29 ON TRANSFERRING A METHOD INTO A USAGE SITUATION

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Abstract Many things can militate against the successful transfer of IS methods from research to commercial environments. In this paper we synthesize a framework for reasoning about method transfer. Four main themes emerge from analysis of the relevant literature: the importance of a clear conceptual framework for a method; support for learning; usability within a defined context; and acceptability to stakeholders. These themes are elaborated in the paper, and also illuminated, by reference to Langefors' infological equation and from experience gained in four case studies of method transfer. We claim that there is an onus on both method developers and those responsible for method adoption to consider all identified aspects, in an attempt to minimize inherent tensions between methods in concept and methods in action.

Keywords: Method transfer, infological equation, experience of transfer, framework

1 INTRODUCTION

We consider here the issue of transferring a method from a method development environment to method users within defined usage contexts within commercial **organizations**. In particular, we present a framework for reasoning about method transfer. Such a framework highlights the key issues to be considered when reasoning about methods and their potential adoption, and is intended as a guide to method users (what should be considered in evaluating a method for possible adoption?), and method developers and promoters (what should be addressed when developing and describing a method?).

Much effort has been expended in the development of methods within the IS community, but the value and nature of methods have been subjects of ongoing debate.

The position taken here is that there remains a broad consensus on the need for methods at least as a guide to assist thinking and acting within IS development.

In considering IS research, Moody (2000) notes the fundamental importance of influencing and being influenced by practice, claiming that "the fundamental problem that needs to be solved in IS research is not a methodological problem nor a theoretical problem, but a knowledge transfer problem" (p. 359).

In this sense, method development without method transfer into a real usage situation is of little value. This sentiment is well represented in the literature (see, for example, Avgerou and Cornford 1993; Bubenko 1986; Fitzgerald 1996; Goldkuhl 1994; Kitchenham et al. 1997; Lyytinen 1987; Moody 2002; Shanks 1996; Wynenkoop and Russo 1995). Amplifying on this, Fitzgerald (1996), based on Ward (1992), adds the prerequisite that such proof "requires the method or technique to have been successfully applied to a non-trivial problem situation" (p. 12).

Method transfer must acknowledge the situated nature of IS development practices—that is, the concept of "method in action" (Fitzgerald et al. 2002)—an issue well addressed in the literature (e.g., Bansler and Bødker 1993; Baskerville et al. 1992; Fitzgerald 1997, 1998; Fitzgerald et al. 2003; Floyd 1986; Grant and Ngwenyama 2003; Hughes and Wood-Harper 2000; Introna and Whitley 1997; Jayaratna et al. 1999; Mathiassen and Purao 2002; Nandhakumar and Avison 1999; Ramesh et al. 2002; Russo et al. 1995; Stolterman 1991; Truex et al. 2000; Wastell 1996).

In the light of the above, the successful transfer of a given method must be interpreted as developing, within a given context and based on the method, a successful method in action.

The framework presented specifically focuses on what affects the success of any method transfer activity. In essence, success must be judged by (1) ease of deployment, (2) success of process (in terms of acceptability to stakeholders and management), and (3) effectiveness of outputs (in terms of a sense of ownership by stakeholders and value judgement by managers and other stakeholders). We use these ideas to reflect on our experience of transfer of the *2G* method into a number of company contexts. This qualitative method was developed for use in the evaluation of IT products, and is intended to aid in reasoning about the implications of adopting a product (Lundell and Lings 2003).

Other frameworks related to methods can be found in the literature, but have differing perspectives and foci. The NIMSAD framework (Jayaratna 1994), while addressing some method transfer issues, focuses on inherent properties of methods themselves rather than method transfer. The framework of Fitzgerald et al. (2002) focuses on ISD method use and is centered on method-in-action. It raises the issues of both rational and political aspects of methods and emphasizes the complexity and dynamic nature of the context in which a method is used.

2 ON METHODS

The terms *method* and *methodology* have been used in a variety of ways in the literature (see, for example, Wynekoop and Russo 1995), and considerable confusion can be generated by intermixing their usage. In order to avoid confusion, we use the term method to refer to documented ways of working in IS development and IT evaluation. In this sense, it is appropriate to refer to SSADM as an IS development method and the

2G method as an evaluation method. We use the term methodology only in the context of research methodology, namely when describing our approach to developing the framework proposed.

