
Reinven t METHO Who Reads It AND *Why?*

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- If methods are to be used more effectively, then formats for distributing that information need to change. Andersen Consulting implemented methodology structures that were successfully reinvented to satisfy various user needs.
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ting DOLOGY:

Many information systems (IS) are developed as part of a larger business transformation initiative, such as an organization's response to competitive pressures. Such initiatives draw from multiple disciplines. They start with a business strategy and align the various components of a firm with that strategy—systems, people, business processes, infrastructure, and assets. Systems development efforts that do not address these important components are often incomplete or insufficient. Thus, system development projects are getting ever larger and more complex. At the same time, information technologies continue to become more varied and complex. To keep up with such changes in the profession, development methodologies¹ have proliferated. Moreover, they must be integrated.

Methodology has been part of IS practice and

research for over two decades. Traditionally, methods are used in roughly a third of the IS practice. Recent phenomena, such as Software Process Improvement or the Capability Maturity Model (CMM), require the disciplined use of systematic ways of doing things. The rise of such phenomena will stimulate the IS practice to use methods much more than before. However, our research indicates that for methods to be used more effectively, methodology formats will need to change dramatically.

Our research was based on suspicions that traditional methods have not been developed with the readers' information needs in mind. Before our research, we were not even aware of reliable estimates about how many methodology materials are read. Different people had different opinions. Thus, we agree with Wynekoop and Russo [11] who suggested there is an "inadequate base of empirical evidence."

This focus of this study was not to test hypotheses, but to answer some fundamental questions and obtain reliable estimates about how much methodology materials are actually read by practitioners. We uncovered different methodology information needs

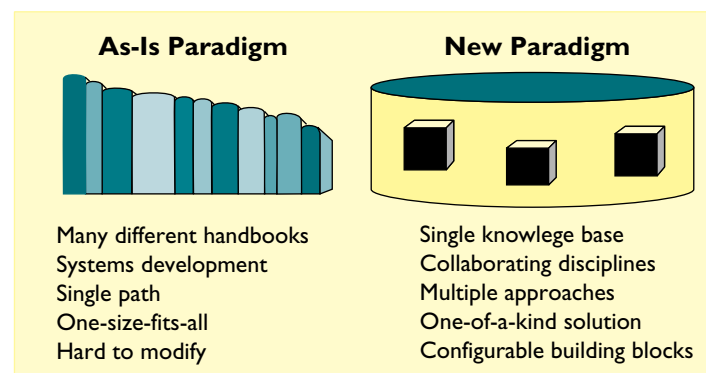


Figure 1.
The as-is and new methodology paradigms

¹We use the terms "methodology" or "method" interchangeably and define them as a systematic way of doing something. They reflect ways of working and controlling (such as processes) or ways of modeling (such as documentation and notation conventions) [9].

for different audiences. In fact, a key contribution of our research is the difference in the information needs of “planners” and “doers.” We concluded that traditional binder formats do not serve the information needs of arguably the most important user group—project planners. Yet, voluminous binders are still written and distributed. Based on our research, we reinvented methodology structures to satisfy the different information needs of different user types, yet accommodate new and complex approaches.

For our research, we had access to the worldwide practice of Andersen Consulting, an organization that makes extensive use of methodology. We interviewed over 70 methodology users, worked with members of four methodology development groups, and analyzed the results of a survey sent to 1,000 practitioners across the organization. The results of our research have been implemented on the Knowledge XChange,[®] the firm’s worldwide intranet. Judging by the impact our research has already had on Andersen’s practice, the use of methodology in practice will change significantly.

In order to determine how current methodologies support practitioners, we started by interviewing methodology users. They described current methodologies as monolithic, or hard to adapt, or modify to a specific situation (system type, project size, business problem, among others. See Figure 1.) However, in crafting an approach for a specific problem, practitioners often integrate information from different sources, with different formats, underlying paradigms and levels of detail. A contributing factor is that many methodologies are documented only on paper, making customization especially difficult.

Practitioners also described existing methodologies as voluminous and documented in different sets of detailed handbooks or binders. These binders are too bulky or heavy to carry in a briefcase—a factor that may cause practitioners not to use a methodology at all, even when they know it contains information that could be useful to them. Finding any given piece of information is often time-consuming because of the large volume of printed material. The practitioners concluded that existing materials are too detailed to efficiently support the planning of a project. Paradoxically, they also found the current materials were not detailed enough to effectively support doing a project.

