Paradigm Shift

Guide to the Information Revolution

Doug Engelbart's Design for Knowledge-Based Organizations—Part 1

Required Technology: Open Hyperdocument Systems

IN BRIEF: Doug Engelbart is the seminal visionary in the field of computer-supported collaborative work. For over 40 years, he has been actively involved in the design, prototyping, and implementation of systems to support collaborative knowledge work. This two-part issue is Engelbart's call to action. He wants us to build on his experience to speed the evolution of our organizations' information systems into true collaborative knowledge-refining organisms.

In this first issue, we examine the technology design principles that, according to Engelbart, need to be incorporated in the evolution of open, standards-based information systems in order to support collaborative knowledge work optimally across computer systems and within and across organizations.

P.S.

This month's audiotape contains an interview
with Doug Engelbart—next month look for more
of my discussions with Doug on videotape.

Doug Englebart's Design for Knowledge-Based Organizations— Part 1

Required Technology: Open Hyperdocument Systems

Patricia B. Seybold
President,
The Office Computing Group

Enduring Value: Knowledge Creation and Dissemination

Understanding the Knowledge-Value Equation

In 1985, Japanese futurist Taichi Sakaiya published *The Knowledge-Value Revolution (Chika Kakumei),* a book that quickly became a best-seller in his country. It was translated and published in America in 1991. One of Sakaiya's contentions is that the knowledge portion of all goods and services will be the most highly valued by consumers. His basic premise is that human society, by nature, gravitates to the consumption of those resources that are most abundant. And, in the coming decades, knowledge and time will be our most abundant resources. Our economic systems, our social systems, and our businesses are already in the process of evolving into their new "knowledge-value" forms. But only those individuals and organizations that can capitalize on capturing, leveraging, and incrementing the knowledge portion of their goods and services will be the survivors in the new economic order—a world in which mass-produced, identical goods will have given way to goods custom-produced by entrepreneurial, information age, knowledge workers.

Collaborative Knowledge Work: Key to Coping with Increasing Complexity & Urgency

Doug Engelbart came to similar conclusions about the value of knowledge 40 years ago when he began to speculate about the impact of two converging trends he witnessed in the world around him: increasing complexity and increasing urgency. He correctly presumed that humans would not be able to deal with the spiraling effects of these two inexorable demands on business and society. Since his academic training was that of an electronics engineer, he turned to electronics to find some antidote for the ills he knew were about to beset modern society. Engelbart realized that the key to dealing with increasing complexity was human collaboration. Many human minds with different perspectives, different specialties, and different experience bases working together and sharing their knowledge, perspectives, and experience would be able to master complex tasks that no single human would be able to master.

P.S.

Douglas C. Englebart, Director, Bootstrap Institute
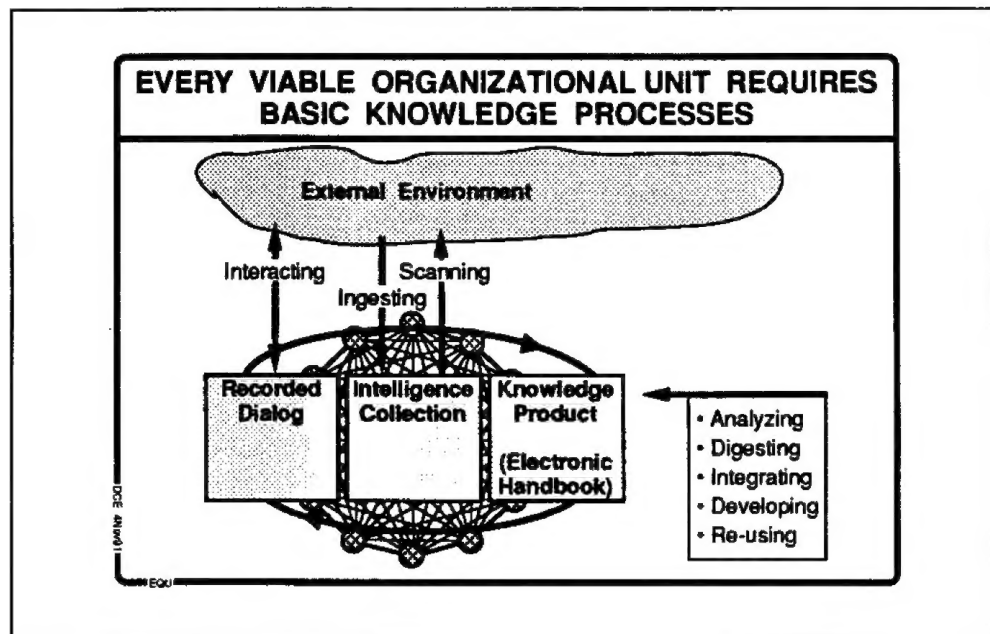
Capturing Knowledge within and across Organizations

An Organization Is Composed of Multiple Knowledge Domains

Engelbart sees every organization as a collection of interacting knowledge domains. He has focused his research on designing support structures for knowledge collection and refinement within and across these knowledge domains.

Understanding the Basic Knowledge Process

According to Engelbart, each knowledge domain or organizational node uses the same basic process to assimilate, analyze, integrate, digest, and re-use the knowledge products it creates. Once we understand that process, we can support and enhance it with computers, communications, and software. Here is how Engelbart depicts this basic knowledge process:

How Any Organizational Unit Processes Knowledge

EVERY VIABLE ORGANIZATIONAL UNIT REQUIRES BASIC KNOWLEDGE PROCESSES

External Environment

Interacting — Scanning — Ingesting

Recorded Dialog | Intelligence Collection | Knowledge Product (Electronic Handbook)

- Analyzing
- Digesting
- Integrating
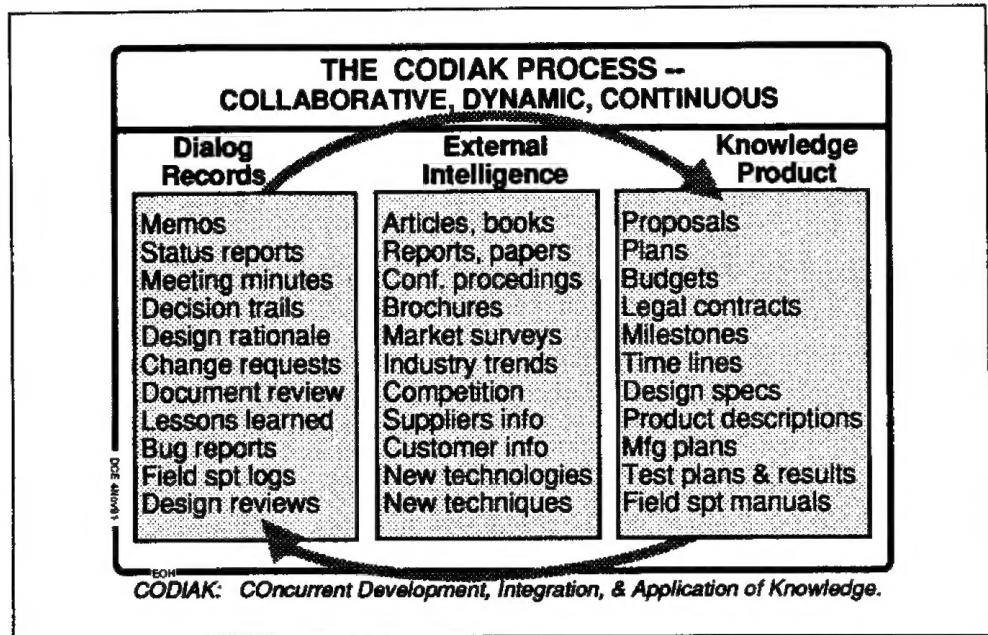- Developing
- Re-using

The basic knowledge processes of each viable organizational unit. The organism scans its external environment for new information and ingests that information. At the same time, the organizational unit is interacting with the rest of the world in conversations and dialogue. The members of the unit are working together to produce an evolving knowledge product that consists of the output of their work and everything it took to produce that work.

Capturing Knowledge within and across Organizations

An Exploded View of the Knowledge Collection and Assimilation Process

If we take a closer look at the on-going basic knowledge process, we see that, according to Engelbart, it can be segmented into three distinct types of information, each of which exists in the context of the continuous and dynamic Concurrent Development, Integration, and Application of Knowledge (CODIAK) process.

The CODIAK Process

THE CODIAK PROCESS --
COLLABORATIVE, DYNAMIC, CONTINUOUS

Dialog Records	External Intelligence	Knowledge Product
Memos	Articles, books	Proposals
Status reports	Reports, papers	Plans
Meeting minutes	Conf. procedings	Budgets
Decision trails	Brochures	Legal contracts
Design rationale	Market surveys	Milestones
Change requests	Industry trends	Time lines
Document review	Competition	Design specs
Lessons learned	Suppliers info	Product descriptions
Bug reports	Customer info	Mfg plans
Field spt logs	New technologies	Test plans & results
Design reviews	New techniques	Field spt manuals

CODIAK: COncurrent Development, Integration, & Application of Knowledge.