In this section, we clarify what we mean by method, which we term method-in-concept to distinguish it from method-in-action. Loosely speaking, method-in-concept refers to a method as understood by its stakeholders, and in this sense it is a social construction: a shared set of values and assumptions identified with a method within a professional community of method developers and users. For example, Hesse (2001) states that the rational unified process (RUP) is based on a phase-oriented software life-cycle model. If this is a shared view of the professional users of RUP, then it can be said to be a part of its underlying philosophy. However, the real claim is that there are no examples of RUP-in-action that are non-phase oriented, and there is reason to believe that this situation will persist.

Different authors have offered different definitions of method. It is clear that the tension between method-in-concept and method-in-action is reflected in the definitions offered, which can be viewed as taking different perspectives on the same phenomenon.

For example, in discussing the scope of object-oriented methods, Rumbaugh et al. (1991) and Henderson-Sellers *et al.* (2001) both take a method-in-concept perspective and identify a number of components (or constituents) for a method. This emphasizes the technical perspective of development.

From a more socio-technical perspective of development, Hirschheim et al. (1995), with a slight method-developer emphasis, define method-in-concept to be "an organized collection of concepts, methods,[1] beliefs, values and normative principles supported by material resources" (p. 22).

By way of contrast, Fitzgerald et al. (2002) offer a more method-user emphasis in their definition of a method as a

> coherent and systematic *approach*, based on a particular *philosophy* of systems development, which will guide developers on *what* steps to take, *how* these steps should be performed and *why* these steps are important in the development of an information system (p. 5).

A more sociological perspective, distinguishing between methods as perceived by method users and as perceived by method developers, is offered by Floyd (1986), who states,

> We consider methods not so much as static, well-defined objects, but as dynamic sources of ideas to be tailored to a given situation and transformed by use…there is a subtle interplay between the system development process as it is (in our view), as it should be (in our view), and as it should be (according to the method's view) (pp. 30-31).

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[1]The term method is here used to denote "a well-defined description" of "a way of accomplishing a task" (p. 11). Hirschheim et al. use the term methodology to refer to method as used here.

If method-in-concept is to be transferred into method-in-action, then both social and technical issues must be addressed. This raises issues both with respect to method development and method deployment. These issues are further complicated when a method is to be supported in a tool. A method as implemented in a tool (method-in-tool) is likely to differ from its method-in-concept and any associated method-in-action. There are many reports of the tensions resulting from these differences (for further discussion, see Lundell and Lings 2004). We focus here on transfer of method-in-concept into method-in-action, but there are clearly also implications for transfer to method-in-tool.

For us, Avgerou and Cornford (1993) sum up the importance of method transfer when they claim that a "theoretically sound [method] which cannot be successfully communicated to and adopted by ordinary organizations and businesses is of little practical value" (p. 280).

While focusing on method transfer in this paper, we acknowledge that it is an aspect of broader issues that have received attention in the literature, including method adoption and diffusion (e.g., Beynon-Davies and Williams 2003) and technology transfer (e.g., McMaster et al. 1997).

3 RESEARCH METHODOLOGY

Our primary goal has been to establish the major factors affecting method transfer. A further goal has been to use this knowledge to plan transfer of the *2G* method into real company contexts, and to analyze our experience of transfer. To this end we have used literature analysis followed by a number of case studies. Our literature analysis emphasized coverage of relevant literature on the topic, and so was "not confined to one research methodology, one set of journals, or one geographic region" (Webster and Watson 2002, pp. xv-xvi). In fact method transfer emerged as one of the most significant themes within a broader literature study related to method validation.

Initially, we used scientific databases for searching high quality papers and conducted an extensive search of relevant journals and conference proceedings. Besides our use of keywords and citations (both forward and backward) for identification of sources, the search also involved systematic browsing.

