



From Ground Zero to Multimedia Product Support: a Real World Example of a Phased Transition to Online Information

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Introduction

SAS Institute is midway through a transition from hardcopy customer documentation to electronic product support systems with multimedia functionality. The first part of this paper discusses SAS Institute's long-range strategy for implementing online documentation and business factors governing that implementation. The second part analyzes the transition process and offers ideas for coping with change.

What is SAS Institute?

To help you understand our transition to online information, here is some background on the Institute and the products we support. SAS Institute is the second largest privately held software company in the world. Our premiere product is known as the SAS® System, which is actually more than 40 distinct, but integrated software products. These products form a comprehensive strategic information delivery system for customer sites, providing the capability for everything from presentation graphics, statis-

tical analysis, data base access, computer performance evaluation, applications development, and more.

The SAS System runs on 8 operating systems and over 25 hardware platforms. There are some 3 million SAS users at over 10,000 customer sites worldwide. The user base includes IBM® mainframe users, VAX users, PC users, and UNIX workstation users. These users include people from the entire spectrum of computing, from secretaries doing word processing, to statisticians in research settings, to the most sophisticated systems programmers.

The hardcopy library documenting this extensive product line for a diversified user community includes over 250 books. There are also some 50 training courses available. The library architecture provides for different types of books:

- introductory and getting started books
- primary product reference manuals
- how-to books
- syntax quick references
- examples guides
- special purpose books.

New editions of reference manuals are published at major software version boundaries. Updates for interim software releases are provided in the form of update reports.

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Business Factors Governing the Transition to Online Information

Unlike most hardware and software vendors, SAS Institute is not motivated to put documentation online in order to save money. In fact, the Institute's Publications Division has always functioned as a profit center, not a cost center. We make money on documentation, recouping the costs of development, printing, and distribution that so many other corporations have found to be onerous. On the contrary, it may prove to be the case that providing online information reduces our profitability.

What has motivated us to go online are three things: better customer support, customer demand, and the need to remain competitive. Our progress and direction have been further influenced by corporate priorities and market factors.

In 1989 we began active work toward implementation of online information. We projected a seven-year planning and development cycle when we first began this work. In reality, that will probably be an eight-year cycle. SAS Institute's transition has been deliberately gradual for three primary reasons:

- The SAS customer base includes a majority of users who do not have access to interactive computing, and therefore, to online documentation. However, since the late 1980's, and through the middle 1990's, that balance has been slowly shifting to include large numbers of users who can access online documentation. Thus, customer demand has increased slowly.
- All technology development is being done at SAS Institute; we are building our own formatting, authoring, and viewing tools for online documentation, rather than adopting a third party's products. The underlying products, including the SAS/PUBLISH™ and SAS/AF® products, have been developing to match customer needs, to keep pace with state-of-the-art technology, and in some areas, to take the leading edge in software development.
- Research and development at each stage of implementation to date has been carried out without increasing staffing. Thus, all project activity has been balanced with other demands on staff time. This approach has allowed the transition program to proceed while holding down costs.

Stages of Implementation

We began in 1989 with a research stage, from which followed 6 implementation stages:

Stage 1. Research: investigation and evaluation of products and methodologies.

Stage 2. Online versions of reference aids: a master index and a collection of abstracts.

Stage 3. Online versions of update documentation.

Stage 4. Online, hypertext version of the product reference library, spanning more than 30 volumes.

Stage 5. Electronic performance support systems for selected windowing-based products.

Stage 6. Multimedia application prototype for customer field test.

Stage 7. Electronic product support systems incorporating multimedia functionality.

Although each stage has its own specific objectives, there is chronological overlap between some stages, and feedback for one stage has influenced other concurrent stages.

Each stage of our transition can be characterized on three critical dimensions:

1. Technology: the means of authoring, displaying, and accessing online information.
2. Content: the substance of useful and usable online documents.
3. Processes: the workflow for developing, testing, and supporting online information.

Each of these dimensions, technology, content, and processes, has evolved from one development stage to the next.