Today's Systems Aren't Set up to Capture Knowledge

Engelbart asserts that the CODIAK process is the way humans acquire and evolve their knowledge in collaboration with others. He notes that we haven't set up our computerized information systems to deal with all three forms of these knowledge-building categories of information in any integrated way. Therefore, we aren't reaping most of the benefits that could be derived from the CODIAK process within a single organizational unit, not to mention the benefits that could be derived by designing architecture to support it across organizational units and across organizations.
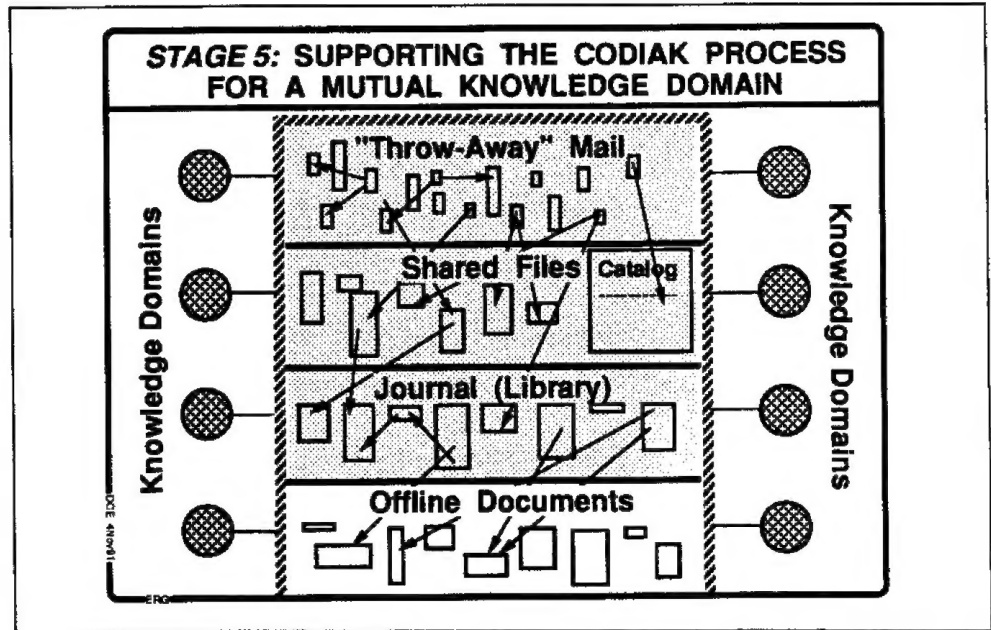
Needed: A Common Infrastructure for Collecting and Interrelating All Forms of Knowledge

As you can see from Engelbart's conception of the CODIAK process, he feels that there should be no distinction made between formal and informal documents and between internal and external (to the system or organization) information. The way that any organism (individual, department, or larger entity) builds and modifies its view of the world depends on making interrelationships among all of these different

P.S.

modes and forms of information. It is also essential that information be maintained, to the extent practicable, in context.

STAGE 5: SUPPORTING THE CODIAK PROCESS FOR A MUTUAL KNOWLEDGE DOMAIN

The Role of the Journal. In Engelbart's ideal world, everything that people want to build upon and refer to—both the material they create electronically and the material they make reference to in the outside world—should be "journaled." That is, it should be uniquely labelled by the system and preserved so that people can continue to make use of it and reference it. Journaling also enables you to easily keep track of multiple versions of a work in progress or of multiple iterations of a budget. Each one is journaled, the journal knows which one supersedes the others, and usually only the new or changed material really needs to be kept.

How many of you already keep an electronic log or journal of files written and received, electronic mail, and so on? Wouldn't it be nice if your system automatically filed that information for you? Wouldn't it be nice if you could easily add references to external documents, flyers, brochures, customer correspondence, etc? Wouldn't it be nice if others in your organization could have access to that information, so they could refer to it, link to it, etc.? What would you do with your private documents? Probably encrypt them or password protect them so they could be maintained with the rest, but only viewable by you. What about potentially incriminating documents? Internal discussions of a sensitive nature? Would you keep them journaled, or shred them quickly?

Capturing Knowledge within and across Organizations

What Should You Keep? I asked Engelbart about the need to maintain and journal "throw away" electronic mail. His experience showed that it was much easier to consider everything in the system useful and preserve it than to require people to go through the mental exercise of deciding a priori what to preserve.

How the Knowledge Base Organically Prunes Itself. Obviously, every bit of information generated on a system is not going to prove useful or relevant. In fact, only a relatively small portion of it might prove really useful. Therefore, according to Engelbart's design, every time anybody references any material, whether it is a mail message, a graphic, or an official memo, that fact is noted and becomes an attribute of the referenced item. That way, the material that is never referenced by anyone automatically becomes a candidate for routine archiving. A record is maintained of its existence and its archived location enabling you to retrieve it in case the information ever becomes important in retrospect. So you can see that Engelbart's design of an evolving information infrastructure or knowledge base is an organically self-limiting beast.

Designing Systems to Support the Evolutionary Growth of Knowledge

Doug Engelbart is adamant about the fact that, according to his experience, it is not possible to really take advantage of, build on, and evolve an organism's knowledge base unless that information can be both interrelated and structured.

The Importance of Structured Documents. Documents, whether they are memos, CAD/CAM drawings, or database views, already have an inherent structure that is derived from the conceptual model the author had when he created them. The structure of documents is not arbitrary or force-fit, but, rather, derives from the natural organization of the concepts being presented (which, of course, can sometimes be improved upon by reorganizing, or restructuring, the document). Engelbart is not advocating that we perform artificial acts with documents by superimposing structure on them. Instead, he advocates that we capture the inherent structure in all forms of human expression in order to make them easier for people to navigate through, view in different ways, and hyperlink (interlink one point in one document with a point made or illustrated in one or more documents).

The Importance of Views. Those of you who have worked with a word processor, spreadsheet, or database that understands the notion of collapsing and expanding views, or outlining, have probably grown to appreciate that feature. Engelbart feels it is imperative that, in a truly open and interoperable world, people should be able to have total and very flexible control over how they want to view information. And, since we are not likely to all choose to use the same applications to create our infor-
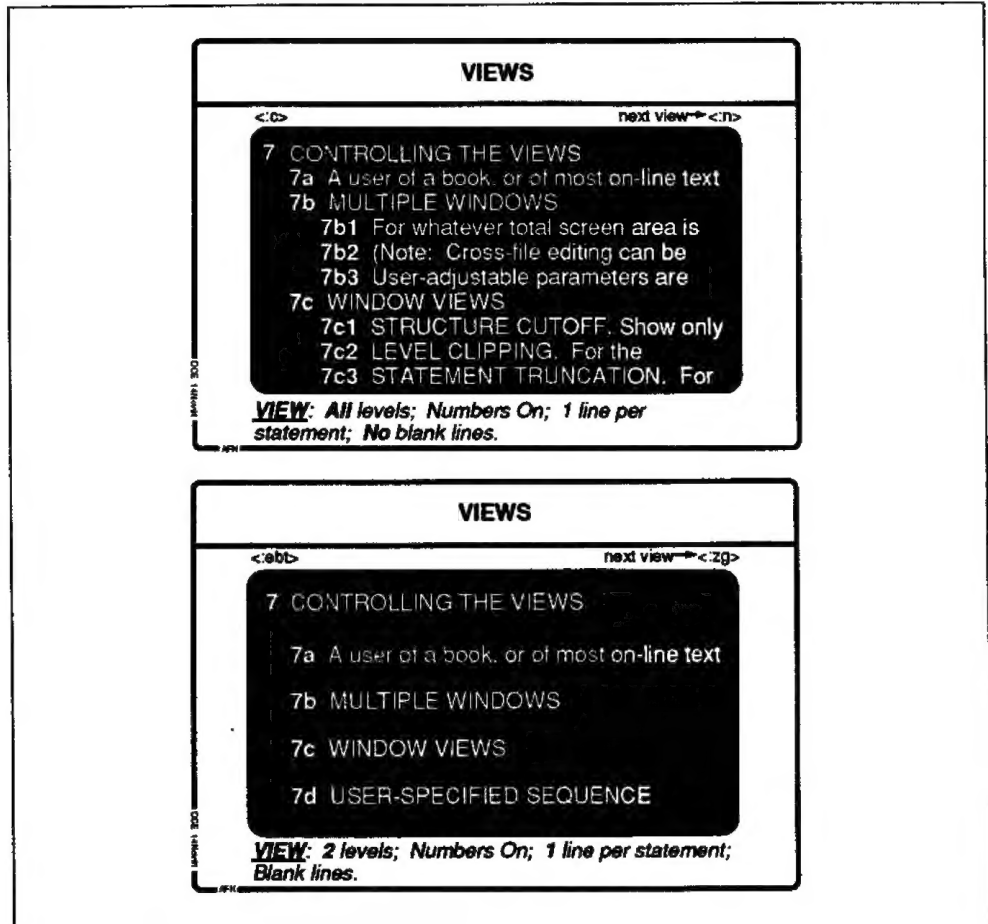
P.S. Please pay attention to this discussion. The importance of using—not losing—the structure in our documents, CAD drawings, etc. is finally dawning on most of us as we begin to organize and keep more information electronically. Without structure, information is not really actionable. You can't find what you need quickly, and when you do find it, the actions you can take are limited, once all the structure (and behavioural knowledge) has been removed.

mation, it is also imperative that there be a consistent set of viewing behaviors and navigational conventions in all interoperable applications.