The study started with a broad search for themes, and in particular factors affecting the effectiveness of methods.[2] The rich body of literature available for analysis includes sources from several (partly overlapping) areas which could be broadly categorized as IS assessment and evaluation (e.g., Etzerodt and Madsen 1988; Hirschheim and Smithson 1988; Kitchenham et al. 1997), IS methods (e.g., Avison and Fitzgerald 2003; Fitzgerald et al. 2002; Veryard and Macdonald 1994), and research methodology (e.g., Marshall and Rossman 1999; Maxwell 1996). None of our own papers was used in the review.

A set of themes emerged which was then used to direct further searches. Extensive note files were maintained throughout, and text relevant to themes annotated accordingly. As themes evolved, annotations evolved also. Occasionally, theme changes

[2]It should be noted that we were motivated to consider these specific areas by the development effort behind the *2G* method.

were such that significant reinterpretation of the set of note files was necessary. A framework for considering method transfer was thus iteratively evolved through a methodology that borrowed from qualitative coding techniques. A small proportion of the sources consulted is considered strongly relevant for informing a theory of method transfer.

The framework was used to plan and analyze four studies of transfer of the *2G* method, each conducted in a different IS development company. Each case study had a method user new to the method and based in a company for the equivalent of four months full time (see, for example, Rehbinder et al. 2001). All studies used individual open interviews; two studies supplemented these with group interviews. Method user experience of transfer was considered across the four case studies. For two of the case studies, the field notes taken by the method user were supplemented by one of the method developers through *post facto* stakeholder open interviews. Stakeholder feedback was also obtained through respective company seminars, involving (at least) the method user, a method developer (who took notes), and stakeholders involved in the case study. For the purpose of dissemination, other company representatives (including managers) also participated in these seminars, and interestingly also proffered feedback on the method application as well as its deliverables.

4 METHOD TRANSFER: AN INFOLOGICAL PERSPECTIVE

To understand method transfer it is enlightening to consider information transfer between human actors. Langefors' early work (1973; see also Langefors 1995) constitutes a foundation for "the Scandinavian approach" in the field of Information Systems. As part of this work, Langefors (1973) defined the infological equation in an attempt to explain the relationship between data and information, and so theorize about information transfer.

In a sense, the equation is a response and reaction to the early work in computing, which did not discriminate between data and information, in that Langefors' definition of information is dependent on a human aspect (which he refers to as *pre-knowledge*). The equation has influenced a number of thinkers (see, for example, Nissen 1995). In a recent elaboration,[3] Langefors himself has stressed the importance of shared pre-knowledge for all forms of communication, including oral, and that this continues to have major relevance in IS.

The equation (Langefors 1973, p. 248; 1987, p. 90; 1995, p. 144) is based on the assumption that information I is obtained through an interpretation i that is dependent not only on data D, but also on the pre-knowledge S of the observer and the available time t for interpretation by the observer:

$$I = i\,(\,D, S, t\,)$$

[3]Invited talk, University of Skövde, April 24, 2003: "ADB i ett historiskt perspektiv."

For example, given a certain available time *t* for observation, the resulting information *I* will be limited if *D* is extensive but *S* is limited; and similarly if *D* is limited even if *S* is extensive. Of course, *S* will evolve over time, as it constantly changes with experience.

In fact, to Langefors, *S* is interpreted as complete life experience, and of course no two people can have the same *S*. For information transfer to take place, two people only require "sufficiently similar" pre-knowledge (Langefors 1987, p. 90). Langefors himself acknowledges that not all of an actor's pre-knowledge is relevant to interpretation of data. Here we, perhaps controversially, interpret sufficient similarity to be also context dependent, in that not all of an actor's pre-knowledge is relevant to any *given* interpretation. To characterize this context dependency, we will refer to congruence of pre-knowledge between communicators to distinguish it from Langefors' notion of sufficient similarity.

Considering method transfer from this perspective, we can intuit that a method user's facility with a method will be a function of the available method description *D*, the user's relevant pre-knowledge *S*, and the time *t* for interpretation. It should be noted that *D* represents communicable data, which will include method documentation but may include any form of communication. Hidding (1997), in a study of methods and the use of their descriptions by practitioners, makes a number of relevant observations which we interpret in the light of the equation. For a method user, *D* will include the full documentation of the method which, according to Hidding, is usually "voluminous and detailed in different sets of folders and binders" (p. 104). However, many practitioners "had internalized the [method] to the point that it had become subconscious" (p. 105), in fact to the level that some even claimed that they did not use any method. This is indicative of very high relevant pre-knowledge *S* ("practitioners no longer 'interpreted' methodology, as they had 'compiled' it" [p. 105]).

