

Communication Design Quarterly Review

ACM SIGDOC (Special Interest Group Design of Communication) seeks to be the premier information source for industry, management, and academia in the multidisciplinary field of the design and communication of information. Edited by Michael Albers and Liza Potts, it contains a mix of peer-reviewed articles, columns, experience reports, and brief summaries of interesting research results.

We invite you to contribute in any of the following areas:

- Peer-reviewed articles. Articles that cross discipline boundaries as they focus on the effective and efficient methods of designing and communicating information; disciplines will include technical communication, information design, information architecture, interaction design, and human-computer interaction.
- Experience reports. Experience reports present project- or workplace-focused summaries of important technologies, techniques, or product processes.
- Interesting research results. Short reports on interesting research or usability results that lack the rigor for a full article. For example, pilot studies, graduate student projects, or corporate usability studies where full details can't be released.

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Defining the Design of Communication

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Welcome to your newly redesigned SIGDOC newsletter. Nearly a year ago, we began having conversations about publishing opportunities for cutting-edge (and often bleeding-edge) research in our field. The kind of work that includes pilot studies, exploratory research happening inside labs, centers, and in the field. The kind of work that has trouble getting recognition and funding because it is new, does not have years of research behind it, and is often risky to take on. Cutting-edge work is also the kind of research and application work that needs to find a publishing venue as quickly as possible to encourage further exploration, discussion, and refinement. Other relevant work would be surprising and interesting results of a usability test or development project. Although this work may not be as bleeding edge (and may not even qualify as a “full research project,”) the knowledge the project team gained can help other groups and needs a venue on which that communication can occur.

We know that our annual conference can support some of this work through presentations, conference proceedings, experience reports, and poster sessions. But outside this conference, where can we publish this kind of work? Where can we hear from our field’s many Centers, Labs, and research groups? Short of a collection of blogs, tweets, and G+ updates, how can we learn more about relevant, timely research that our peers are engaging with? It was from these discussions that we began to envision *Communication Design Quarterly Review* (CDQR). What you are reading now is the culmination of many months of conversation, planning, and development from our leading scholars, researchers, and practitioners.

And, indeed, over this past year SIGDOC has gone through a period of rapid change as we update our mission, realign our emphasis areas, and work to support our members in academia

and industry. We knew we needed to help revitalize our membership, refocus our scope, and ignite our base. We are still working towards fully realizing these goals, but we want to present them here for you to read through, engage, question, and discuss.

The mission of SIGDOC includes:

- Encouraging interdisciplinary problem solving related to the [user-centered] design of informational communication
- Studying and encouraging emerging modes of communication across organizations
- Promoting the professional development of communication designers
- Providing avenues for publication of research and exchange of best practices
- Supporting the research and development of communication and processes, including applications, networks, and services

SIGDOC emphasizes the following areas of special interest to its members:

- Design and evaluation methodologies that improve communication, such as user-centered and activity-centered design, participatory design, contextual design, and usability studies
- Types of designed communication, including interface elements, information design, information architecture, documentation, and user assistance
- Project management and content management as it relates to communication design projects
- Qualitative and quantitative studies of how communications are designed and used
- Practices, research, and theories relevant to any of these areas

For CDQR to be successful, we want to publish cutting-edge, new research about the design of communication. Looking at our About section of the SIGDOC website, this research includes:

“The design of information communication including interface elements, information architecture, information design, documentation, and user assistance. The SIG fosters the study and publication of processes, methods, and technologies for communicating and designing these artifacts. Members include technical communication professionals, usability specialists, information architects, software engineers, educators, researchers, web designers, system developers, computer scientists, information technology professionals, and managers responsible for researching, producing, and/or supervising the creation of user interfaces, information architecture, technical materials, websites, and social media.