Stage 1: Research

In the research stage, a staff of three people, on a part time basis, investigated and evaluated products and methodologies from other vendors. They also experimented with SAS software to apply 1989 SAS technology to the problems of authoring, displaying, and accessing online information. Their work was exploratory, unstructured, and free-ranging. The results of this stage were:

- a centralized online collection of research notes and a research bibliography

- a library collection of hardcopy research materials from periodicals and books
- prototypes of SAS reference documentation and of conference presentation abstracts in online form
- a characterization of general information types and identification of specific information types in the SAS documentation library
- a proposed chronology for implementing different SAS information types as online information in 6 succeeding stages.

Stage 2: Online Reference Aids

Although the research efforts continued, the team moved on to implement our first true online information application. For this experiment, we chose two information types that we call reference aids: a master index to the SAS library and an enhanced version of the online abstracts that we prototyped in Stage 1. These reference aids had the advantage of being pre-existing and required no modification to move online. Since the material was already published in book form, putting it online could be treated as a separate project that did not jeopardize a book schedule.

Again, the actual team was very small: four people who worked on these projects part time. But, unlike the research phase, we consulted with technical and process experts from other divisions in the company on a regular basis. We employed Release 6.06 SAS software for the applications. They handled ASCII text only and were quasi-portable to different operating systems.

The online index was released to customers as a test product, allowing us to get experience with the testing and production processes for software. The test release also provided the opportunity for communication with customers. We opened a channel for dialogue with users that has been a reliable source of much invaluable feedback for technical, usability, and marketing factors.

Stage 3: Online Updates

Stage 2 proved to be excellent training for the next stage. In early 1992, the Institute adopted an aggressive schedule for shipping software maintenance on a regular basis. This new software schedule pre-

sented the unpleasant prospect of inundating customers with numerous small update documents. So, we offered to ship the updates to customers online with a custom display system. Fortunately, we had learned enough about feasibility and technology in Stage 2 to say with confidence that we could handle online updates.

With the advent of the online updates project, many characteristics of our transition program changed. Our team acquired many new members, including several who were devoted exclusively to the project. The application itself was planned and implemented by staff from across the company, rather than just Publications staff. We implemented on a new SAS System release, 6.08, which included object-oriented functionality, a greatly matured authoring system, and hypertext capability. Based on our requirements specification for the online updates application, specialized features were added to the SAS System just for our purposes.

Although the online updates project used new text, the format and structure of the updates text were the same as we had used in previous releases of hardcopy updates. We were able to employ many established processes, but had to develop new processes as well. New tools were also developed, especially tools that supported group authoring situations.

Although we haven't shipped our online updates application to customer sites, we have demoed it for customers at our users conference and elsewhere. We've talked to countless users about this specific application and our future plans. We've created a data base of interested users willing to serve as test sites for future work.

Stage 4: Online Reference Library

We are in the middle of Stage 4 at this time. More than 50 employees from Publications, as well as employees from across the company, are planning and implementing a conversion of our 10,000+ pages of reference documentation. The text for these online books will be all new, but the structure of the information will remain the same as it has for the past several years. There will be more and better access mechanisms for users to find what they want in this information base.