It should also be noted that if *D* is large, then practitioners for various reasons will not be willing to invest large amounts of time *t* and so high pre-knowledge *S* with ready access to relevant parts of *D* will be demanded. Such behavior was noted by Hidding: practitioners demand ready access to method documentation but will typically be prepared to read only around 30 pages as required (p. 106).

While not directly influencing the framework for method transfer presented in this paper, we use Langefors' equation in interpreting many of the concepts that emerged within the framework.

5 THE FRAMEWORK FOR METHOD TRANSFER

Through our literature analysis and our early experience of method transfer (Lundell and Lings 1999), the framework for reasoning about method transfer represented in Figure 1 has been evolved.

5.1 Clear Conceptual Framework

All methods have an underlying philosophy, whether implicit or explicit, and offer at least some guidance for a way of working. The extent to which they are prescriptive

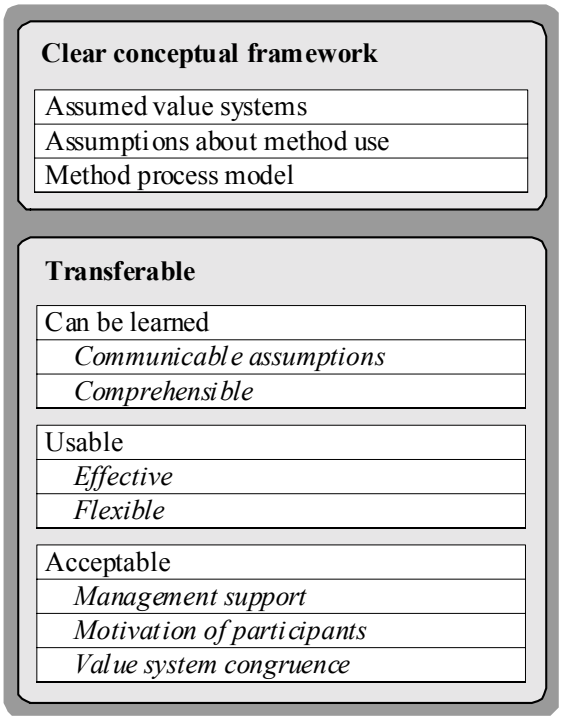

Figure 1. A Framework for Reasoning about Method Transfer

in the latter varies, as does the consequent detail to be conveyed to any potential method user (*D* in Langefors' equation). The (often tacit) conceptual framework on which a method draws can usefully be considered as contributing to an understanding of the pre-knowledge of the method developer—which we will indicate by S_m. Of course, this is an inexact analogy. A method may be developed by many developers, each with their own pre-knowl edge, and therefore each with their own method-in-concept. This may mean that inconsistent interpretations exist of the conceptual framework of a method and thereby what is good practice with respect to the method. We acknowledge this complexity, but for the purposes of exposition will assume a coherent S_m.

It is clear that a user's pre-knowledge is fundamental in influencing the ease with which a method may be transferred, and thereby influences the perception of its success. In other words, efficient transfer requires congruence for the method between S_m and the user's *S*.

5.1.1 Assumed Value Systems

The traditional view of IS development and evaluation as a technical process has been questioned. For example, Myers and Young (1997) note the focus of much information systems research on the "social, political and organizational aspects of IS development" (p. 224), and Bennetts et al. (2000) claim that it is "clear that one key

issue in ISD is organizational politics" (p. 194). Furthermore, as software development is a social process (Pflegger 1999, p. 34), or at least partly a social process (Sawyer and Guinan 1998, p. 552), it is important to acknowledge the complexity involved in the social and political issues of human communication. Therefore, it seems that a consideration of human issues with respect to methods and method usage is of fundamental importance. Interestingly, as noted by Beynon-Davies and Williams (2003), the dynamic systems development method (DSDM) does have some acknowledgment of cultural issues and organizational learning in its description.