Traditionally, methods advocate a single path, which is often perceived as one-size-fits-all. Although several current methodologies do offer multiple approaches, they typically cover only a small set of application types, architecture styles,

technologies, management issues or disciplines. To support practitioners in the new, more complex environment, methodologies must change from this as-is paradigm.

Any given methodology is more or less appropriate given a specific business problem. Consequently, a methodology must be selected, tailored, or custom-made for a particular business situation. Kumar and Welke [7], as well as Brinkkemper et al. [1], have called this paradigm “Methodology Engineering.” In effect, that paradigm is “configuring a one-of-a-kind methodology from common building blocks.” The configurable building blocks embody multiple approaches that originate from multiple disciplines.

There are a number of issues surrounding the design of methods building blocks. This article does not address content or semantic issues, such as in [4]. Instead, it focuses on issues regarding structure or syntax. The building blocks must have a common

	Training	Reference	Totals
Planning	8% ± 3% *	36% ± 6%	44% ± 6%
Selling	6% ± 3%	20% ± 5%	26% ± 5%
Doing	6% ± 3%	13% ± 4%	19% ± 5%
Managing	2% ± 2%	9% ± 3%	11% ± 4%
Totals	22% ± 5%	79% ± 5%	100%

*Denotes 98% confidence interval

Table 1. Methods reading by role and objective

structure, that is they must adhere to common formats and standards in order to be interchangeable which led us to a fundamental underlying question: What are the information needs of practitioners regarding methods?

Reinventing Methodology

Our research was inspired by the following fundamental questions:

- Are methodologies used at all?
- Why does management want people to use methodology?
- Why do practitioners read methodology?
- What are the roles of the methodology users?
- What methodology information do doers need?
- What methodology information do planners need?
- How much do they read methodology?

During the interviews, most practitioners told us they did not use methodologies. At first, it was not clear how to interpret their statements. On the one hand, this organization is well-known for its exten-

sive use of methodology; on the other hand, organizations generally do not apply methodologies systematically. For example, the Software Engineering Institute reports that 81% of organizations were at Level 1 when they were first assessed using the CMM (see [8]), indicating they work without formalized procedures for doing or managing work.

Other researchers even argue that methodologies are not very useful. Orr [10] reported that practitioners perceive corporate “directive information” and accompanying training to be of no use. Instead, they found it valuable to contact and communicate with others who had solved a similar problem. Ciborra [2] argues that the “a conflictual and mechanistic” nature of structured development approaches does not fit the current, and complex reality. Instead, Ciborra proposes an alternative metaphor for systems development: “bricolage” (improvisation).

Even though practitioners told us they did not use methodology, they produced deliverables demonstrating they did indeed use it. We learned that although practitioners seldom read the methodology materials anymore, they had internalized the methodology (through training and repeated on-the-job use) to the point that it had become subconscious. In terms of Ericsson and Simon [3], the practitioners no longer “interpreted” methodology, as they had “compiled” it.

Methods are often promoted by management to attain more sophistication or better project control. Many of the vehement methodology debates (“How does it represent?”, “Does it cover. . . .?”) are really about sophistication. Another objective is project control; the larger the project, the more important it becomes to control it. The core of project control is coordination—ensuring that large groups of people work in a systematic way towards the same objective.

Methodology is sometimes viewed as a description of steps and deliverables, but it is really much broader. Indeed, it represents a body of skills and knowledge that becomes an organization’s standards, based on a common language among practitioners.

Practitioners can no longer be trained in all methods that may become applicable—proliferation has

resulted in too many of them. To keep up with updated and new materials, practitioners will need to read at least some methods information to determine which are relevant to their work. Consequently, we focused our research on what kinds and how much methodology material practitioners actually read.

We found from our initial interviews that people generally read methodology to learn about something new (training) or to look something up that they once knew or want to confirm (reference).

People assume different roles when they use methodology. As previously mentioned, an important objective ensuring project control, which includes planning the project and managing it. The

project itself is the result of a selling effort, and of course, the work itself needs doing. Consequently, we recognized four different roles: selling, planning, doing and managing. We postulated that at any given time, dependent on their role and their objective for reading methodology, practitioners have different information needs.