Table 1: Technology, Content, and Processes across Implementation Stages

	TECHNOLOGY	CONTENT	PROCESSES
RESEARCH	<ul style="list-style-type: none"> Online collection of research notes and bibliography Central hardcopy library of materials Based on SAS System Release 6.06, using screen control language Prototype of reference document, quick reference tool Comparative study of other vendors' products Developed on IBM® MVS operating system and 3279 class terminals Prototypes were host-dependent 	<ul style="list-style-type: none"> Identified general information types Identified instances of general information types in SAS library Mapped SAS information types to online information implementation phases 	<ul style="list-style-type: none"> Literature search Product comparisons Application prototyping Limited number of participants Exploratory, free-ranging work Very small team; generalists No effect on ongoing processes
ONLINE REFERENCE AIDS	<ul style="list-style-type: none"> Based on SAS System 6.06, screen control language, indexed data base Developed on IBM® MVS operating system and Apollo workstations Quasi-portable to multiple hosts ASCII text only No specialized tools or components to build applications 	<ul style="list-style-type: none"> SAS Master Index SUGI abstracts Text-oriented Information units are small, unconnected Used existing material Content is rhetorically identical across information units 	<ul style="list-style-type: none"> Used existing text Close consultation with experts in other divisions Very small team; generalists No effect on ongoing processes Set up limited new processes Informal usability testing Customer tested Market research activities Experience with software production processes
ONLINE UPDATES	<ul style="list-style-type: none"> Based on SAS System 6.08; OOPs, advanced display technology Quasi-hypertext capability Portable implementation Developed on UNIX workstation Group authoring and information management tools New SAS technology built to meet our needs Specialized authoring tools Prototyping 	<ul style="list-style-type: none"> Application met very specific purpose Information units from very short to medium length; loosely connected for WHERE searches New text but old approach and form Text based Content rhetorically identical across units 	<ul style="list-style-type: none"> Planning actively involved many other divisions and functions Implemented through close collaboration and cross-development with software developers Many old processes, but significant new processes also Participants more specialized Many more participants Formal usability testing Demoed for customers
ONLINE REFERENCE LIBRARY	<ul style="list-style-type: none"> Based on SAS System 6.10 and 7.01 Graphical user interface Portable New tools for document, source, and link management Mature authoring environment True hypertext Rapid prototyping Testing tools Software management 	<ul style="list-style-type: none"> Information units are large and connected Online reference books New material in old format New access methods Rhetorically identical content across units Text and graphics 	<ul style="list-style-type: none"> Most processes are new, but some old processes still useful Everyone learning new roles or new way to do old role Staff are specializing Broader cross-division teams; more multi-disciplinary New tools spur new processes Testing on a large scale
EPSS	<ul style="list-style-type: none"> Based on SAS System 6.10 and 7.01 High-end hardware Graphical user interface Integrated with software product Host dependent Application drives technology; features are developed for EPSS use All specialized authoring tools carry forward from Stage 4 Prototyping 	<ul style="list-style-type: none"> Information units are small and connected Rhetorically different across units (help, reference, tutorial) Text and graphics New material, new format New access mechanisms 	<ul style="list-style-type: none"> Most processes are new Requires continuous inter-division collaboration for each information project Lots of participants More software tools to manage projects
MULTI-MEDIA EXPERIMENTAL	<ul style="list-style-type: none"> Host-dependent (PCs) Hardware dependent Prototype Text, graphics, video, audio, animation Few development/authoring tools available 	<ul style="list-style-type: none"> Sample application for demo only Content not product -related Information units small, unconnected Rhetorically identical across units 	<ul style="list-style-type: none"> Small, generalist team Created new processes; no effect on ongoing processes Consulting with experts
EPSS & MULTIMEDIA	<ul style="list-style-type: none"> Host dependent Hardware dependent New development, quality assurance tools needed Diverse media Integrated with software products 	<ul style="list-style-type: none"> Open to diverse content Information units of any size, connected Product-related content More access mechanisms 	<ul style="list-style-type: none"> Still more new processes Multi-disciplinary Specialists

Our work is based on a more advanced SAS System, one which hasn't yet been released to customers. The interface will be graphical. We'll support true text retrieval. We'll have a battery of authoring tools to support our work, including link mapping, document management, and source management.

Stage 5: Electronic Product Support Systems

Concurrent with converting the reference library to online delivery, we are experimenting with electronic product support systems (EPSS) for selected SAS products. The EPSS concept is best suited to highly interactive, window-based products. In an EPSS, product information is integrated with the software product itself. There are three types of information in an EPSS: help, reference information, and tutorial information. An EPSS by definition contains modular, nonlinear information that is interconnected via hypertext linking.

Our work with EPSS is based on the same SAS technology that our online reference books will use. In fact, the display system and hypertext will be fundamentally the same. However, the structure and content of the information will be all new. The teams working on this experimental effort are smaller than for the reference library, but include members from divisions around the company.

Stage 6: Multimedia Experiment

The SAS System is adding capability supporting multimedia applications. This will allow us to incorporate multimedia features in online information in future. Presently, we are experimenting with multimedia on a limited basis. We demoed a multimedia application at a recent users conference to show customers what the SAS System could provide.

Our work with multimedia is comparable to the Stage 1 research we performed in 1989-1990 with online text. It is exploratory and open-ended. From it, we expect to gain experience and understand possible applications for our online information base.