However, methods vary widely in their underlying philosophies and a mismatch with the culture of the deployment context could be disastrous (Carroll 2003). Indeed, Avison and Fitzgerald (2003) identify underlying philosophical assumptions of methods as "perhaps the most important aspect" when comparing methods (p. 55), but note that these are frequently not made explicit, making them difficult to assess.

5.1.2 Assumptions about Method Use

Assumptions may be made about the intended usage of a method. Some method providers demand that their users are certified (as with SSADM). Assumptions may also be made about the nature of the objectives of method use. For example, a method may be directed at the production of safety critical software (such as VDM); such a method would be unlikely to suit a research environment targeting the production of prototype software systems. Further, some may specifically cater for scaling, but many may not (Laitinen et al. 2000).

Method developers must also be clear about the intended context for use of a method. For example, it may be assumed that a method will be applied in a production environment (such as may be the case for COTS). This will be detached from any specific context in which the product will be deployed. Alternatively, a method may be designed for a high level of stakeholder participation (for example, SSM), within the context of the intended software usage situation. It may also be that different assumptions are made about different stages within a method.

5.1.3 Method Process Model

By method process model we mean any implied way of working within a method. Certainly there are different views on appropriate models of such processes. For example, according to Nandhakumar and Avison (1996), "it has been widely acknowledged that information systems development in practice is not a sequential process" (p. 210), and Kruchten (1999) claims benefits for RUP in its iterative processes. In fact in Multiview2, there is "no implied precedence in the four components of the methodology…since all four are co-present" (Avison et al. 1998, p. 130). Some methods will emphasize contingency, perhaps offering support for method tailoring, while others, such as SSADM, will emphasize a "clear prescriptive structure, in which every step in the development process is precisely delineated" (Wastell 1996, p. 26). For the purpose of method transfer, it is important that any inherent assumptions about process be conveyed to a method user.

5.2 Transferable

We will use the infological equation as an analytic device to elaborate on important factors for method transfer. In particular, we make the following observations.

First, efficient transfer requires the intended method user to have sufficient pre-knowledge (*S*) to interpret the data available about a method (*D*). In other words, a good transfer strategy will acknowledge the need to align *S* with the pre-knowledge of the method developers (S_m).

Second, if a large volume of documentation is assumed necessary for detailing a method (i.e., there is a large *D*), then even with *S* reasonably congruent with S_m, the time necessary for transfer may be large. For example, a proficient user of the rational unified process (RUP) is likely, on moving to object-oriented process, environment, and notation (OPEN), to have closely congruent pre-knowledge (*S* with S_m for OPEN), but may still take a long time to fully interpret the new method.

Of course, documentation cannot be complete as aspects of a method will always be implicit. Efficient transfer, therefore, requires high congruence between *S* and S_m or, more realistically, a means of increasing the congruence between *S* and S_m. This may be facilitated, for example, by supplementing the published material about a method (*D*) through communication with other method users (i.e., by opening other communication channels; see, for example, Hughes and Wood-Harper 2000, p. 401). The cost of each of these new communications must be acknowledged as effectively extending the time for interpretation of *D*, and for a given situation it may be too costly to achieve the required congruence between *S* and S_m.

With these issues in mind, we consider each transfer factor in turn.

5.2.1 Communicable Assumptions

In essence, *communicable assumptions* refers to information interchange concerning the conceptual framework of a method. The reason for communication is to assist in aligning the potential method user's pre-knowledge with the assumptions behind the method (i.e., increasing the congruence between *S* and S_m), and for this to happen these assumptions must be made available.

Of course, as pointed out by Russo and Stolterman (2000), whether design knowledge can be communicated to practitioners is an open question, but if such knowledge is not communicable then it is not possible to change the way practicing designers view the design process, and method transfer becomes an impossibility. We would characterize this scenario by observing that it would reflect very low relevant pre-knowledge (*S*) of the method receiver, with no realistic way of increasing *S* with the resources available.

5.2.2 Comprehensible

Method developers must consider how to communicate underlying method assumptions, and those involved in method transfer must adopt strategies for efficient communication of them to potential method users. This is unlikely to be achieved simply

by increasing D. In fact, Introna and Whitley (1997) argue that this is not possible. Hence, alternative strategies need to be devised. For example, Hidding's (1997) reference to "voluminous and detailed" documentation was to point out that it was inaccessible at the point of need, and so did not assist comprehension in the way intended. This may be helped by mechanisms to assist the retrieval of relevant documentation, but during transfer it is difficult for a putative method user to know what may be relevant.