Two Different Views Enabled by Document Structure

VIEWS

<:c>   next view→ <:n>

```
7  CONTROLLING THE VIEWS
   7a  A user of a book. or of most on-line text
   7b  MULTIPLE WINDOWS
       7b1  For whatever total screen area is
       7b2  (Note: Cross-file editing can be
       7b3  User-adjustable parameters are
   7c  WINDOW VIEWS
       7c1  STRUCTURE CUTOFF. Show only
       7c2  LEVEL CLIPPING. For the
       7c3  STATEMENT TRUNCATION. For
```

VIEW: All levels; Numbers On; 1 line per statement; No blank lines.

VIEWS

<:ebt>   next view→ <:zg>

```
7  CONTROLLING THE VIEWS

   7a  A user of a book. or of most on-line text

   7b  MULTIPLE WINDOWS

   7c  WINDOW VIEWS

   7d  USER-SPECIFIED SEQUENCE
```

VIEW: 2 levels; Numbers On; 1 line per statement; Blank lines.

Filtering & Navigating with Views. In Engelbart's scheme of things, views aren't used only to condense and expand views of information. You can also create special purpose filters—for instance, everything written by a certain person on a certain topic. In fact, in Engelbart's original system, end users could give instructions to a module known as a sequence generator to create special purpose hypertrails through webs of information.

The importance of the need for flexible Views really came home to me when I visited Clorox recently and looked at the documentation they use for their manufacturing process. Different people in the plant need very different views of information: recipes, safety information, packaging information, shipping information— and yet it's all part of an organically changing whole.

Capturing Knowledge within and across Organizations

The Need for Granularity. As you've probably deduced from the emphasis on preserving structure, inheritance, and hierarchy in documents, and the desirability of using that structure to expand or collapse information so that you can view it, filter it, and navigate through it at different levels of detail, it is also imperative to be able to precisely direct a reader's attention to a very specific point within a document. We agree with Engelbart that it's not sufficient to insert a hyperlink from one document, card, or note file to another. Instead, you really need to be able to link very precisely to a specific phrase, word, or even a single character within a document or file.

The Need for Relative Addressability. It's also important to be able to direct a person or an application to the referenced point. Engelbart explains it this way: "It's like the way the municipal system puts house numbers on houses. You can use it if you wish to tell somebody how to get to a certain house, or send a letter to it. Or you can say, 'If you go to 4th and Main and go west on 4th until you find the second yellow house on the left.' That's another way, relatively speaking. You give an exact address and then something relative to it. Or you can say, 'Hey, someplace on 4th, west of Main, you can find where Joe lives. Go ask for Joe.'"Similarly, if you didn't remember the exact directions to give someone to find something you want him to see in the electronic world, you could direct him to a particular node in the system and then tell him to go down a level, jump to the end, and take the second link he finds there.

The Need for a Common Command Language. As we begin to interconnect our organizations' information systems via networks, electronic mail, interoperating applications, and shared work products, it will become more and more essential that these information systems, applications, and the information itself respond consistently to the commands we use to interact with information and to navigate through it. Doug Engelbart describes the future this way: "Suppose you and I work for two different companies, using two different computer systems and many different applications. One day, you send me an electronic mail message relating to some work that we are doing together. The message contains a link to information in a file that you want me to review. The file is located on your system, and you have granted me read/write permission to this file for the duration of this project. There is only one hitch. When I click on the link and am transported across the network into your information system and the file is opened for me along with the application required to manipulate the information, how do I know what to do? Do the buttons in your application do the same things that I'm used to? How do I know how to navigate through the file/application?"

P.S. No one else, with the possible exception of Dave Liddle of Metaphor/Patriot/IBM has argued so coherently for a set of cross-system behavioral, navigational and command standards and expectations. If all our systems act differently, not only on the surface, but also deep down—if there is no underlying unifying structure—we'll never achieve the level of interoperability we need to design knowledge-based organizations.

This simple example (simple because only two people and two systems are involved) illustrates the point. If we are to have that kind of interactivity among knowledge workers and across applications and systems, we need to pay more attention to agreeing on a core set of commands, methods, and navigation conventions, that could be implementable across applications. These would need to be extensible, of course, so that special purpose commands and shortcuts could be added. One of the analogies that Engelbart makes to describe this phenomenon is the following; If you were suddenly transported from New York City to a village in the south of France, and you didn't speak French, how would you find your way around? As human beings, we have conventions for these things that cross cultural boundaries—maps, street signs, directional signals, common conventions (such as, in many parts of the world, sidewalks and streets) that people have developed and learned over time. As we work to define standards for open, interoperable systems, we need to take care that we also agree upon and evolve standard conventions for commands, navigation, and expected behavior of certain classes of objects.

What Steps Can We Take to Evolve an Open Hyperdocument Standard?

Needed: User Experience. Engelbart assumes that the future tool-base underlying our highly improved CODIAK capability will be a multi-media, hyperdocument *system*. Engelbart feels that the only way to seriously work towards creating a viable specification for an open hyperdocument architecture is to get real users in real businesses to pool their experiences as they work toward creating improved CODIAK capabilities within their own organizations. Some people will begin to build improved CODIAK capabilities using their existing systems and running into and documenting the roadblocks they encounter. But for much greater evolutionary efficiency, a number of organizations may choose to collaborate on the development of a shared, common, prototype hyperdocument system to support cooperatively planned CODIAK-enhancement pilots in each organization—integrating their collective users' experiences toward evolving an ever more generic and interoperable hyperdocument system. If one or more such collective initiatives got underway, all poooling resources and experiences, they would be able to distill the most important specifications and requirements and begin to work with standards groups and consortia to make these requirements part of the open systems interoperability process.

Start with Engelbart's Paper on the OHS. I recommend that you start by requesting, from the Bootstrap Institute, a copy of the paper, "Knowledge-Domain Interoperability and an Open Hyperdocument System." This paper goes into a bit more detail in delineating the specific requirements that Englebart foresees we'll need.

If you'd like more information about Engelbart's Boostrap Initiative, or, if you'd like to order the article mentioned above, "Knowledge-Domain Interoperability and an Open Hyperdocument System," call (510) 713-3550.

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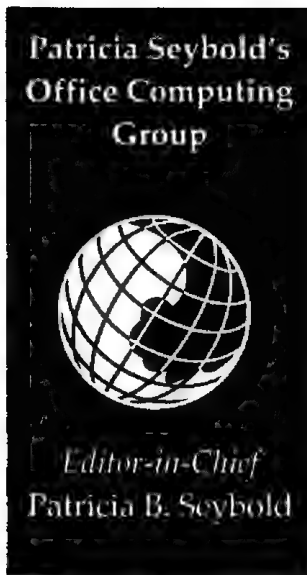CITY STATE   ZIP

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Paradigm Shift

Doug Engelbart's Design for Knowledge-Based Organizations—Part 2

Co-Evolution of Organizations & Technology

IN BRIEF: This two-part issue is Doug Engelbart's call to action. He wants us to build on his experience to speed the evolution of our organizations' information systems into true collaborative knowledge-refining organisms.

In the second of this two-part series (which is designed to complement the audio- and videotaped interview with Doug Engelbart), we look at the interactions among people, organizations, cultural and business practices, and technology. We all know from experience that these are inextricably intertwined. Doug Engelbart offers a blueprint for the transformation of today's organizational structures into true collaborative, knowledge-based organizations. What may surprise you about this blueprint is that Engelbart has found, through experience, that the best leverage point in the human/technology/organization/process system is to focus not on improving the organization's core business, but on improving the improvement capability of the organization. What Engelbart calls "bootstrapping."

P.S.

This is the second of a two-part series designed to accompany both the audiotaped and videotaped versions of an interview with Douglas C. Engelbart. The Video is entitled: "Together We Can Get There!"