Stage 7: EPSS and Multimedia

At a future stage of the transition, we will merge EPSS technology with multimedia to produce sophisticated and flexible information products for SAS users. This will require further development of our technologies and support tools, new processes

for development and testing, and a fresh assessment of information types and methods for conveying information. In sum, EPSS plus multimedia will launch another new era for product information.

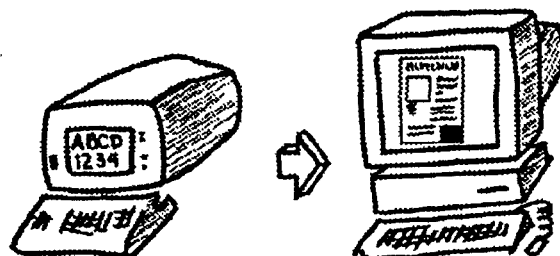
Cycles and Evolutionary Trends

Some interesting cycles and evolutionary patterns have emerged across the stages of our transition to online information. Some of these trends reflect realities that social scientists have recognized in other spheres for years, and as such, are not startlingly original. But when applied to the specific corporate situation that we are working in, understanding these trends can help us, and colleagues in other settings, to know what may be looming in the future.

Refer back to Table 1 for details on these trends.

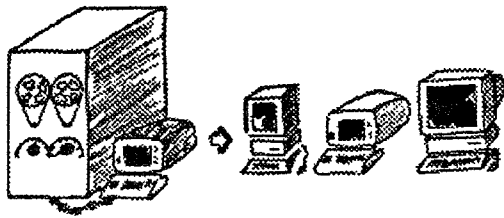
Technology

Hardware



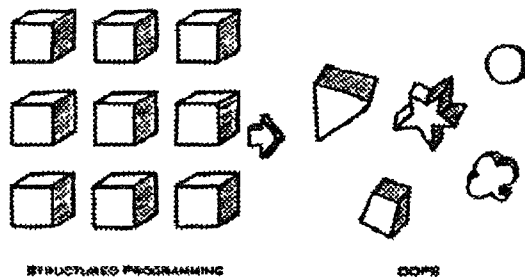
The hardware platforms supporting our research, implementation work, and customer applications have evolved from low-end to high-end. We began with dumb terminals attached to an IBM mainframe, then to 386 PCs and Apollo workstations, and finally to Hewlett Packard 7000 workstations.

Operating Systems



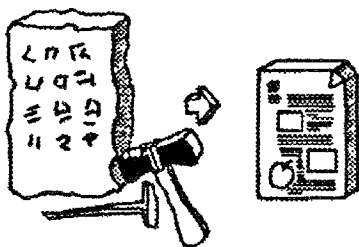
On a cyclical basis, the applications we build have gone from being totally host-dependent, to quasi-portable, to fully portable, and back to host-dependent.

Software



We built our first prototypes and tools the old-fashioned way: using a 4GL and structured programming methods. As the SAS System has adopted OOPs capability, we have matched the progress with OOPs applications. And the implementation has become easier with each step.

Text Handling

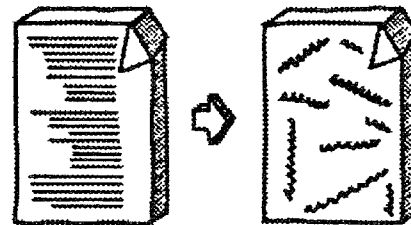


At Stage 1, the information we were putting online was authored using markup language, flat files, and low-tech text editors. We have progressed to a more advanced technical publishing system, SAS/PUB-

LISH software, which will continue to evolve through Stage 7. By Stage 7, we will work in with a GUI-based environment that supports text and graphics, and offers an array of tools for authoring and information management.