In starting out our first issue, we wanted to explore the concept of what our SIG means. We have been a SIG in ACM for over 30 years. Throughout that time, our emphasis has shifted, the artifacts we examine have evolved, and our research methods have improved. So, in 2012, how do we define and describe the “Design of Communication” for our SIG?

Inside this issue, we hear from various voices across SIGDOC as they provide their definition of “Design of Communication.” From senior researchers to assistant professors, this issue provides answers to this question spanning discussions on networks, information design, big data, and sociocultural approaches. What we find from these definitions is a diversity of thought, research, and application of these concepts. This variety is seen across scholars as it is in industry and in the way everyday people deploy communication. Or, as Spinuzzi tells us:

We tend to think of communicative artifacts - such as texts, pictures, and voice communication - as *being* the communication. But as William Gibson once remarked, the street finds its own uses for things. (Spinuzzi)

Negotiating the path between what the writers and designers thought they were creating and how these materials were used them involves defining and redefining what “Design of Communication” actually means. And, in the end, involves

defining and redefining communication's relevance within both the academy and the workplace.

Part of the planning for CDQR involved a discussion of what SIGDOC is about. What field(s) we serve, what kinds of research we seek out to support, and what kinds of work our members do. For some, the Design of Communication is skewed towards technical writing, for others towards information design, information architecture, and systems design. These can be pictured as a Venn diagram with multiple overlapping areas; where the overlaps occur and how knowledge migrates through those overlaps are areas which CDQR intends to explore. In discussing this, Hayoe states in his article:

My perception, however, is that most technical and professional communicators today are stuck in ornamental mode, with a significant minority having advanced to holistic information design. The number who approach the problem of designing information strategically is vastly smaller. So what accounts for the lack of strategic focus in our design of information? (Hayhoe)

Taking this up in his article, Swarts moves beyond the task of writing to look at problem solving in general. Here he addresses what Hayhoe calls a "lack of strategic focus" and points to it as a strength:

A different answer is that the term communication design captures an awareness that our field lacks a center. It has its genres and its processes, but as Johnson-Eilola and Selber (in press) argue, it is the focus on defining and solving problems in novel ways and in response to the exigencies of highly varied situations that underscores the importance of what we do. (Swarts)

And indeed, this skillset is needed in industry and academic. Taking this discussion further, we hear from Hart-Davidson and Grabill. Here, they look across experience architecture, taking up Hayhoe's challenge of holistic design:

The second, related issue is the requirement for communicators to be able to assemble the necessary people

and things for communication and communication-intensive work. We need humans, machines, data, processors, analytics, art, and so on. And we need to activate these participants as participants—that is the difference the communicators make, the assembly of resources as participants in doing communication. (Hart-Davidson & Grabill)

McNely brings us full circle, defining the term broadly and discussing this approach. Here he gives us a call to action for our field(s) and for SIGDOC itself:

Communication design, today and into the foreseeable future, means that technical and professional communicators, information architects, and user experience designers must plan humane, human-scale approaches to big data, where relevant and meaningful ambient information finds people when they need it, contextualized for their local situations. (McNely)

We look forward to many issues to come, helping to define, innovate, and explore the Design of Communication. We want to see the cross-pollination of our field with others, leveraging the strength of our interdisciplinary work. As Salvo states in his article

Data, statistics, visualizations, InfoGraphics, Big Data: this group of emergent genres knits together invention, arrangement, style, memory, and delivery in ways that challenge conceptions of print--based literacy and textuality. (Salvo)

This issue is just the start of this conversation. We want to encourage you to submit your cutting-edge work, writing shorter, focused pieces that can begin to circulate across our field and within our SIG. Together, we can continue to build bridges across research and practice, using the next 30 years to explore this question of “What is Communication Design.”

What is Communication Design?