Hence, a further implication of transfer is the need for access to human expertise. This can take the form of interaction with colleagues, training, real-time support, and mentoring. The key factor is access to a human actor knowledgeable about the method and the context of its deployment—in other words, with pre-knowledge that is congruent with both S and S_m. For example, a commercial method consultant will be strongly congruent with S_m but not necessarily with S, whereas a method user within an organization may well have pre-knowledge less congruent with S_m but may be more effective in support of a colleague because of congruence of local knowledge.

5.2.3 Effective

As noted by Wynekoop and Russo (1997), there is no single way of assessing effectiveness. We consider effectiveness to be the extent to which use of a method is seen to contribute to achieving organizational goals. However, perceived ineffectiveness may reflect ineffectiveness of transfer rather than inappropriateness of the method for the particular usage situation.

Effectiveness of transfer can be considered to be the extent to which S has evolved toward congruence with S_m, thus allowing high information flow, and therefore rapid progression toward method expertise. Method users who have deeply understood and internalized the principles behind a method are more likely to be more innovative in their ways of working with the method. If this level is not reached, there is a danger that following a method can stifle creativity (Wastell 1996).

5.2.4 Flexible

Flexibility includes "the ability of the [method] to be adapted and improved" (Veryard and Macdonald 1994, p. 270). In particular, it is essential to establish whether the particular assumptions behind the application of the method are too particular to an envisaged usage context. There is also the related issue of whether the method scales for use in different usage situations within a context. As noted earlier, it is unclear whether many methods lend themselves to being scaled down (Laitinen et al. 2000). Furthermore, it may also be important to be able to adapt methods to local work practices (Fitzgerald et al. 2003).

In terms of the infological equation, adapting a method to a context is effectively a process of adjusting a method in order to increase congruence for the method between the method developer and the particular method users. Hence, the method developer's pre-knowledge, S_m, becomes more closely congruent for the method, within the usage situation, with the S of each method user.

5.2.5 Management Support

Lyttinen (1987) observes that "One reason for the abundance of IS design approaches is that it is quite easy to develop a method, but difficult to get it accepted" (p. 4). It is clearly the case that management support is important in influencing such acceptance (see, for example, Kozar 1989).

The investment required in adopting a method is likely to be high, and no matter how efficient the transfer, *t* is unlikely to be short enough for managers. Thought must, therefore, be given to how this can be ameliorated. For example, it may be possible for methods to offer managers useful early indications of success. If benefits can be expected from method use early in method transfer, then investment in adoption is more likely.

5.2.6 Motivation of Participants

According to Beynon-Davies and Williams (2003), methods are "the vehicles by which practitioners…introduce changes to development practices" (p. 30). Taken alongside the claim of Viller and Somerville (2000) that methods "are unlikely to be adopted in industry unless they can be integrated with existing practice" (p. 169), a potential tension can be observed. We see this as supporting the view of Grant and Ngwenyama (2003), who identify the background knowledge (i.e., *S*) and motivation of those applying a method as an important factor in affecting the outcome of the application of a method.

5.2.7 Value System Congruence

It is clear that information exchange is maximized if method user pre-knowledge (*S*) is congruent for the method with the method developer's pre-knowledge (S_m). It is important to note, however, that methods "implicitly or explicitly demonstrate the value sets of their creators" (Jayaratna 1996, p. 26). That is, the value systems of the creators of a method are embodied in S_m.

At the same time, "Methodology users' values play a significant role in terms of the choice of methodology. It is natural to adopt or use a methodology that is congruent with their value systems" (Jayaratna et al. 1999, p. 33). That is, a method is more likely to be adopted if there is congruence for the method between the value systems implicit in *S* and S_m.

6 OBSERVATIONS FROM CASE STUDIES WITH THE *2G* METHOD

Our own model of case studies for method transfer involves a number of roles, including method developer, method user, mentor, and participant. In the studies reported here, a method developer acted as mentor for each method user. Each method user was based in a different company, with each study taking place over a period of from four to six months. Method users were given access to senior developers—the participants—who made time available for open interviews.