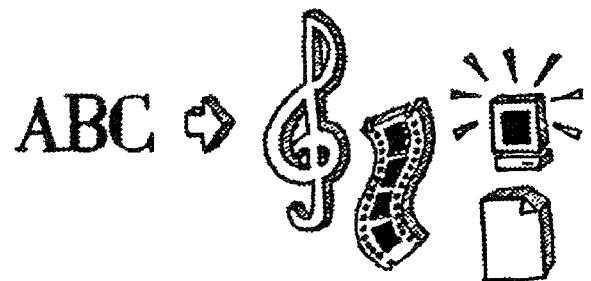
Content

Linear to Nonlinear Information



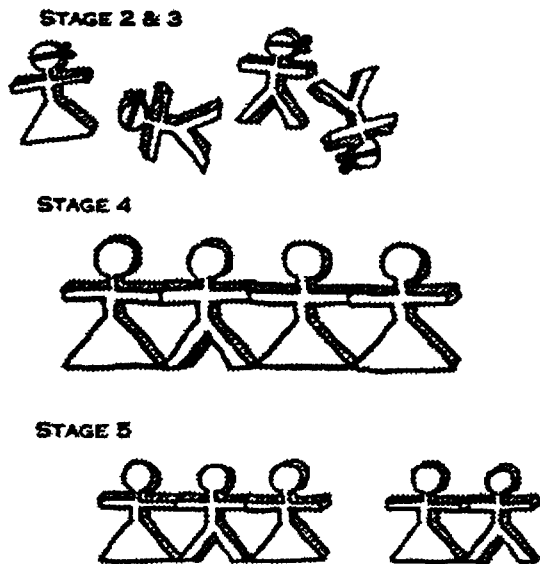
Our earliest efforts concentrated on putting existing text, text designed for hardcopy media, online without modification. By Stage 3 we were writing new text, using old organizational techniques, for online display. By Stage 5, with EPSS implementation, we adopted new structures (nonlinear) for new text.

Text to Multimedia



The information we presented was text-only in our first attempts. By Stage 4, we have the ability to incorporate graphics, and by Stage 6, video, audio, and animation.

Information Units



The nature, relationships, and shape of information units has evolved. In Stages 2 and 3, we dealt with small, disjointed information units that are rhetorically identical. In Stage 4, the information units are much larger, connected via links, but still rhetorically identical. By Stage 5, the units are once again small, still connected via links, and can be rhetorically diverse.

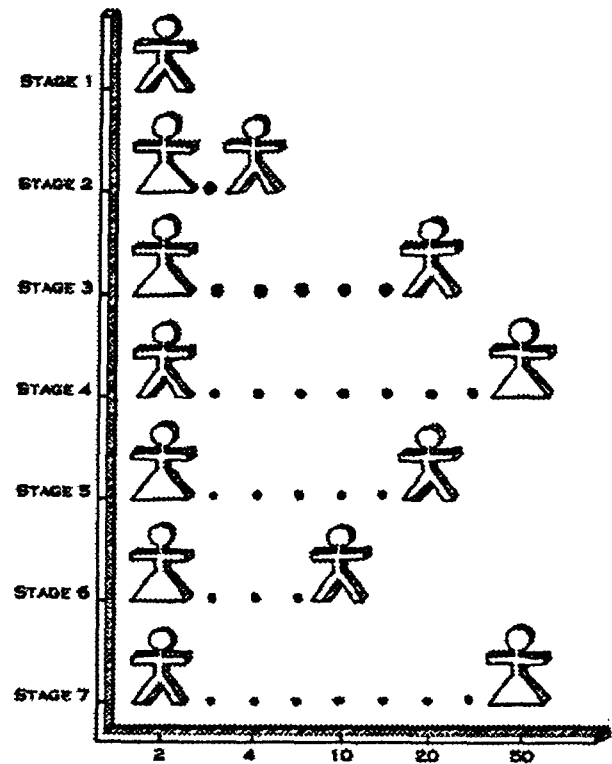
Processes

The Old and The New



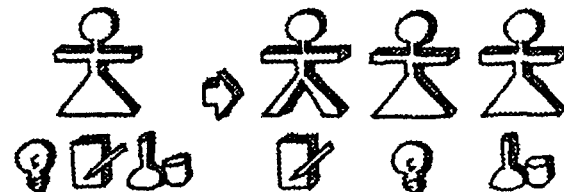
From Stage 1 through Stage 7, the ratio of old to new processes has shifted completely.

Participants



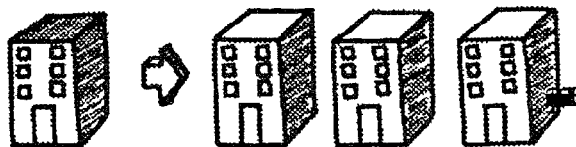
We began in Stage 1 with a small team working part time on research. By Stage 4, more than 50 people are involved.