Clay Spinuzzi

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In 1997, I worked with a team to conduct my first qualitative research project, a study of how software developers used code libraries when developing a common codebase (McLellan et al. 1998; Spinuzzi 2001). In particular, I was interested in how developers used inline comments to understand their own and others' code. At two sites, the developers used comments pretty much as you might expect: as notes for interpreting and communicating information about the code. But at the third site, developers essentially ignored the comments. One compared the comments to an approaching car's blinker: it might or might not indicate intent, but you'd be foolish to trust it. Another set his editor to gray out comments so they wouldn't distract him. A third used comments - not to interpret the code, but as landmarks for navigating it. "If I have 50 lines of code without a comment," he told me, "I get lost. It takes me a while to actually read the code and find out what it's doing. But if I have comments I can separate it into sections, and if I know it's the second section in the function, I can go right to it."

This quote made a huge impression on me, since it emphasized how much users will sometimes bend and repurpose communicative artifacts. We tend to think of communicative artifacts - such as texts, pictures, and voice communication - as *being* the communication. But as William Gibson once remarked, the street finds its own uses for things. In my subsequent research, I have seen people link complex, expensive sets of data together with a sticky note (Spinuzzi 2003); use an expensive database system solely to convert copy-and-paste data from one format to another (Spinuzzi 2008); and mark up printouts of customer databases, turning them into elaborate call lists (Spinuzzi 2008).

If we think of communication solely as designed into artifacts, we're hard pressed to understand what's going on in these

examples. These people are clearly *misusing* the communication artifacts - that is, they're using these communication artifacts in ways contrary to their design. And yet, without these misuses, the work falls apart. It's only through these little misuses, these improvisations, that people can establish the flexibility to hold together what would otherwise be irreconcilable parts of their work.

We've used texts for a long time to perform work - in fact, evidence suggests that writing evolved from a quirky Sumerian accounting system (Schmandt-Besserat 1992). But texts are now central to work, particularly knowledge work: as more of our time is devoted to manipulating symbols and information, and as digital technologies allow us to connect more easily and broadly across time, space, organizations, and disciplines, we do more and more of our work through texts.

And so many texts! In my research, I see people constantly using multiple texts: email, memos, timesheets, checklists, sticky notes, databases, forms, and the list goes on and on. These texts form complex ecologies - they are more than the sum of their parts. The texts come from different times, places, and fields - they're designed for different purposes - but they are changed in relation to each other. A database *plus* a map yields a sophisticated policy tool; source code *plus* scripts *plus* comments yields a collaborative problem-solving environment; a printout of outstanding accounts *plus* an annotation system yields a running account of progress at work. These text ecologies are customizable, allowing individual workers to tailor them. But they are built on shared texts, allowing workers to develop shared work and shared assumptions.

These text ecologies, however, tend to be organic: they are idiosyncratic, they grow out of haphazard innovations, they typically occur as tactical reactions to recurrent situations. They're largely unplanned. They're "invisible": It's unlikely the boss is going to review a worker's sticky notes and checklist annotations and get a sense of that worker's shape or productivity. Text ecologies tend not to be designed. That's what gives them their flexibility, but at the cost of a coherent strategic stance. That is, they're not planned, and thus they often don't scale well; transfer well; lend themselves to being taught; or lend themselves to directed change.

Not that this problem hasn't been addressed. But it's often addressed in terms of a master plan: a formalization. For instance, software in the 1980s and 1990s tended to gather all the texts in a given work domain and reproduce them in an interface (e.g., desktop publishing software). But that doesn't work well: it's too rigid. From another direction, fieldwork-to-formalization methods aim to map out the texts in a given domain, then reconstruct these functions in a centrally planned manner. But this approach also has its limitations: it attempts to fix and control texts, and it focuses primarily on internal texts - and that's not going to work, since digital technologies have led to texts that can be shared across organizations. For many kinds of work, there is no interior to the organization.

For these reasons, I argue that communication design must go beyond *individual* communication artifacts (texts, pictures, and voice communication) to examine systems, sets, or ecologies of communication artifacts. We must particularly look at how people are currently interrelating these communication artifacts, especially in surprising or counterintuitive ways. And as we attempt to redesign these systems, we must make sure that they retain the flexibility and extensibility they need in order to respond to future challenges.

