of Helsinki from the early 1980s up to the present. The presentation structure for each example follows the same pattern: problem statement, theoretical basis, solution for the practical case, and possible extrapolations.

The first problem encountered in the history of the research approach was how much more hardware resources were needed in the early 1980s because of the increased input data that was induced by the syllabus reform (Heiskanen and Helanterä 1982). Regression and simulation model building were used to calculate CPU- and I/O-time as a function of "natural business units" (Artis 1980) and equations were derived to predict CPU and I/O demand as a function of the number of database and transaction records. Methods and experiences of program instrumentation could be reported. An argument for the estimation of resource demands for the whole IS life cycle was made. This early work was quite different from the later efforts. The problem was perceived to be a technical one which should be dealt with in a positivistic way, the only way of doing research known to the first author at that time.

The next example of research was of how the Student Record System decentralization strategy should be designed in the late 1980s (Heiskanen 1993). The theoretical basis was the conscious use of an organizational image as a generative metaphor for the strategy: the organization as brain (Morgan 1986). This yielded an interpretative strategy (Maassen and Potman 1990) which took into account the special nature of universities (Mintzberg 1979b). This case shows how a theoretical basis is combined with practical recommendations and gives support for the brain metaphor by demonstrating how this complicated metaphor is applied in practice.

The subsequent research problem was to analyze the interaction structures between users and developers in software contracting with a software house (Heiskanen and Similä 1992). To solve this problem, the notion of gatekeeper as the controller of information flows was used (Pettigrew 1972). A model of the evolution of the interaction structures was developed and a case presented to show that the gatekeeper role is not stable, thus falsifying prior conceptualization of gatekeeping in IS development. This research stream was later enlarged to include both other information systems from the administration of the University of Helsinki and a more explicit theoretical basis in IS process studies and transaction cost theory (Heiskanen et al. 1996).

The last research area was the analysis of the difficulties of discerning whether the development process of an IS is a failure or a success. These results have been published only in the dissertation of the first author (Heiskanen 1994, Chapters 6 and 7). In a limited scope research, solving this success or failure problem was attempted by building an aspiration or expectation level model for IS assessment (Lewin et al. 1944; Lyytinen and Hirschheim 1987), using a simple criterion, the number of voluntary Student Record System adoptions in departments. The work also entailed an ethnographic description of the process. It could be concluded that the process was a moderate success. This conclusion was based on an understanding of the adoption microcosm in departments. For a broader audience, a detailed case analysis of the reasons why IS goals are problematic success referents could be provided.

In order to find a reliable and practical solution to the IS assessment dilemma, an assessment procedure for the information systems of the University of Helsinki administration was devised. The assessment procedure development was based on the recognition of the political dimension of assessment (Palumbo 1987), analysis of the mechanisms of influence (Mintzberg 1983), fourth generation evaluation (Guba and Lincoln 1989), and interpretative evaluation principles (Walsham 1993). Assessment data were obtained through several channels such as questionnaires and user-developer meetings. Organizational negotiation structures that were connected to annual development planning were developed. For the Student Record System, support indicated that it was a moderate success. A case example of connecting assessment to development planning was also provided.

In the near future, a new cycle in the research of the Student Record System will be undertaken. The target will be a nationwide consortium implementing a modern system to support teaching and learning.

5. REFLECTION-IN-ACTION AS A RESEARCH METHOD

In this section, some of the issues which need to be addressed in order to develop the Reflective Practitioner approach into an accepted scholarly method will be identified. Unfortunately the space does not allow the full treatment of reliability and validity issues. For those issues, the reader is referred to Heiskanen (1995). A profound analysis of these “naturalistic” ways of doing research can be found in Lincoln and Guba (1985). Their stance toward scholarly inquiry quite closely forms the philosophical basis of the present work.

Schön recommends the combination of practice and research (1983, pp. 307-325). Related to his advice, an outline of the comparative analysis of Reflection-in-Action and organizational ethnography is put forward. Ethnography

is chosen as a "yardstick" because it is close enough to Reflection-in-Action in two important respects: the ethnographer stays within the target organization and she or he is the research instrument.