Doers² told us they read methodology information in the form of detailed examples or templates for work products. Work products are the tangible results generated by a process (for example, reports, manuals, or

software). We found that doers are also interested in job aids—condensed, structured materials that contain detailed directions or steps, checklists, questionnaires, and other how-to information.

During our research, it soon became clear that planners are a crucial target audience for methodology. We found that when methods change, project planners are affected the most. If planners do not incorporate the updated methodology information, they may expose the project to unnecessary risks, or deliver low quality work. If the work does not go as planned, planners may well bear much of the blame. Consequently, our research focused on information needs of planners.

We found that the planners’ main concern is speed: how fast they can produce or revise a plan.

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²“Doer” and “planner” refer to someone doing or planning work. The role is in relation not to a person, but to a particular activity. Someone may be doing one activity and planning another.

Hence, they are very interested in reference information. They are particularly interested in summary overviews of the processes that a project will go through. They may also be interested in work products, mainly to estimate how long it might take for the deliverables to be produced.

The Survey

To obtain more robust data regarding our tentative findings, we sent a questionnaire to 1,000 practitioners randomly selected from three geographic regions: Americas, Europe (including the Middle East, Africa and India), and Asia. We focused on practitioners that were most likely to perform planning activities. (See sidebar for questionnaire details.) Some 256 questionnaires were returned, constituting a response rate of 25.6%. The number

ence). It shows that methodologies are read most for reference purposes, and in the role of planning.

Each cell in Table 1 implies different information needs. For example, training information for selling (like an explanation and background of a new concept) is clearly different from reference information for doing (like the detailed steps of a technique). Handbooks generally address all of these information needs to some extent. As a result, they fail to address any of the information needs very well.

The survey measured three dependent variables. The following results are based on data describing planners reading methodology information for reference purposes:

How many pages do practitioners read each time they read a methodology (section)?

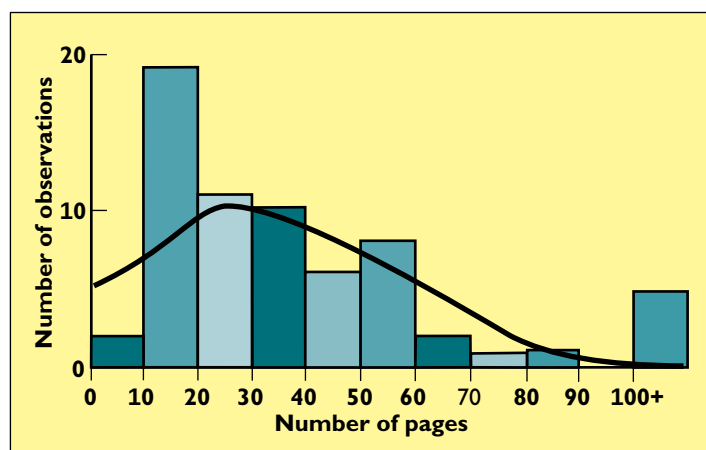


Figure 2. Distribution of number of pages read

When planners read from any given methodology, they read an average of 31.3 pages (standard deviation of 26.5); Figure 2 shows the histogram with the curve of the derived normal distribution superimposed. In 29% of the instances, the pages were “skimmed;” in 54% of the instances the pages were “read;” and in 17%, the pages were “studied.”

How often do practitioners read a (section from a) methodology?

Of the methodologies that planners reported reading for reference, 63.2% were read only once. On average, planners read the remaining 36.8% once every 101.4 days (standard deviation 83.3). Some respondents read from a given methodology as often as once a day, others as little as once a year.

How much do practitioners apply the methodology concepts after reading it?

Some 0.8% answered “not at all,” 8.5% “a little,” 28.5% “somewhat,” 43.1% “much” and 19.2% “very much.”

of respondents by geographic region and practice areas (various industries and competencies) fairly reflected the total population.

Of all respondents, 5.6% indicated they did not recall reading any of their organization’s methodologies during the past five years. Note that methodology (non)readers probably self-selected by choosing to (not) return the questionnaire. Also, because this organization is well-known for its extensive use of methodology, respondents might not want to deny reading any methodology. In all, the results on how much methodology is read probably constitute upper bounds, although, in the absence of further research, we do not know by how much.