In the rest of this section, we use our experience from four case studies on method transfer, here referred to as alpha, beta, gamma, and delta, to illuminate the main themes of the method transfer framework.

6.1 On the Conceptual Framework of the *2G* Method

There is an underlying assumption behind the *2G* method that evaluation is a socio-technical activity, and that evaluation framework development is a key early phase in any evaluation activity. The method differs in two main respects from other systematic methods for developing an evaluation framework. First, it does not use concepts that have been defined *a priori*. Instead, the definition of concepts evolves during analysis. Second, it does not use an *a priori* structure for interrelating these concepts. Instead, interrelationships emerge during analysis. Therefore, we would characterize its approach as primarily data driven: it is a qualitative method, informed by grounded theory, and requires a user to be sympathetic to qualitative techniques.

The method grounds data both from an organizational and a technological perspective, using an iterative, two-phase process. The focus is on organizational need in the first phase, but shifts in the second phase to how needs might be met through current technology.[4] The method is not prescriptive, but gives clear guidelines concerning the use of different kinds of data source in the two phases, and how frameworks may be evolved. It is important that both phases of the method application take place in the organizational setting in which the technology under investigation would be used. The method is intended as a general method, scalable according to context.

The development of an evaluation framework is an evolutionary process involving data collection, analysis, and coding. These activities are not inherently sequential; each can affect (and trigger) the others so that, in essence, all activities are going on together. This characteristic is inherited from grounded theory. In practice, the method uses a process model of iteration between its two phases, but there is no rigid assumption about the speed of this iteration. For example, phase change may occur several times within an interview session, or each session may be devoted to a single phase.

6.2 On the Transfer of the *2G* Method: Can it Be Learned?

None of the users had prior exposure to the *2G* method, or to qualitative techniques in general. There was variation in the level of prior work experience, and in specialism, but all were sympathetic to qualitative ideas and had outgoing personalities. It is an acknowledged weakness of the studies that only in one case (delta) was the method user employed in the respective company prior to undertaking the study, and so had been genuinely a part of the context of the *2G* method application (for one year).

Initially, selected readings were offered, both of documentation of the method and of specific aspects of qualitative techniques, such as conducting open interviews and

[4]Interpreted broadly as "any method, technique, tool, procedure or paradigm" (Pfleeger 1999, p. 111) used in IS development or maintenance.

coding. Tutoring in the underlying assumptions behind the method was continued through mentoring, which took place outside the organizational context. Method users were also required to gain familiarity with the phenomenon under evaluation, which was different for each case study, but this is not considered specific to the *2G* method.

In the alpha study, the method user had a systems analysis background; in the other studies, the method users had a more technical background. However, all adapted readily to conducting open interviews. Coding was in general more problematic, requiring mentor assistance in the early stages of each method application.

The nature of the context of the delta study led to initial misunderstanding of the exact role of the second phase of the method, requiring further input from the mentor. In the other studies, the nature of the two phases was more clearly understood, and only the usual problems of field work using elite interviews, namely ready access to senior developers, was experienced.

6.3 On the Transfer of the *2G* Method: Usable?

In each case study, the framework produced was presented to participating stakeholders for comment after completion. In the alpha study, organizational need was felt to be very well reflected in the framework but technical detail was not fully developed. There were two contributory factors here. First, a very broad scope for the interviews demanded the analysis of large amounts of rich data. Second, the method user had restricted pre-knowledge of the technology under consideration, which made coding more challenging than anticipated. The beta study also produced a rich framework. It was initially difficult to delineate the desired scope of the study, which caused the framework to be broader than eventually required. This again inhibited its refinement with an appropriate level of technical detail.

The beta study required the method user to apply the *2G* method in a novel way, namely in a post-usage situation. This meant that open interviews were more challenging. Interviewees had already compiled the knowledge gained from their experience, and accessing information about their experience at the time of tool usage was difficult. This contributed to the initial difficulty in delineating the appropriate scope of the study.