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Communication Design

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What is communication design? The term may represent, along with technical communication, information design, and content development, the latest permutation of how the work once known as technical writing has been re-named and re-professionalized. This is a reductive answer, of course, since the terms emphasize different qualities of that work and all are pinchy and baggy as generic descriptors. A different answer is that the term communication design captures an awareness that our field lacks a center. It has its genres and its processes, but as Johnson-Eilola and Selber (in press) argue, it is the focus on defining and solving problems in novel ways and in response to the exigencies of highly varied situations that underscores the importance of what we do. I prefer to see communication design as an embrace of that role, a recognition that the scope of our concern is broad: it is communication. It is also constructive work, aimed at producing concrete effects in the world. It is not just writing; it is design.

Characterizing communication design this way reveals reasons for preferring a more generic instead of a narrower name. Consider why this is a field that grows through centrifugal expansion rather than centripetal consolidation. It is because problems themselves develop and move in this manner, and by reflecting on these movements, we can outline what it means to do communication design. To start, we can classify these movements as horizontal and vertical. By horizontal movement, I mean professional expansion across fields of application (Horn, 1999). By vertical movement, I mean the increasingly thorough integration of communicative practice into the day-to-day work of various fields. Each draws out complications that situating the field as communication design better helps us address.

Horizontal movement highlights a broad range in points of uptake across traditional fields, including those related to software,

medicine, and engineering, but also now areas related to emergency management, public policy, education, and others. Each site foregrounds a different set of communicative problems that require attention to aesthetics, engagement, ethics, interaction, clarity, and other issues not typically associated with technical communication. Given this range, the application of “technical” communication hardly seems appropriate since there is no obvious accommodation of readers to technologies as much as to technologies, data, texts, institutions, and other people, all situated in a variety of places, locations, and times.

Vertical movement highlights the integration of communicative practice into various worlds of work, an outcome of which is that communication becomes inextricably entangled with a wide range of work practices (Reynolds, 2003, p. 189). Reports, study methodologies, and marketing materials are obvious examples, but work related to human resources and finance is communicative as well. Even day-to-day interactions with small bits of information that float in databases and surface in a multitude of interfaces that are carried on the body (e.g., mobile phones) or embedded in the environment (e.g., kiosks) are communicative. At this level of movement, not only does “technical” no longer adequately describe the function of communication, neither does “writing,” adequately describe its form. Communication is more constructive; it helps build the “stuff” out of which organizations, innovations, and knowledge are made. In this sense, communication designers do not write so much as they design.

If communication design asks us to think about the work of communication as constructive, building spaces for communicative interaction, it also invites us to consider how people move through these spaces, carrying with them potentially conflicting interests and exigencies. These interests and movements, which are historical, disciplinary, spatial, organizational, and social, outline a complex set of contexts to which communication design responds. The objectives of communication design, then, are focused on managing these movements and interests. Communication designers are those who facilitate the connections in these networks and who give shape to their character. They are “switchers” and “programmers” (Castells, 2004, p. 32), the embodiment of network

protocols in the socio-technical networks where communication does work. In this light, we can draw a helpful comparison to the development of Internet protocols. Early efforts at establishing protocols wanted components of the network infrastructure to impose cohesion on data being transferred, to stand in as “virtual links” (Abbate, 2000) between senders and receivers, not unlike switchboard operators in early telephone networks. The purpose was to provide a clear channel of communication, a role similar to how technical writers were once characterized. The TCP/IP protocol ultimately adopted puts responsibility for cohesion and uptake on the end user, a move that parallels how people use texts anyway (Geisler et al., 2006, p. 115).