Ethnography (Sanday 1979), a form of cultural anthropology (Bernard 1989), is an established field and the ethnographic conduct code (e.g., Bernard 1989; Sanday 1979; Van Maanen 1979) is well developed. Normally an ethnographer is not supposed to be active in the manner of an action researcher or a reflective practitioner. This gives contrast to the outline, thus helping in the analysis of the limitations and advantages of Reflection-in-Action in bridging the gap between research and practice.

Traditionally, these studies are often known to suffer of the following problems (Miles and Huberman 1984, p. 230):

- **The holistic fallacy:** interpreting events as more patterned and congruent than they are, lopping off the many loose ends of which social life is made.

- **Elite bias:** overweighing data from articulate, well-informed, usually high-status informants and underrepresenting data from intractable, less articulate, lower-status ones.

- **Going native:** losing one's perspective or one's "bracketing" ability, being coopted into perceptions and explanations of local informants.

In principle, Reflection-in-Action likely avoids the holistic fallacy, because the Reflective Practitioner is required to pay attention to the uniqueness of the situation at hand. It seems reasonable to suppose that the Reflective Practitioner approach *per se* does not give any special credence to the elite bias. On the contrary, quite often the practitioner must show compliance to the powerful groups and individuals around her or him.

The problem of going native, getting over-involved in the views of some particular informants and losing researcher professionalism, needs special attention from a reflective practitioner/researcher. On the one hand, Reflective Practitioners have a natural social and professional role in the host organization. Therefore, they can have "natural" mistrust toward the claims made by other organizational actors. This is related to the reliability of informants in another way, too, because it is reasonable to suppose that informants do not distort "facts" to a Reflective Practitioner as easily as they would to a stranger (cf. Van Maanen 1979). This does not remove the problem because, quite probably, the participants are prone to try to affect the Reflective Practitioner and therefore their perceptions should not be accepted at face value. On the other hand, there still remains the problem of the Reflective Practitioner being too close, too native, to her or his prejudices.

It seems that Reflection-in-Action performs reasonably when compared with standard ethnography when it comes to the three problems above. There are other issues to be considered here: the neutrality of the researcher and the methods and resources that are available for research.

Two incidents are presented as examples that highlight issues of neutrality, indicating that a researcher may pose a threat to some members of the target organization or its stakeholders. Järvinen and Tyllilä (1980) described a conflict between a software vendor and the researchers who saw that improvements were needed in software functionality and in organizational implementation. Eriksson (1994) noted that an EDP manager was fired because—so it seemed— the research project (Eriksson 1990; Hellman 1989) indicated that EDP personnel had neglected to provide sufficient user support. The research project took care of many such support functions that normally should have been attended to by the EDP personnel such as the production of an accepted user manual. The research project clearly adopted the user point of view, not a balanced one between the organizational actors (Hellman 1989).

Related to these incidents, it is possible to conjecture that Reflective Practitioners as researchers may even be a greater threat than professional strangers for two reasons. First, the practitioners may have stakes in the process, i.e., they are not neutral and therefore may have motives to promote their practical interests through research. Second, because they are participants, they may have access to privileged information and the means to influence the situation.

These incidents also show that an outside IS researcher as an active participant may quite easily lose or purposefully abandon the neutrality that is sought by a participant observer (cf. Barley [1990] who was careful not to take sides). Or the outside researchers may find that they cannot sustain a neutral stance because it seems unethical. This research accepts that a researcher can be non-neutral, but not unfair. It can be added that standard ethnography also admits that there is no value-free science (Bernard 1989, p. 117).

On the grounds above, it may be supposed that a Reflective Practitioner has different problems of neutrality from an ethnographer, especially when there is a value conflict in the site. The solution of the neutrality problem seems to be more difficult for practitioners, because they do not have the option of taking the role of a professional stranger, the archetype of an ethnographer. Generally, a practitioner cannot leave the research site as easily as an ethnographer. Moreover, a Reflective Practitioner often cannot be inactive when problems emerge. However, the practitioner should exclude from research such topics where the fairness of reporting is jeopardized because of neutrality problems that cannot be mastered. This is because the Reflective Practitioner can distort the facts presented to the public, thus taking unfair advantage of her or his dual role.

The main asset of Reflection-in-Action is that the practitioners are in the middle of the action: they do not need to bother with how to gain access, which is one of the most difficult task of an ethnographer (Bernard 1989, p. 160; cf. also Barley 1990). The learning of the local language does not presuppose any extra efforts, because a competent practitioner by default masters the language. The practitioners do not need to take extra efforts to explain their presence in the organization.