The gamma and delta studies were conducted in smaller companies and with a narrower focus. The *2G* method was applied in a lightweight fashion, using group interviews and coding with limited interrelationships. In these studies, the level of technical detail in the resulting frameworks was considered by the stakeholders to be good. The delta study also applied a novel technique in phase 2, using prototypes to stimulate discussion.

6.4 On the Transfer of the *2G* Method: Acceptable?

In all studies care was taken to explain the nature of the method to be used, requirements in terms of stakeholder commitments, and expected organizational benefits, both in terms of the delivered output (the evaluation framework) and organizational learning. Initial contact was made with all participants, and method users were based

in the companies throughout the studies. It was felt important to build trust, and therefore to explain exactly how the method user would handle confidentiality—an important aspect politically, as testified in post-study interviews.

In all of the case studies, a sizeable majority of stakeholders have been enthusiastic participants, which has contributed significantly to the level of success. In the alpha study, feedback from *post facto* analysis suggested that the method was highly transparent, and appeared to be a natural way of working. From the beta study, one stakeholder was committed to following the application in detail: an initial skepticism of the way of working as a method user changed over the course of the study so that, by the end, there was management commitment to using the method internally. In the delta study the resulting evaluation framework was adopted by the company as the basis on which to select a product for adoption, but the method itself was again seen as transparent. In all of the studies there was feedback that participation was an informative experience, even where a delivered framework was considered to require further development.

7 CONCLUSIONS

In this paper we have reasoned about method transfer as a special case of knowledge transfer. We have presented a framework for considering the issue of method transfer, which we claim has implications for method development. We have also applied the framework to reasoning about our own experience of method development and transfer.

The infological equation has helped us to reason about method-in-concept and method-in-action. In particular, it is clear that there can be no realistic assumption that method-in-action will ever reflect a method-in-concept as understood by a method developer. This would require full congruence, for the method, of the method user's and method developer's pre-knowledge. Given that in practice there is likely to be more than one method user, such congruence is even more unlikely.

One reaction to this situation may be to attempt to engineer a method for a specific context, effectively tailoring a method in full appreciation of the given pre-knowledge of the intended method users. However, this again is unrealistic when viewed in terms of the infological equation. Not only is user pre-knowledge difficult to access, but it will vary between users and change over time. Hence, an engineered method will still be a method-in-concept, with all the implications that that implies. Further, the engineering itself suggests a requirement for documentation of the engineered method and its rationale. This implies added investment, which may not be forthcoming.

One final position is to look to IS developers to evolve effective practice in their own context, without requiring adherence to any method-in-concept. This can be said to acknowledge real practice, and can be seen as offering freedom for creativity among developers. This treats methods-in-concept as merely exemplars, to be used to develop further the pre-knowledge of developers. This removes the problem of congruence with an external method developer's pre-knowledge, although the different pre-knowledge of the individual users may remain a problem. From a management perspective, acceptability may be lowered because of the need to control projects. The fact that

working practices will, to a large extent, be embodied rather than documented can be a two-edged sword for managers. Lack of prescribed procedures may be attractive for recruitment, but may militate against quick and effective utilization of new staff.

Behind all method use is the question of method support, and in particular the role that tools can play in IS development. It may be that IS development requires some form of tool support, but it is unclear what form this should take. This is a particular question for those who advocate direct support for methods in tools, such as in CASE.

We believe that the role of IS researchers is to attempt to minimize the inherent tensions between method-in-tool, method-in-concept, and method-in-action. For method proponents, this means explicitly addressing the issues raised: concerning a clear conceptual framework, highlighting early benefits of adoption, and explicitly addressing scalability. Further research is required into how methods can be presented to better support comprehension, evaluation for contextual relevance, and adaptation. Open questions also remain concerning evaluation, adaptation and diffusion within defined contexts. More situated research is required to aid in understanding the complex dynamics of method adaptation and diffusion within real organizations, and more support must be offered for organizations wishing to tailor methods for their own environments. Finally, there is a need for more research into the nature of effective tool support for methods. As a minimum, tools must be non-prescriptive with respect to method; at best we need to know how to build tools that transparently support ISD in all its variety.

We claim that the major factors underlying these issues are those identified in the method transfer framework presented here. They relate to congruence of users' pre-knowledge with a method's underlying principles, and effective ongoing support for the method.

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