Communication design represents not just a set of practices of symbolic representation; it reflects a more profound shift toward the sociological work that it does. Communication has always been about moving and connecting people and things. But “Communication Design” captures this activity in a manner best described as “translation,” a linking together of actors, human and non-human, in a manner that organizes and coordinates their goals and actions for situated, purposes (see Callon, 1986).

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The Value of Computing, Ambient Data, Ubiquitous Connectivity for Changing the Work of Communication Designers

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Our experiences as part of the Writing in Digital Environments (WIDE) Research Center have led to a complete break with the notion that we are concerned with the effective communication of idea to an audience or even with the related idea that we design technologies for that purpose. At least this is the stance that we take in this very short essay.

Instead, we are interested in the importance of listening, in the invention of tools that enable the assembly of resources (people and things) necessary for communicative work, and in how we can best support the communicative work of others—all backed by the great power of computation for its ability to support human creativity. To be more precise, we see computation, connectivity, and mobility as drivers for how we invent expressions of the worlds we seek to create and the values of those worlds for ourselves and others. This inventional work is an appropriate vision for the design of communication. It is work that requires communicators, in turn, to be inventors.

Technology Drives Change Because it Alters Culture

To go forward, we would like to first look backward at relationships between computation and invention. As a kind of human activity, the creative process is cyclical. For the artist working alone or the aerospace engineer working on a large team, the iterative nature of creative work is a common feature. Also common are the constraints associated with iterative processes. Trial and error. Another trial. And another. Which means that one

of the primary limits to creativity is time. The other, which some may posit as no limit at all, is the number of participants in any given creative process. Indeed, while some might argue that creative processes are inherently inefficient due to their iterative structure, we believe that such thinking misses a key point. Enhancing creative processes does not resolve to limiting the number of trials, but expanding on what can be done in each trial, particularly in terms of solving the problems of time and participation. Each trial is an act of composing, each act of composing contributing to invention.

Frank Gehry's Bilbao Guggenheim structure is considered a masterpiece not only for its striking visual forms, but also because it represents a watershed achievement in architectural creativity. Gehry's design is possible only with the aid of 3D modeling software to enhance the ways Gehry and his team could compose—visualize and analyze—possible designs.



Writing about the Bilbao achievement in *Science*, architect William J. Mitchell characterizes the architectural process as “largely one of creating and analyzing representations of alternative proposals, and then translating the completed representation of a selected proposal into full-scale, physical reality.” Human limits of time, visualization, and translation of ideas into testable forms constitute the constraints of the creative process in architecture, Mitchell argues, and so architects turn to tools to overcome these

constraints. Gehry's design at Bilbao was, for many, the first dramatic example of what the analytic capability of computer-assisted design makes possible for architecture. For Mitchell, these capabilities are represented in the creative process as much as in the final form of the building:

Gehry could employ visualization software to produce, almost instantaneously, whatever views he needed. He could also utilize rapid prototyping devices to generate physical models automatically. The digital model also provided input data needed for structural and other analyses. The complexity of these analyses no longer presented a difficulty either: the available algorithms had improved enormously in versatility and scientific accuracy.