The second major asset of Reflection-in-Action arises from the practitioner's familiarity with the research site. It seems that often the burden to prove the reliability and validity of findings is easy for the practitioners, because they can be considered to be connoisseurs. Their arguments may preserve their cogency, although they do not present as detailed evidence as a "professional stranger." Two examples will make the point of what the burden of proof means. Pettigrew (1972) had to engage in a long analysis to prove that the gatekeeper he had identified really was a gatekeeper who took advantage of his position. Heiskanen and Similä (1992) could rely—with reasonable validity— on our direct experience of being a gatekeeper or seeing a colleague acting as one. Barley (1990, p. 228) spent 171 days (approximately 1,100 hours) watching and recording the work of physicians and radiographers. The typing of his notes, done on the evenings of the observation days, produced a corpus of 2,500 pages (the typing time is excluded from the figures above). Through these efforts, he could verify that the technique of computerized tomography did not dictate the division of labor between these two professional groups.

The conclusion here seems to be that Reflection-in-Action has weaknesses as well as strengths when it is compared to ethnography. The conjectures are summarized in Table 1.

As the last issue, note that a necessary condition for Reflective Practitioners to act as (publishing) researchers is that their organizations accept this activity. The organizations backing this research have been supportive, but universities may be exceptional organizations, accepting scholarly activity among their administrative as well as research personnel. Practitioners can and often must rely on several different research methods and traditions. The research options remain only options if the practitioners do not have enough time to make themselves "theoretically sensitive,"

Table 1. Conjectures About the Comparison Between Organizational Ethnography and Reflection-in-Action

ISSUE	ETHNOGRAPHY	REFLECTION-IN-ACTION
Holistic fallacy (G)	Considerable threat.	Unlikely to happen.
Elite bias (G).	Considerable threat.	Considerable threat, especially when the career prospects of the practitioner are dependent on presented research findings.
Going native (G).	Considerable threat.	Unlikely to happen in the classical sense. The threat is in too limited a reflection if the practitioners remain too close to their (initial) perceptions.
Neutrality of the researcher (G).	Option for neutrality exists.	Problematic, because the practitioner may also have stakes in the process; difficult to withdraw in case of conflict.
Experience of researcher (G).	Multiple sites, broad comparisons possible between different organizations.	Single site or few sites. Deep but narrow experience.
Entering the research site, moving around the research site (RP).	Difficult.	Easy, because the practitioner is already in the site; access to other sites may be difficult, but perhaps easier than for ethnographers.
Access to data on the site (RP).	Demands effort. Relies on good will of informants.	Usually well established.
Mastering the language of the site (RP).	Takes time.	By default.
Researcher as a perceived threat in the site (RP).	Only modest and rarely occurs.	Varies depending on the amount and severity of conflicts; may be very high.
Penetrating the fronts of the informants (RP).	Possible, demanded from a good researcher when informants seem to distort evidence. Corroboration may alleviate this problem.	Unethical for research purposes in case of conflict; other means should be employed. Unnecessary if there is no conflict.
Reporting evidence and verification (Post)	Established rules and procedures exist for checking research validity.	No tradition. Must be treated case by case basis.
Burden of proof (Post)	Heavy, because the researcher has adopted the role of a professional stranger.	Alleviated by the researcher's familiarity with the field; problems because of the threat of partiality and revisionism.

G: general issue RP: research process issue Post: post research issue

i.e., to get familiar with relevant theories, to make and record the observations needed, and to carry out the research reporting. Mastering these aspects of researcher professionalism is perhaps the most difficult and time consuming task in the dual researcher/practitioner role.

6. CONCLUSIONS

The conclusion of this paper is that Reflection-in-Action is best in process studies, because it is easy to arrange data collection. For the negative side, it is difficult to report in a balanced and believable way on conflicts where one is a participant. Other practitioners are encouraged to intellectual curiosity toward their own work, but they must realize that in so doing they become doubly accountable, first in the research community where they publish their findings, and later in the practice community where the participants may read the "scientific" reports. This paper agrees with Nord and Jermier (1992) who make the point that "scholarly educated" managers might be a real threat to people emancipation if they use their theoretical knowledge, analytical skills, and track of publications to promote malicious ends.

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