Specialization



Early on, with limited staffing, each team member had to be a generalist capable of filling many roles. Now, team members are more specialized

Toward the Multidisciplinary



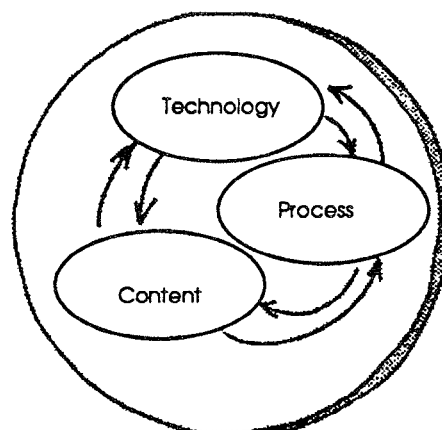
We began the transition to online information within the Publications Division, a single discipline approach. From Stage 3 on, the contributions of many divisions were an integral part of the development process.

What Does It All Mean?

At SAS Institute we have tried to develop a framework that will help us manage change in three dimensions of technology, content, and process as we shift to developing online information. This section discusses the implications of some of these changes in a more abstract context, suggesting ways that technical communicators can understand and take advantage of the increasingly complex task of moving online when faced with constant change in all three dimensions.

Innovation and Change

Throughout this paper we have been looking at structural and behavioral components of change in the way we develop and present online information. With the move to online information, adjustment to innovations in technology, content, and process requires us, as technical communicators, to handle new information concerning the way we perform our jobs. As technical communicators we face the challenge of meshing change in the very disparate areas of technology, content, and process. This is quite a challenge since each of these dimensions is constantly redefined in relation to the others.



"Handling change is a challenge since each of these dimensions is constantly redefined in relation to the others."

Impetus for change can often be viewed in terms of the tension generated by opposing paradigms (for technical communicators this means considering very different ways of viewing technology, content, and process.) For example, the shift from mainframe text-based systems to workstation/PC GUI-based systems forced us to re-examine the way we present information. Such paradigm shifts generate uncertainty and "disequilibrium" in an overall system such as a documentation development division. Increasingly we find ourselves asking questions such as "which system do we accommodate with online design?" We have found that what happens is that some elements are retained from both systems—we compromise and design for presentation on both. This accommodates the old way of doing things but may, initially, produce a product that falls short of its potential on newer systems. Through time, however, the synthesis of the best of technology from both systems usually means a more robust product.

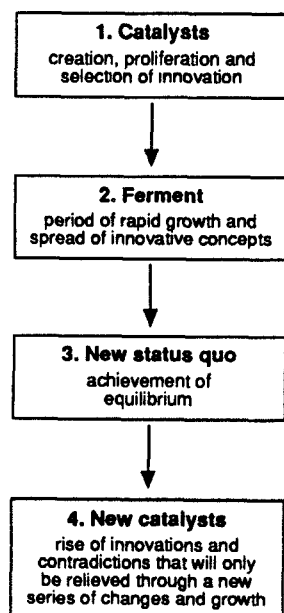
The constant interplay between technology, content, and process is a given in our work. Recognizing the nature of the underlying process of fluctuation, change, and re-organization helps us develop a framework to plan for a future filled with constant change.

Paradigm Shifts in Technology, Content, and Process

We are on the verge of several major and interrelated paradigm shifts in these dimensions that will affect technical communication. For example:

- text to graphical/visual presentation of information
- linear information to encapsulation of information (representing several words with an icon and several concepts with sets of icons on a desktop)
- information supporting software integrated with the application itself rather than separate from it
- time to read work-related information shifting from hours to minutes
- single to multi-cultural presentation of information
- stable to unstable environment (there may be several potential and often unknown outcomes given any mix of technology, content, and process.)
- management-staff hierarchies to matrix- and team-based approaches.