Doug Englebart's Design for Knowledge-Based Organizations—Part 2

Co-Evolution of Organizations & Technology

Patricia B. Seybold
President,
The Office Computing Group

Douglas C. Englebart
Director,
Bootstrap Institute

Today's Organizations Are in Danger of Extinction

Needed: Improved Organizational Nervous Systems

Doug Engelbart likes to compare human organizations to living organisms; both evolve in response to the world around them. He says that, like living, biological creatures, organizations mutate, and those mutations are continually being tested for survival value within their environment. Engelbart feels that "today's environment is beginning to threaten today's organizations—finding them seriously deficient in their nervous system design—and that the degree of coordination, perception, rational adaptation, etc., which will appear in the next generation of human organizations will drive our present organizational forms, with their clumsy nervous systems, into extinction."[1]
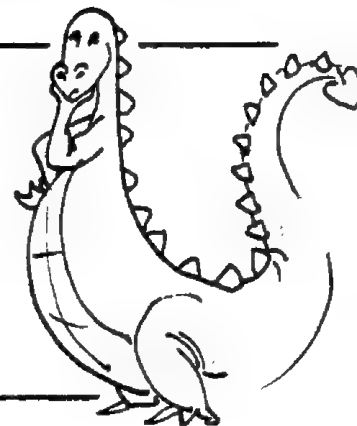
Teaching Organizations to Learn

Since the late '50s, Engelbart has been hard at work on the redesign of organizational nervous systems. By 1970, he was deeply involved in what he dubbed his "Human Intellect Augmentation" project. He explained: "By intellect, I mean the human competence to make, send, exchange, and apply to decision-making the commodity called knowledge, as applied toward giving human individuals and organizations more effectiveness at formulating and pursuing their goals."[2] Engelbart could foresee that the nervous systems that organizations had evolved in order to thrive in the industrial age were not going to be adequate to take them into the knowledge age. What was needed was a major advance in organizations' abilities to think, to observe, and to assimilate, apply, and refine knowledge.

P.S.

1. From the paper "Intellectual Implications of Multi-Access Computer Networks," by Douglas C. Engelbart. Published in April, 1970 —Document # Augment 5255-2e)
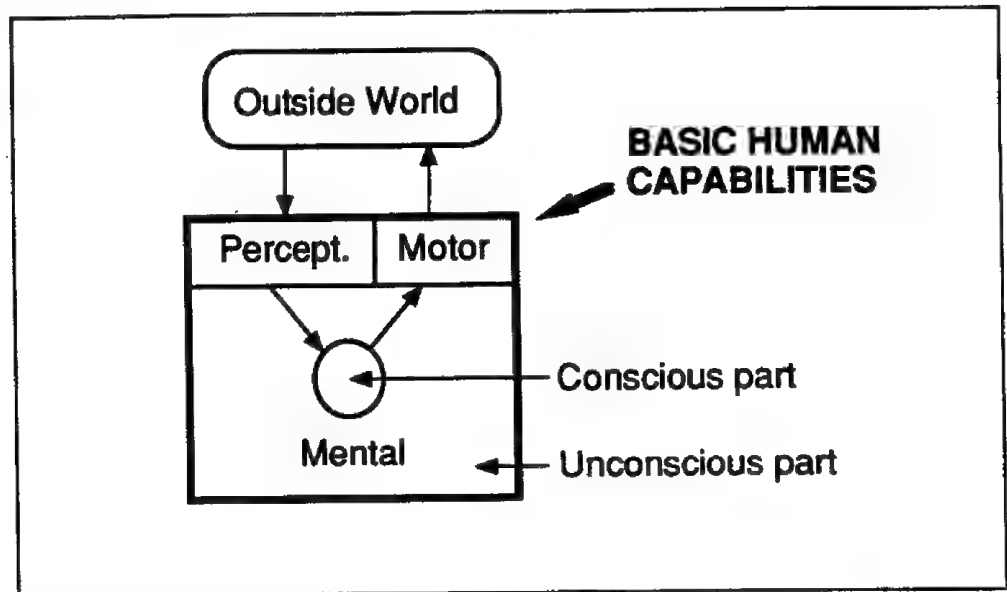
2. Ibid, (5255-3)

Redesigning Organizations for the Knowledge Age

First: Start with Human Systems

Organizations are composed of humans, so it's appropriate, Englebart reasoned, to begin by looking at the process individuals use to make sense out of the world. "First," Engelbart said, "let's start with the capabilities with which humans are biologically endowed." These include "the human's mental capabilities, such as memory, visualization, learning, and reasoning, and the linkage to the human's internal/external environment by his or her sensory perception and coordinate-motor I/O systems."

Humans Start with a Biologically-Provided Cognitive System

Starting to think about augmenting the knowledge-worker? Begin with the basics.

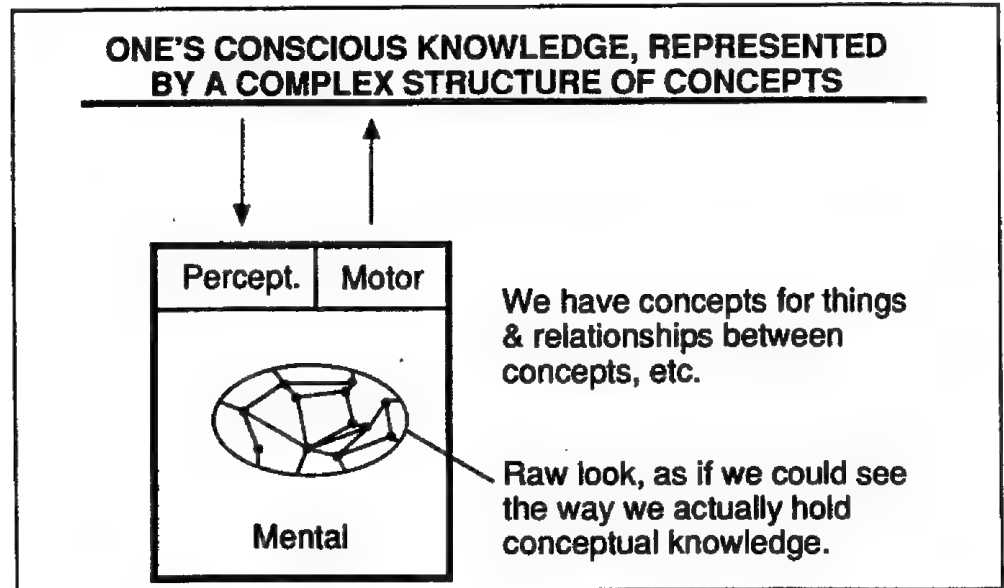**Basic Biological System Is Embedded in a Cultural System**

The culturally provided components of the basic human system are equally important. According to Engelbart, these include, among others, "language, values structure, attitudes, and motivations as well as education, training, methodologies, and tools. These come in specific forms, such as: algebra, schools, meetings, books, computers, maps, and filing cabinets."

Doug points out that the amount of unconscious capability humans have and continue to learn is astounding. Think about how you learn to brush your teeth, tie your shoes, etc. At first, it takes a lot of conscious attention, soon you become unconsciously competent at it. Organizations have many of the same characteristics. There are many things they are unconsciously competent at doing as well as other capabilities which they practice consciously. Obviously, to augment human systems (individuals and organizations), you need to improve both the conscious and the unconscious capabilities.

Redesigning Organizations for the Knowledge Age

How Humans Hold & Navigate Conceptual Knowledge

ONE'S CONSCIOUS KNOWLEDGE, REPRESENTED BY A COMPLEX STRUCTURE OF CONCEPTS

| Percept. | Motor |

Mental

We have concepts for things & relationships between concepts, etc.

Raw look, as if we could see the way we actually hold conceptual knowledge.

How do we actually "map" concepts in our brains? Doug Englebart points out that we have interconnected webs of conceptual knowledge. The way we store away knowledge, make associations, navigate through those knowledge structures is very different from the way we represent knowledge on pages of paper. He feels that knowledge that is captured and stored electronically should be and can be mapped much more closely to the way humans actually process knowledge in their minds than the way we do it on pieces of paper in books.