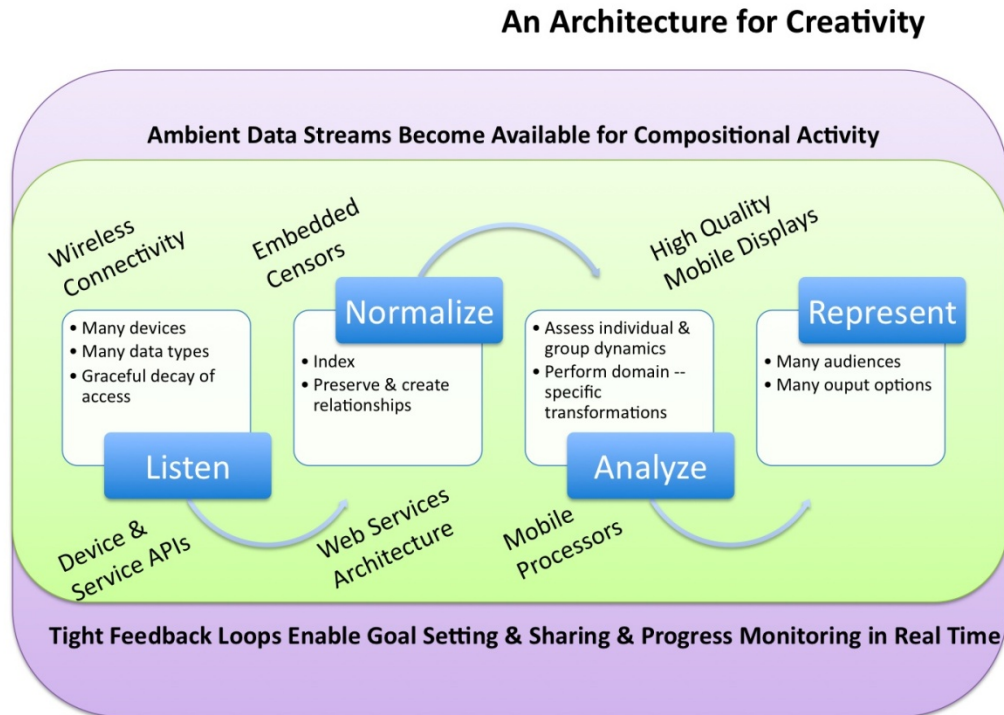
And so with the aid of software, Gehry's process could include many more iterations, and with the computer doing the heavy lifting to rapidly produce and analyze the structural properties of each idea, the proposals could approach the limits of what is physically possible to construct.

A New Opportunity: Ambient Data, High-Performance Computing, & Mobile Learning

We learn a number of things from that story. One is the power of computation to alter time and space in relation to complex work. Another is the power of new ways to represent and communication information. More significant, perhaps, is what this story represents for how architects work today—a moment that represents more distributed changes in the culture of work.

Today, the potential for another great leap forward is catalyzed by a major change in the way the computing environment Gehry and his team relied upon has undergone since the early 1990's. Gehry's computer was not connected to anything! Computation as a medium for creative advancement proved to be powerful, but even more powerful is the potential of connectivity, mobility, and diversity of sensors, processors, and data available at the present moment. These same technological potentials have significant cultural consequences, and for communicative work in particular, represent significant challenges and opportunities. The diagram

below illustrates this potential, made possible by the convergence of technologies in the green rectangle.



The purple rectangle suggests how we might expect inventive processes across a wide variety of specific disciplines to advance. Specifically, we see a vast increase in the *availability* of both the means and substance of creative endeavor—human-produced information and machine-powered analysis—driving feedback loops in work processes. The increases in availability, moreover, are not simply gains in the amount of raw data that can be accessed, but gains in the ways information can be gathered, aggregated, analyzed, shared, and transformed as well. Both the speed and scale of availability of all of these are much more vast than they were even a decade ago.

The value of this diagram is that it depicts a very general model of the creative process in our mobile, networked world.¹ It can be

¹ This makes it a slightly different model than those proposed for Web Science, though we hope it is complementary to those. See Berners-Lee, et. al.

applied with equal success to work in drug discovery and experimental theater, and from music to civil engineering. And in our case, to communicative work in particular.

Our diagram is relevant to communicative work because it describes the environment for *composition*—those moments when individuals and teams are creating something new using known elements (e.g. words or shapes) and structures (e.g. genres). The model is agnostic about the medium and domain of composition. Deliberately so.