Table 1 shows a contingency table summarizing survey results regarding the reading of methodologies by the respondent’s role (selling, planning, doing, or managing) and objective (training or refer-

The survey also gathered data on three independent variables:

Role: selling, planning, doing, or managing

Objective: training or reference

Medium: binder, quick reference, printout from software tool or database, Methods Knowledge Base, other database, or software tool (e.g., CASE tool with embedded methodology).

We tested several hypotheses regarding the impact of the three independent variables on the three dependent variables using analysis of variance.³ (For example, null-hypothesis that the medium had no influence on how many pages were read.) We performed single-factor, two-factor, and three-factor univariate and multivariate analyses of variance with and without interaction effects. We could not reject any null-hypothesis (“no influence”). Consequently, we conclude that how much and how often methodology materials are read and applied is independent of practitioners’ roles, their objective for reading the materials, and the medium in which they read them. Visual inspection of the data suggested that the (sometimes large) differences may be due to individual reading habits: some people simply read a lot, some very little.

During the initial interviews, we identified four important types of methods information: work products, job aids, process descriptions, and first principles.

	Reference				
	Process	Deliverable	Job Aid	First Pr.	Total
Planning	43% ± 6% *	37% ± 6%	14% ± 4%	7% ± 3%	100%
Selling	48% ± 8%	35% ± 8%	12% ± 5%	5% ± 4%	100%
Doing	40% ± 10%	34% ± 10%	16% ± 8%	10% ± 6%	100%
Managing	42% ± 12%	34% ± 12%	18% ± 10%	6% ± 6%	100%
Overall	44% ± 4%	36% ± 4%	14% ± 3%	7% ± 2%	100%

*Denotes 95% confidence interval

Table 2. Reading for reference by role and type of information

ples. Work products and job aids were defined earlier. First principles describe the “way of thinking” that is embedded in a particular method, (see [9]). Typically, a first principle is documented in a concise paper, generally including a few key figures.

The contingency table in Table 2 shows the survey results as to how many times the different types of reference information are read by role. It shows that—regardless of role—the type of reference information that is read most (statistically significantly) is information about the process.

Traditionally, process information is described in methodology handbooks. (Work products are generally described in separate binders or addenda.). From the perspective of reference information, handbooks contain information useful for selling or planning (for

example, skills to attract to the project team) alongside information useful for doing (the complete set of steps and criteria for completing a certain activity). Although handbooks cater to those three information needs, they do not satisfy any very well.

The insight that there are considerable differences in information needs is an important contribution of our research. Such differences in information needs are NOT about the level of detail of the information; they are about the type of information that is useful for one role as opposed to another role. For example, planners are interested in high-level and detailed information about a process-as long as it supports their planning activities. They are generally not interested in information that supports doing, such as job aids.

Given that reference information about processes (Table 2) in support of planning (Table 1) is most important, we focus on planner’s needs regarding reference information about processes.

How Do Planners Want to Read Information about Processes?

We analyzed the specific requirements of planners regarding reference information about processes using Quality Function Deployment. We gathered requirements information during interviews, joint design and low-fidelity prototyping sessions, and review meetings with 47 methodology users, representing all competencies and geographic areas of the organization’s worldwide practice.

We determined that planners want to read process information at a summary level. For domains in which they are experienced, they prefer to read the summary information in a checklist scanning mode to verify an approach they may already have configured. They do not want detailed or in-depth descriptions because information only hinders their scanning. For domains in which they have little or no experience, planners want summary information because it quickly points them to what they do not know. They can quickly determine which questions to ask of a more experienced person and/or which detailed sources to consult (books, training modules, articles, among others) to become more knowledgeable.

Also, planners want the summary information to be very portable, since they might need it in a variety of environments (in the office, while traveling, or at a client). Planners would like to have detailed information on specific topics available as needed, but not as part of the materials they use daily. A set

³The low and unequal number of data points for each dependent variable per respondent prevented running repeated measures analyses.

of heavy binders is clearly not very portable. In contrast, a pocket reference guide is very portable, and, as several interviewees demonstrated, typically a permanent part of planners' briefcases.

Implications for New Methods Structures

Process descriptions to support planning (which we called "method processes"), work products and job aids constitute the key building blocks for the new methodology paradigm. Based upon the research results, we designed a detailed representation for each of them [5].