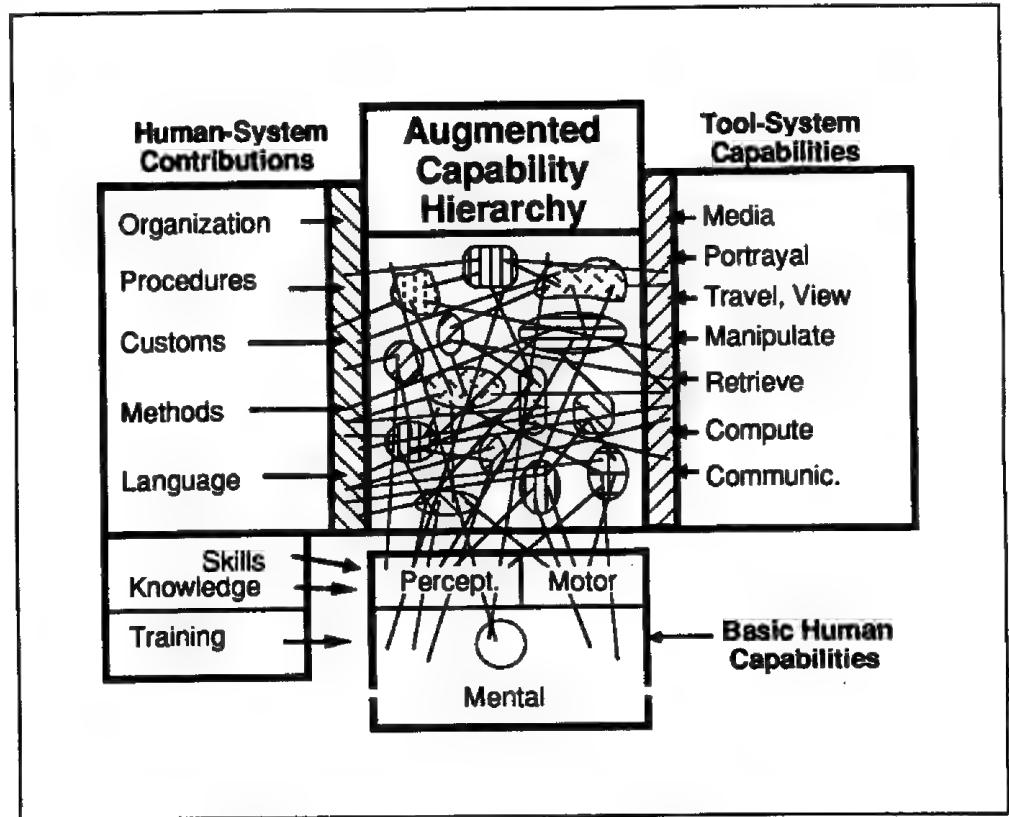**Human Capabilities Build On One Another**

It is staggering to think about the extent to which all of our basic human capabilities are interdependent and intertwined. For example, you need the basic capabilities to read and write in order to have the capability to write a memo. You also need the tools to do so (whether these are paper and pencil or a word processor). These capabilities are multi-level. Higher level capabilities depend on the ability to integrate the execution of lower level capabilities into a process which exhibits new higher level capabilities. When you augment basic human capabilities with human and tool systems, that augmentation is pervasive throughout all the multiple levels of definable capabilities. Engelbart points out that the current scope of the change that organizations are experiencing on the tools systems side of the equation throws into question all of the practices on the human systems side.

P.S.

If you think about it, **Doug Engelbart's** model of hyperlinked chunks of structured information fits the human conceptual map (as we understand it) quite well. On the one hand, Engelbart's original design presumed a hierarchical document structure as the basic starting point, with the ability to make infinite relational links among any of the thought chunks. "Why a hierarchy?" He's often asked. I think it has to do with the way we label and chunk information from short term memory into long term memory—The Information Mapping (TM) notion of grouping 7 (+ or - 2) chunks of information together under one conceptual label and moving on to the next set of concepts.

Basic Human Capabilities Interacting with Human Systems and Tool Systems

Humans operate within cultural and organizational contexts, using tools that enable them to interact with the world and with one another.These human and tools capabilities combine together in intricate and overlapping ways in order to augment the basic human capabilities.
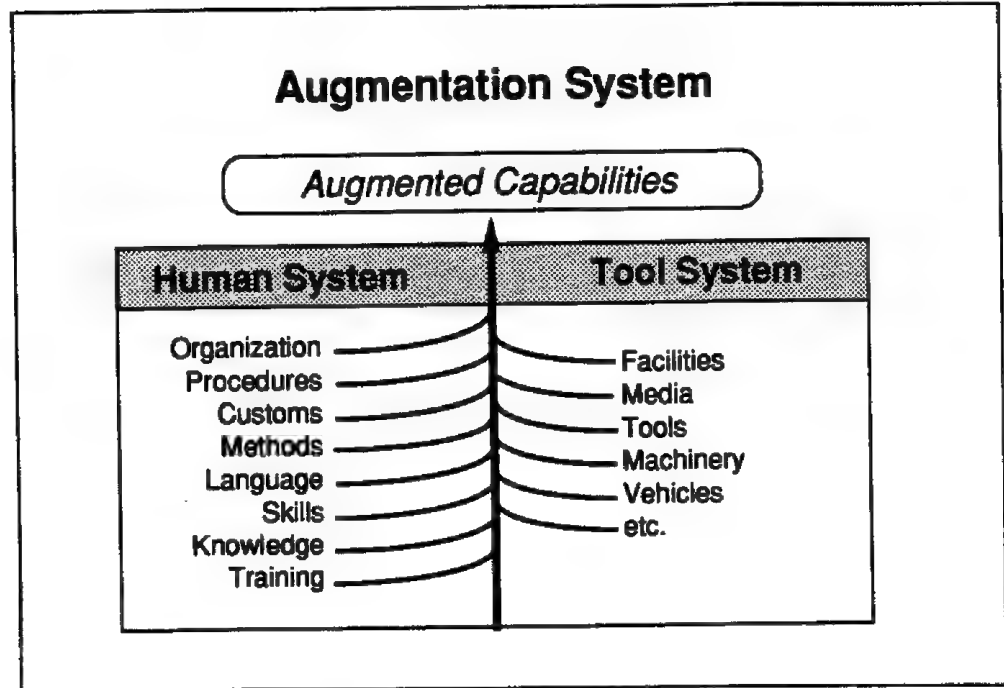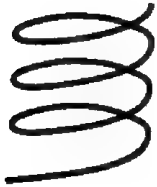
To Augment Human Capabilities, Augment Both Tool and Human Systems

It goes without saying that there's not much we can do to improve the basic, biologically provided capabilities humans are born with, nor do we have much control over the culture within which we are raised. However, organizations can affect their own culture in meaningul ways, and they do have control over both the human systems and the tools they evolve. Therefore, Engelbart points out that companies should assume in their budgeting and planning process that all human and tool systems are candidates for improvement.

The notion of how interdependent our human and tool systems are in organizations really came home to roost at our Executive Forum Workshop held in March. As we worked in teams to solve particular organizations' technology-related problems, we weren't at all surprised that we found ourselves spending a lot of time on organizational issues, like managing change, shifting organizational culture, and redesigning business processes.

Redesigning Organizations for the Knowledge Age

Focus on Co-Evolution of Human and Tool Systems

Augmentation System

Augmented Capabilities

Human System	Tool System
Organization	Facilities
Procedures	Media
Customs	Tools
Methods	Machinery
Language	Vehicles
Skills	etc.
Knowledge	
Training	

To augment any significant organizational capability, you have to improve both sides of the system.