The four sub-processes in the center of the diagram—*Listen, Normalize, Analyze, Represent*—correspond with areas where there are great opportunities for advancement and leadership in both research and practice. *listening* refers to the means by which we allow human and non-human agents in the creative process to “tune in” to ambient data resulting from human activity, regardless of where the data originates. Many devices, software, and services today produce information that is sharable—smartphones, point-of-sale transaction systems, search engines—but without attention and ability to gather this data, it may remain siloed. Once we tune into ambient streams of data, our next significant issue is intelligibility, how to make humans and other agents aware of the information and how to prepare it be analyzed and transformed. Analyzing and representing are the final two steps needed to complete an iterative cycle, where the analysis methods must be finely tuned to the activity domain of the creative endeavor and the representation(s) equally fine-tuned to the needs of those engaged in that endeavor.

Assembly and Participation

What does this mean for the design of communication and more generally for the work of professional communicators? The first issue is to take seriously the mobile computing landscape as a medium for composing practices that do not require individual humans to be “writing” in order for a system to compose texts that individual actors—human and non-human—contribute to. That is, the architecture is focused on computation and on the ambient nature of how writing saturates our lives. Indeed, it is deliberately tuned to leverage our writing (data) saturated lives as a resource

for creativity. In other words, our lives and the lives of our audiences are immersed in writing made by us, made about us, and made by robots via activity that none of us would associate with writing. Therefore, a primary task for communicative work is to listen, and this means designing listening services and the interfaces and architectures that makes ambient writing (data) available to others as resources for more explicit inventional activities.

The second, related issue is the requirement for communicators to be able to assemble the necessary people and things for communication and communication-intensive work. We need humans, machines, data, processors, analytics, art, and so on. And we need to activate these participants as participants—that is the difference the communicators make, the assembly of resources as participants in doing communication.

The real power of computation, connectivity, and mobility is that it distributes communicative work. This distribution has had some negative effects on the number and type of jobs held by professional communicators, and there is no question that technologies will continue to be disruptive. We told the story of Gehry's invention of the museum in Bilbao positively, but there is no question that changes driven by computation had negative consequences as well. The clear opportunity that we have seen emerge, however, is the need to move beyond communicating and toward supporting the communicative work of others. There is significant opportunity in areas of process, tools, interfaces, and the like for communication design to enable the communicative work of those who don't see themselves as engaged in communicative work.

What we think we have learned at WIDE excites us. We see opportunity for those engaged in the design of communication, but it requires us to understand the relationships between computation, connectivity, mobility, and creativity in new ways in order to leverage their rhetorical power.

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http://www.flickr.com/photos/jp_photo_online/7009520639/in/photostream

Telling the Future of Information Design

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Ask 10 technical communicators to define information design, and you're likely to get as many very different answers (Redish, 2000). Despite the variety, however, I think that most definitions of information design correspond more or less to one of the following approaches.

1. Information design applies graphic design principles to information in order to communicate the information more effectively.
2. Information design is the process of identifying, selecting, organizing, composing, and presenting information to an audience so that it can be used efficiently and effectively by that audience to achieve a specific purpose.
3. Information design is the series of activities that an organization routinely applies to communication tasks to match purpose, audience, and presentation with the information to be conveyed in order to consistently produce optimally effective information products.

I think that these three approaches—which I call ornamental, holistic, and strategic—suggest where we have come from and where we are moving in the realm of information design.

The ornamental approach differs very little, I think, from graphic design. No matter what our culture, we have a rich heritage of design on which to draw and from which to diverge for effect. This kind of design can attract audience interest and help to make the information more legible, emphatic, and clear. But if we fail to go beyond this superficial level, our information products might as well contain nothing but *Lorem ipsum* placeholder text because the connection between content and presentation is at best tenuous.

The holistic approach integrates content and presentation, and recognizes the importance of audience and purpose. Holistic information design draws on the rich traditions of both visual design and rhetoric to construct information products that help users accomplish tasks or that facilitate other types of learning. This is obviously a significantly more sophisticated and helpful means of devising and delivering information to consumers, but it is essentially a one-off process, a tactical approach applied to “discrete communication tasks or specific document types” (Ellmer and Lewanski, 2010, p. 18). Under this holistic approach to information design, each product is considered individually, and even if most information developers in an organization adopt this approach, it hasn’t become embedded in the organization’s communication culture.