Each shift can be seen in terms of the following model of change:

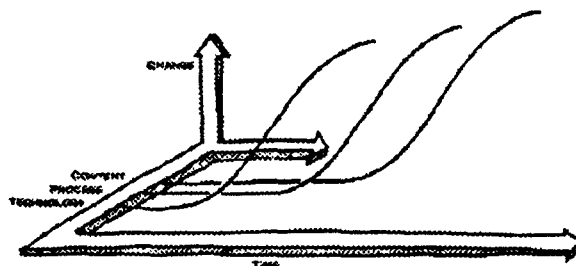


Each dimension affects the other as new information is added to the documentation system as a whole. For example, part of the shift to online information may involve an innovation in technology such as software enabling group authoring, which will, in turn, affect the processes in a writing department. Conversely, innovation in content, such as minimalism or information mapping, can affect how information is presented online technically (software capable of displaying and mapping modules and links may be needed).

Implications

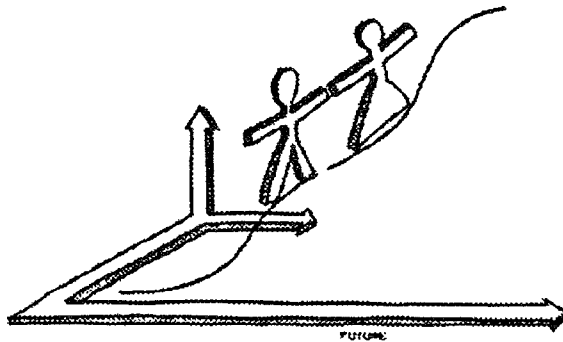
Paralleling these concepts, at the Institute we have found that it has been beneficial to wait until a new technological advance, new approach to communicating, or a new process has had time to mature before trying to incorporate it. We are waiting not out of hesitancy to apply the innovation but rather to give the "new arrival" time to sufficiently affect all three dimensions of the documentation development system. During this period system reorganization and synthesis can proceed in a "safe environment."

In other words, waiting implies experimenting and prototyping—getting the new item out into the established environment in a reasonable way. Not jumping at the first glimpse of "something better," conserves corporate resources. Further, finding the appropriate time to jump in enhances resources. The time to "jump" is when you decide that an innovation has had sufficient time to affect each of the three documentation development dimensions.



Waiting allows each dimension to adjust to changes in other two dimensions.

How to Get Along with the Future



The status quo is a springboard for the future.

If we (individuals and organizations) have a structure in place that accommodates rapid changes then we can take advantage of such changes and incorporate the new in a positive manner.

Here are some ideas and suggestions for technical communicators operating in a changing environment; managing the interaction between the three dimensions of technology, content, and process in terms of the concepts noted earlier:

- Minimize risk and maximize gain by openly experimenting with innovative technologies, processes, and content approaches. Introduce these items directly into your environment in small doses. Isolating them in experimental areas only will not give you an idea of their full impact and potential.
- Meet the needs of a diverse customer base by a phased transition, introducing new technology without entirely doing away with the old (offering both hardcopy and online, for example.)
- Try to consider instability and flux in technology and processes as positive because both are opportunities for the examination of alternatives. Understanding what's going on can help you control the rate of acceptance and application of alternatives, ensuring smoother transitions.
- Share information within and between work groups and organizations to ensure broad exposure to new ideas. Resulting feedback helps ideas mature faster and provides a more informed basis for possible incorporation and implementation.

- Use teams to facilitate handling change. Highly structured systems cannot easily change their internal organization and therefore their approach to a rapidly changing environment. Team-based organization is more "organic" in that teams are more open to interaction with a variety of environmental influences. They are self-energizing and more flexible in balancing and adjusting to rapidly changing factors along all three dimensions.

Conclusion

Most successful technical communication organizations will

- act as "bridge systems" allowing input from both conventional and innovative approaches to developing information
- look at where innovation and change is occurring along each of the three dimensions, then, go one more step and examine potential and implications for total system change
- operate in a framework accepting the constant nature of change in our profession
- recognize that everything will turn out ok in the end; it's the nature of open systems.

We think that our seven-step plan through the EPSS world and beyond is the way we will go. However, we recognize that unforeseen innovations may encourage us to change our approach at any point.

The bottom line will be to try to make such shifts or transitions a smooth process of incorporating change, in which portions of old and new are used to develop information in a some exciting way may be entirely different from either.

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