To augment human knowledge-refining and learning capabilities, we need to co-evolve both the human and tools systems sides of the equation. While most of us realize this instinctively, there are few efforts underway that consistently employ this co-evolution strategy. Engelbart points out that "with the recent computer revolution, many organizations' augmentation systems are now heavily weighted with point-solution technology, seriously overpowering the human-system elements."
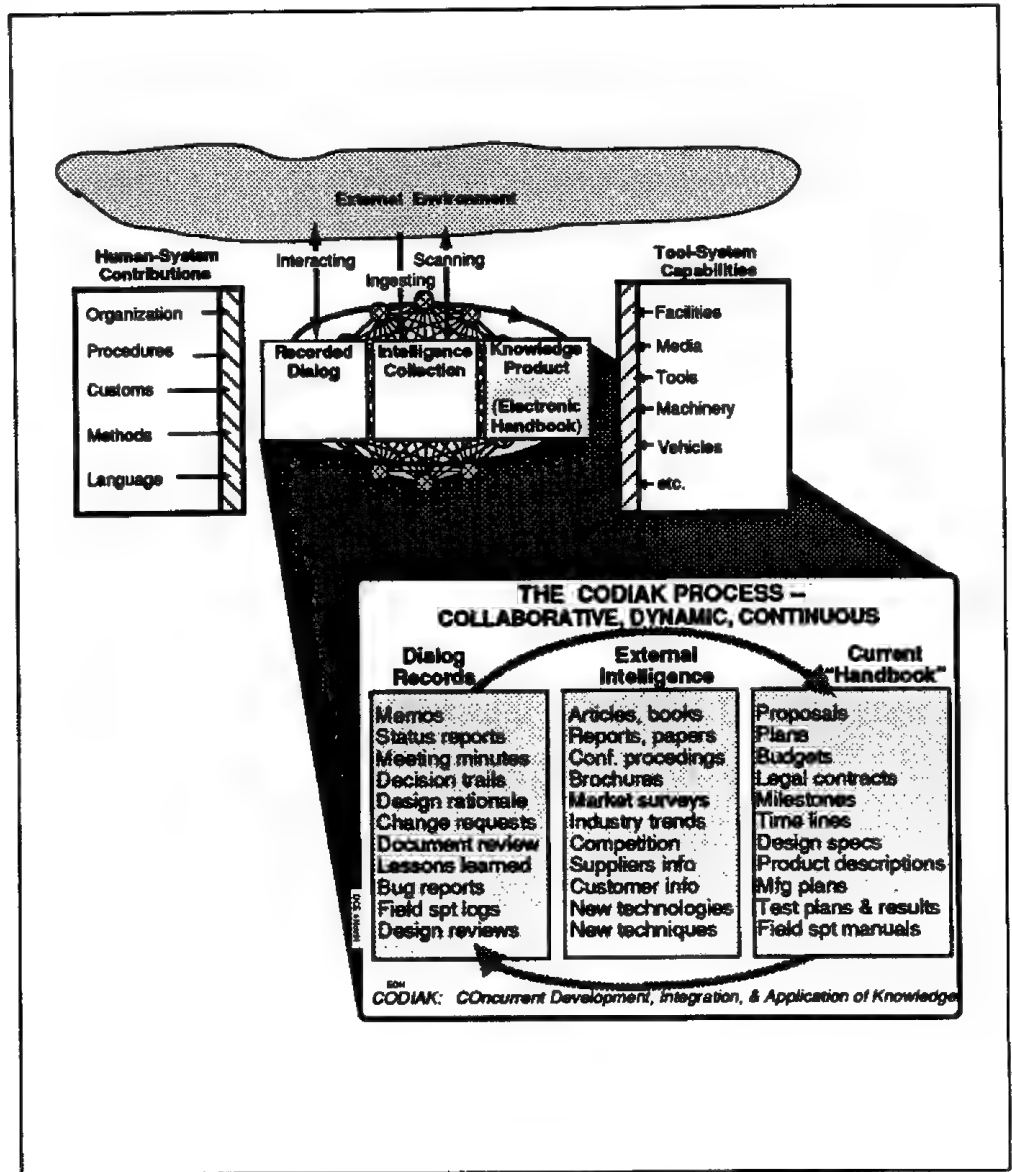
Focus on Improving CODIAK Capabilities

Engelbart suggests that one way to ensure that we co-evolve our human and tools systems is by focusing on improving the CODIAK capability (COncurrent Development, Integration, and Assimilation of Knowledge) within our organizations. It turns out that by continuously improving this capability, we also augment the organization's aptitude for continuous improvement. Therefore, by focusing on improving your company's concurrent development, integration, and assimilation of knowledge, you gain more leverage because you can simultaneously improve the organization's core capaibilities, and at the same time, improve its improvement capability.

P.S.

Doug and I had some interesting discussions about knowledge vs. learning. I wanted to interject the notion of improving organizational learning into this discussion. He prefers to focus on knowledge assimilation and refinement. I feel that CODIAK is the fertile ground out of which learning arises. Doug is concerned that if you indicate that learning supersedes knowledge, people who only understand learning as "static knowledge poured into the head" as opposed to learning as continuous shifting of perceptual filters, learning new distinctions and new practices, will come away without an appreciation of the organic nature of this co-evolutioary augmentation process.

Improved CODIAK will Enhance Co-evolution

Augment human systems' knowledge assimilation capabilities by focusing on improving the organization's CODIAK capabilities in order to co-evolve human and tools systems.

In our last issue, we discussed the design principles for an electronically-enhanced CODIAK capability. Engelbart's point here is that since humans are constantly interacting with information and knowledge in organizations and continuously coordinating their activities, if you focus on capturing those ongoing, living activities and on improving peoples' capabilities to digest and assimilate knowledge, you will dramatically augment that organization's knowledge-refining capabilities.

Bootstrapping Your Way to Improved Organizational Effectiveness

Find the Activity with the Most Leverage

Even if you know that you want to focus on co-evolving your human and tool systems by improving your organization's concurrent development, integration, and assimilation of knowledge, how do you ensure success, given that most organizations are very resistant to change? Doug Engelbart recommends that you use the principle of leverage. Apply your efforts to the area in your organization that will give you the highest pay-off for the smallest investment.

ABCs Of Organizational Improvement

An Organization

A
Core Business Activity

↓

B
Improves A's Capabilities

↓

C
Improves B's Capabilities

A Activity:
Product R&D, mfg, marketing, sales, accounting, etc. Ex: aerospace -- producing planes; congress -- passing legislation; medicine -- AIDS research.

B Activity:
Improving the organization's ability to perform A work. Ex: introducing email or CAD systems; upgrading quality processes.

C Activity:
Improving the organization's ability to perform B work. Ex: introducing better ways to address needs, or run pilots.

Every organization is actually engaged (simultaneously) in a number of different activities. Engelbart characterizes these as A, B, and C activities---each representing a different focus of attention. If you want to improve the effectiveness of your organization's performance, you must first understand these basic distinctions about the different sorts of activities people are (or should be) engaged in.

A, B, & C Activities within Organizations

Engelbart points out that every business or organization has its core activities— whether those are manufacturing airplanes, marketing soft drinks, or selling and servicing insurance policies. But, within those same organizations, there are activities designed to improve the effectiveness of the core business, such as quality improvement programs. Engelbart suggests that if you focus on improving the

P.S.

In other words, don't start by designing an organization-wide improved CODIAK capability. Instead, start by improving the CODIAK capabilities of your C community. That means, of course, that you first need to identify your B and C communities, and then recruit their interest and commitment to the notion of improving their CODIAK capabilities. Another consultant recently described the C activity as "improving the quality of thinking in the organization." I would still vote for learning, because to me, learning subsumes thinking, knowledge, and continuous improvement.

improvement capability of the organization's core actitvity, you can make a bigger difference with less effort. So he suggests that we focus our attention on improving the B and C capabilities of our organizations.

A, B, & C May Be Different "Hats" on the Same Person

Bear in mind that these activities may be carried out by different groups of people (different line and staff functions), or they may represent the different consciousness we bring to our tasks. If we are simply cranking widgets out on a production line, then we are performing an A activity, but if we are trained to stop work and help solve problems when these arise and to constantly be on the lookout for improvements in the production process, then we are applying our B consciousness to the job. And, if we are leading a quality team and instilling the principles of continuous improvement in the members of that team, we are probably acting out a C role. Engelbart points out that with the rapid pace of change confronting today's organizations, it becomes increasingly important to explicitly identify and focus our attention on the B and C activities. Today's Total Quality Management (TQM) programs provide an excellent example of this trend to explicitly identify quality improvement activities in all areas of your business. For example, to participate in the Baldridge competition, your company needs to demonstrate the way in which continuous improvement is embedded in its budgeting and planning process.

Step-Function Change Required

It's simply not possible to revamp an entire organization simultaneously. We know from experience that we need to roll out changes using a modular, step-function approach. If we are changing over the capital equipment we use in a manufacturing process, we'll start with one plant first, get the new systems up and running, retraining everyone involved, and wait until that is running smoothly before we move onto the next manufacturing site. If dramatic changes need to be made by using this modular approach, where should we begin? What's the highest leverage module we should begin with.?
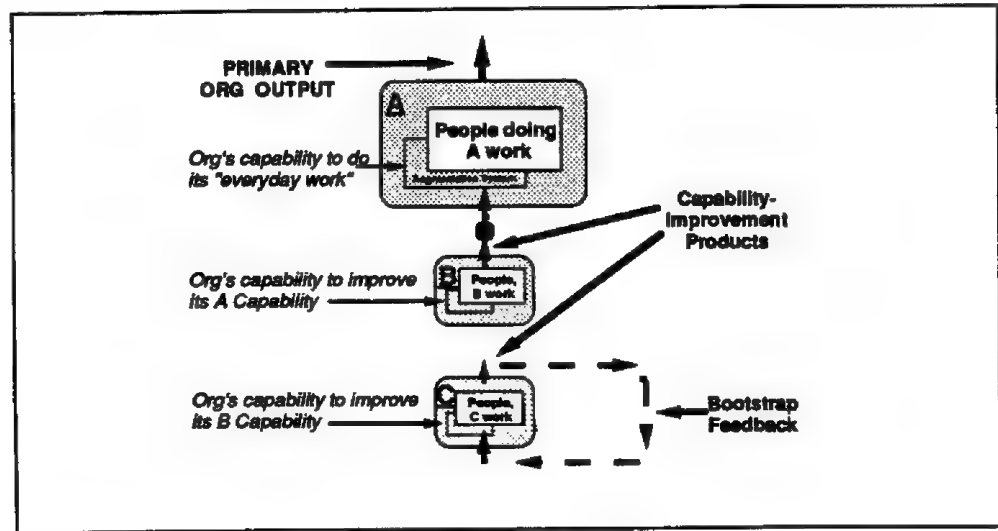
Bootstrapping Your Way to Improved Organizational Effectiveness