As mentioned earlier, this article focuses on planners' information needs for reference information about processes. We define a method process as the set of attributes (of a process) that are of particular interest as reference information to planners. Kellner and Rombach [6], for example, describe 18 potentially important aspects for any process, including multiple levels of abstraction, narrative explanation, or supporting tools. However, they do not distinguish among the information needs of different roles, which we found necessary. We designed a method process structure that includes information about such factors as required key skills, significant estimating factors, and planning hints. Any given method process building block can be one of three subtypes, corresponding to recursive levels: task package group, task package, and task.

We also designed building block structures for work products and job aids. They were based on research we conducted into information needs by doers. Whereas a method process focuses on key summary information to support planning of work, work products and job aids contain more detailed information about the necessary components or steps, and information about any required techniques, for doing work.

The designs of the new structures were validated by methodology users, members of four methodology development groups within the organization, and several senior executives. Following these validations, several methodologies that were originally written in handbooks were disassembled into methods building blocks. Method developers who did the disassembling told us they found the new structures easy to understand and use. However, they found it more difficult to express methodology information in the new method process structure because they had to think more about which information was key for planners. (Previously, distinguishing key information was left to methodology users.)

All of the validations and disassembling efforts,

and also the initial, controlled, user testing, the pilot testing on various projects, as well as subsequent beta testing by hundreds of users, yielded zero requests to change the proposed structures.

The restructured methodologies cover domains such as systems development,⁴ business process reengineering, and change management. In addition, several new methods have been documented in the new structures. The resulting methods building blocks have been stored and disseminated as part of the Methods Knowledge Base (MKB), which is our implementation of Kumar and Welke's [7] Component Base concept. The MKB is a key part of the core knowledge capital on the Knowledge Xchange. These systems have been implemented by the organization to support its worldwide internal consulting practice for years to come. At the time of this writing, there are indications that at least 5% of the target audience is already using the new method building blocks.

Conclusions and Further Work

We found that different practitioners need different kinds of methods information depending on their roles and objectives. In addition, we determined that most current methodologies do not address these different information needs very well. To address the identified information needs, we designed new types of methods building blocks, focusing on methods processes: reference information to support planning.

Methods are now arranged in a more flexible structure. A group of configurable building blocks is stored within a single knowledge base that incorporates multiple disciplines and approaches, supporting the creation of a one-of-a-kind approach for each client problem.

The survey results described in this article form the baseline or "pretreatment measurement." We plan to conduct similar surveys on a regular basis as part of a longitudinal study into the usage of, and experiences with, the new methods paradigm. A key question we will try to answer in the longitudinal study is whether practitioners read more methods materials in the new method structures than in the old.

Also, we plan to conduct similar surveys in other organizations to test whether our current results are valid across different organizations, if the current results indeed constitute upper bounds, and, if so, by how much. ■

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⁴METHOD/1,® a methodology product under the FOUNDATION® umbrella, will evolve within the next few years to incorporate our research results.

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Questionnaire Structure

The questionnaire we devised for this study had four sections: confidential background information, data on specific instances when respondents remembered reading a portion of a method (specifics), data on their average reading of up to five methods (averages), and a closing section containing some open-ended questions.

The specifics and averages sections included mostly multiple choice questions to ease the completion of the questionnaire. The specifics section asked recipients to name the methodology they remembered reading most often. For that methodology, recipients were asked to recall up to three instances when they specifically remembered reading it. For each of these three instances, the recipients were asked when they read the methodology, the name of the portion(s) they read, the methodology version (if known), the type of information read (process description, work product, etc.), and whether they skimmed, read, or studied the methodology portion.

In addition, we asked:

- The medium in which the methodology information was read (binder, databases, etc.)
- The number of pages read
- The respondents' roles in the project
- Their objective of reading (training or reference)
- How much of the information they actually applied in their work

Subsequently, the averages section of the questionnaire asked the recipients to recall any of the company's methodologies they read or scanned at least some portion during the last five years. For each of those methods, the averages section asked the same questions as in the specifics section, except that it asked for averages over the past five years. In addition, the averages section asked how frequently recipients read each methodology over the last five years.

We asked the same questions in both sections because people derive averages by recalling specific instances and computing an average from those instances [3]. By asking about specific instances first, the likelihood increases that the averages are accurate. Also, by asking about both specifics and averages, we could (and did) omit questionnaires whose specifics and averages were inconsistent.