The Principle of Bootstrapping

To me, the notion of bootstrapping implies starting with the basics and feeding on what you learn/earn along the way. Englebart refines this notion by introducing the flywheel approach. Start bootstrapping at the point in the organizational system that will yield the largest amplication in organizational improvement.
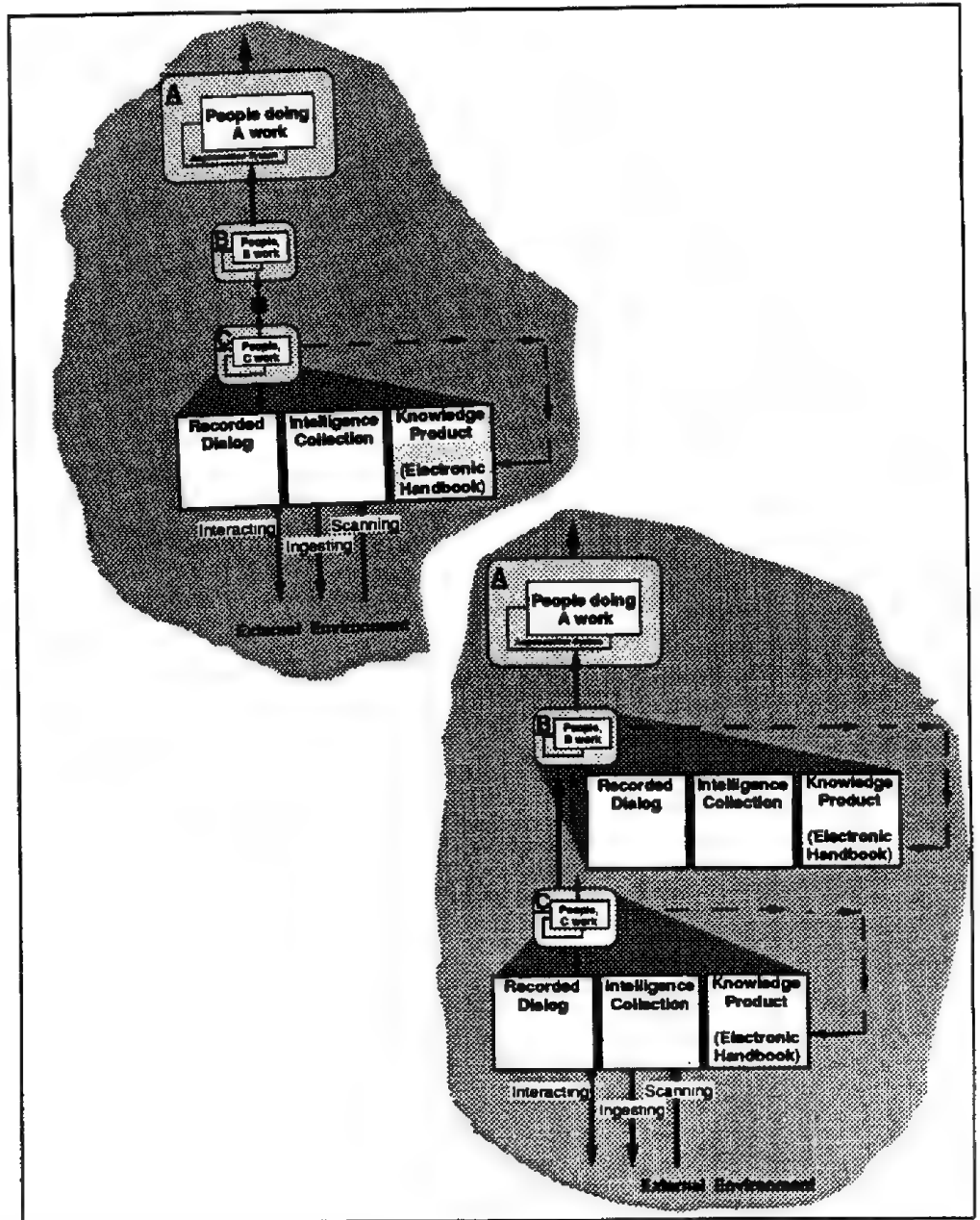
How to Get Started? Identify Your B & C Activities

If you want to improve the capabilities of your knowledge work, then it makes sense to begin with your knowledge workers, and specifically, with those activities that are devoted to your organization's many capability improvement processes. So, you'd start by locating your B activities, and then, from there, finding the C activities supporting the B activities. Then, focus your attention on improving the CODIAK capabilities of those C, B, and A activities (in that order). Engelbart recommends that we focus our attention specifically on improving the organization's ability to concurrently develop, integrate, and apply knowledge. And, as we've already seen, this activity will require the radical co-evolution of both the human systems and the tool systems. Engelbart also feels strongly that, since your organization will get such incredible leverage out of improving its CODIAK capability (to wit, the simultaneous improvement of both core activities and improvement capabilities), this particular C activity should be given a high priority, not be buried in a part-time, low-priority research project.

P.S.

The Bootstrap Institute will also assist you in indentifying or forming a "C" activity within your organization and in forming a C-community across organizations. Doug used to have a single Bootstrap initative he was trying to get off the ground with multi-company participation and sponsorship, but it proved to be too unwieldy to launch, too logistically time-consuming to manage, and too many eggs in one basket.

Focus Attention of C Community on Improving the Organization's CODIAK Capability

What's the best way to improve the organization's improvement capabilities? Improve its CODIAK capability.

Now Doug would prefer to assist various organizations and groups who want to form single or multi-company C communities and hopes that some or all of them will be interested in his coaching on the design of improved Codiak capabilities thru the evolution of an Open Hyperdocument System (see discussion in previous issue). That way he can put his time and attention on the intiatives that are moving most aggressively in the directions he feels will have a high payoff.

Bootstrapping Your Way to Improved Organizational Effectiveness

Help from The Bootstrap Institute

Doug Engelbart's Bootstrap Institute offers consulting and mentoring services to organizations ready to embark on a bootstrapping initiative. The first step, according to Engelbart, is to identify the B and C activities within your organization and begin to explore ways to improve your own organizational improvement capabilities. It is important, Engelbart feels, that this be given a high priority by senior executives. For companies (user or vendor organizations) who are giving serious consideration to understanding and implementing an improved framework for concurrent knowledge work, Engelbart is also available to play the role of consultant and mentor. He will recommend, of course, that two initiatives be tied together—your organizational improvement efforts, and the improved CODIAK design efforts.

How do I Get More Information?

Contact
　　The Bootstrap Institute:
　　6505 Kaiser Drive, Fremont, CA 94555
　　Phone: (510) 713-3550; Fax: (510) 793-2362
　　Email: Info@ Bootstrap.stanford.edu

Form a C Community across Organizations

The real brilliance of Doug Engelbart's recipe for success, in my opinion, is his recommendation that organizations should interlink their C activities. Imagine, if you will, tens or even hundreds of organizations committed to improving their companies' abilities to concurrently develop, integrate and apply knowledge. And imagine what would happen if the C communities of those organizations all joined forces to collaborate, to share learning and experiences, and to develop, assimilate, and disseminate knowledge about their findings. Further imagine what would happen if the tools and methods that meta-C community used in its work across its organizations could also serve as a pilot program for improving the CODIAK capabilities *within* its organizations. That is the essence of Doug Engelbart's Bootstrap concept. If a group of organizations' C communities were to combine forces to invest in developing and experiencing an improved CODIAK capability, the costs involved would be relatively modest, because they could be shared across multiple organizations. Yet, the benefits to each participating organization would be tremendous—benefits that would accrue first from identifying and empowering their B and C activities, and second from investing in improving the concurrent knowledge capabilities of the C community, thereby empowering those C communities to improve their capabilities to improve their organizations' improvement capabilties. This bootstrapping framework could serve as a launching pad for the further development of true collaborative knowledge-based organizations.
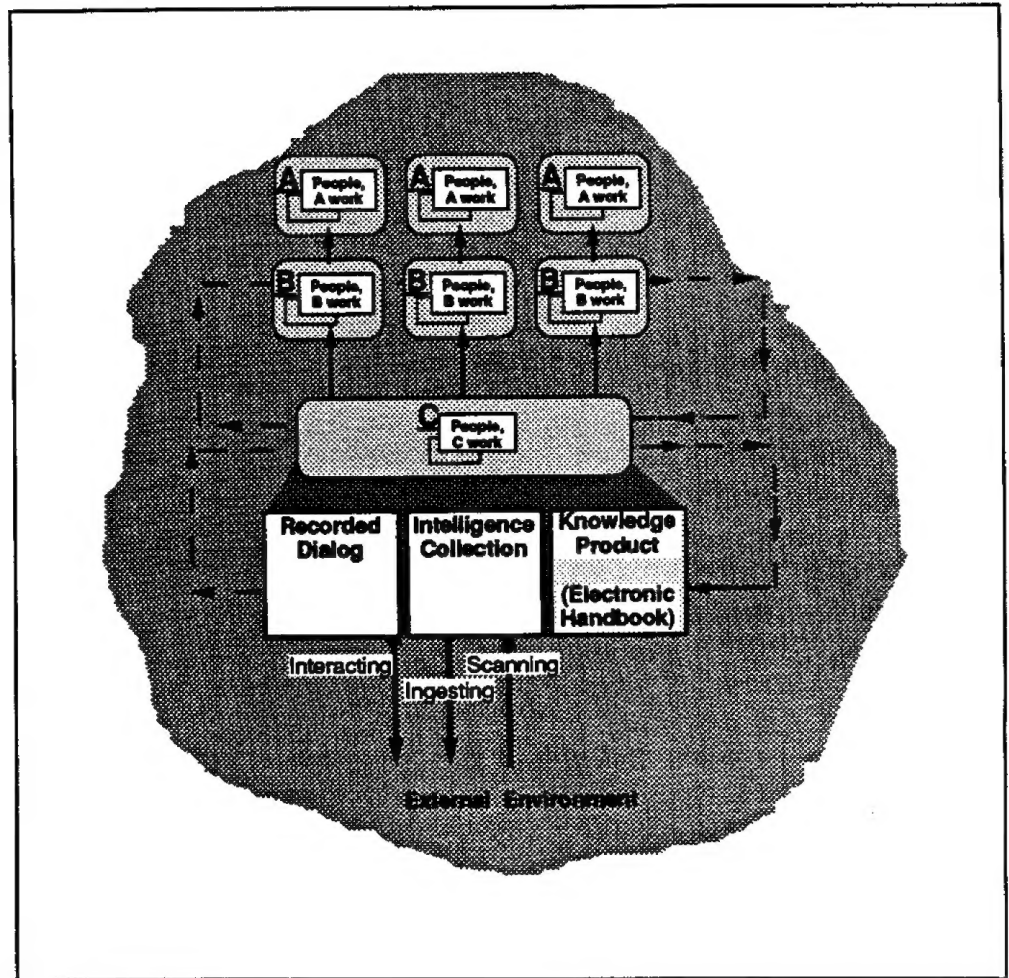
P.S.

Does this Idea Intrigue you? Do you already have identifiable B & C activities within your organization? Is there a cross-divisional or cross-organizational collection of these C activities to which you currently belong that is already acting like a common community of practice? If so, and if you'd like to consider augmenting the effectiveness of that C Community by piloting better CODIAK capabilities, or if you'd like to form or to join such a community of practice, contact Doug Engelbart.

The Best Leverage; a C Community across Organizations with Enhanced CODIAK Capabilities
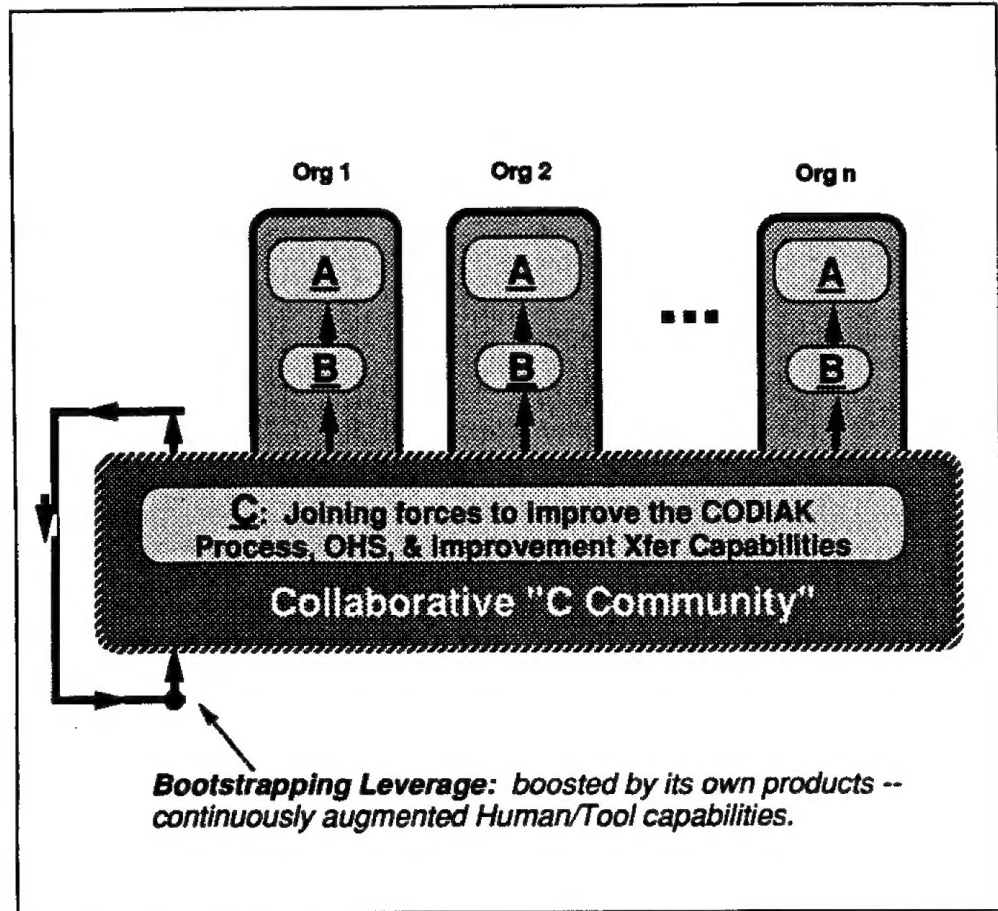

Form a C Community With Seybold (& Engelbart)

Engelbart hopes that over the next few years, as organizations begin to focus their attention on improving their abilities to concurrently develop, integrate, and apply knowledge, they will naturally find allies in other organizations which have started down the same path, and that a number of active cross-organizational C Communities will emerge. We, at the Office Computing Group, are interested in facilitating the formation of at least one of these C communities. Our own focus is likely to be influenced by our own early experience (and that of some of our customers) in the use of Lotus' Notes as an early CODIAK prototype. But we would welcome organizations using other tools to augment their CODIAK capabilities as well, so we can develop a better understanding of many of the cross-system interoperability issues that will be impacted by collaborative knowledge work.

Remember in the last issue, we talked about the need for Open HyperDocument System standards that would go deeper into the behavioural aspects of open systems (common navigational paradigms, common grammar, common object methods, increased granularity of objects and increased accuracy of addressability of links and objects). Doug feels, and I agree, that you can't come up with meaningful standards in a vacuum. Instead, we need to build a body of experience using the most advanced hyperlinking and knowledge-management systems we can build, find, and gain access to in order to set standards priorities.

Bootstrapping Your Way to Improved Organizational Effectiveness

The C Community as an Advanced Pilot

C: Joining forces to Improve the CODIAK Process, OHS, & Improvement Xfer Capabilities

Collaborative "C Community"

Bootstrapping Leverage: *boosted by its own products -- continuously augmented Human/Tool capabilities.*

This is where the notions of Bootstrapping, CODIAK, OHS and the C Community come together. You form a cross-organizational dedicated and committed C Community. Then, you make the first activity of that C community be the design, implementation, use, and refinement of an advanced CODIAK capability to serve them and to improve their ability to help the B's and A's they serve within their own organizations. Out of this CODIAK design and piloting activity would come the specifications for an Open HyperDocument System that could be implemented across technology platforms and organizations.

P.S.

Interested in joining us?

A "C-Bold" Community? Doug Engelbart recommends, tongue in cheek, that we call our Seybold C Community Initiative, the C-Bold Initiative. What would such a C community look like? We envision it as a group of organizations that have committed themselves to:

1. Balanced co-evolution of their own human and systems tools,

2. Improving their cabiliities to concurrently develop, integrate, and assimilate

3. Identifying and empowering a C community within their organizations whose focus will be to improve each organization's ability to improve its core competencies by concentrating on improving the collection, sharing, and dissemination of knowledge within the organization,

4. Pooling their resources and sharing knowledge by empowering their C groups to work collaborattively with the C groups in other organizations,

5. Piloting improved human and systems tools along with other members of the meta-C community in order to test the principles for improved CODIAK capabilities.

6. Working with members of the C-Community to apply the experiences learned from piloting improved CODIAK systems towards the development of better standards in the form of an Open HyperDocument Specification. And feeding those specifications and requirements directly into the standards development bodies, such as the Object Management Group, the Open Software Foundation, X/Open, NIST, OSI, and so on., in addition to working with system and software designers to incorporate users' requirements in the domain of collaborative knowledge work into their evolving products.

Paradigm Shift Back Issue Listing

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