The strategic approach to information design makes the holistic approach routine. Every information product released by the organization is treated as a means of accomplishing the organization’s strategic goals, and the significance of information products in helping the organization achieve those goals is recognized (Ellmer and Lewanski, 2010). Information products are always designed as carefully as the organization’s other products and services, they are built to the specifications of their design, and they are tested to ensure that they help the audience achieve the intended purpose.

A fairly extensive literature has explored and championed this strategic approach to information design (see, for example, the references and bibliographies in Schriver, 1997; Jacobson, 1999; Albers & Mazur, 2003; Albers, 2004). My perception, however, is that most technical and professional communicators today are stuck in ornamental mode, with a significant minority having advanced to holistic information design. The number who approach the problem of designing information strategically is vastly smaller. So what accounts for the lack of strategic focus in our design of information? Why do we neglect the one thing that could make us indispensable to the organizations for which we work?

I suppose that we could decry the economic climate of the past 12 years that has caused the exodus of so many people from our

profession, the lack of adequate funding by employers for continuing education in our discipline, or the hiring managers who rely on tool knowledge rather than communication and subject matter expertise in making employment decisions. All of these things are undoubtedly factors contributing to the problem. But I think that we deceive ourselves if we don't look within our own profession rather than to external forces beyond our control for the source of the problem.

We technical and professional communicators must come to terms with our own lack of interest in becoming a strategic part of our organizations by advancing beyond a tactical approach to designing information. We must acknowledge that since many of us have come to the profession through the "back door" without a degree in field, we have a great deal to learn, and that the responsibility for that learning rests squarely on our shoulders. We must be willing to read on our own and press our organizations for the funds needed to attend essential training. We must support the professional organizations responsible for publishing the journals that advance the body of knowledge and organize the conferences that contribute to our expertise on the job. Above all, we must acknowledge the reality that professional learning is a lifelong process that requires a professional lifestyle change, not a matter of first aid.

The launching of the *Communication Design Quarterly Review* is an occasion to be celebrated because it will undoubtedly be a resource to help our profession better understand the strategic role that information design can play in organizations, and thus the strategic role of professional and technical communicators within those organizations. But a journal is valuable only to the extent that it is read and its content is understood and applied. I hope that we all have the good sense to read, understand, and apply.

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Big Data, Situated People: Humane Approaches to Communication Design

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In his 2005 book *Ambient Findability*, Peter Morville argued that what we find changes who we become. In 2012 and beyond—in an information environment of filter bubbles, contextual advertising, and friend-of-friend chains that push ordinary folks well beyond the Dunbar number—perhaps Morville is in need of some updating: what *finds us* changes who we become.

Today, terabytes are commonplace. We design communications in a world of exabytes, zettabytes, and yottabytes. Data has long been funneled into relational databases, but given the rise of social networking applications that have scaled so rapidly as to defy previous assumptions, distributed databases have become more common. The age of *big data*—much of it generated not *by* users but *about* users, in the form of GPS coordinates, EXIF trails, transaction histories, et al.—is upon us. Currently this data is most often useful in the aggregate—depersonalized, decontextualized, and pasted together with millions of others. There is a real need for communication design researchers and practitioners to formulate approaches that distinguish between the usefulness of big data in the aggregate—think here of the utility that a national grocery chain derives from discount card data across a given demographic of customers— and big data applied to situated, local, human users—think here of the individual value provided by personal analytics, al la Stephen Wolfram (2012), where the data *about* us is made meaningful and local.

Communication design, today and into the foreseeable future, means that technical and professional communicators, information architects, and user experience designers must plan humane, human-scale approaches to big data, where relevant and meaningful ambient information *finds people* when they need it,

contextualized for their local situations. A central challenge of communication design, therefore, is leveraging the affordances and outputs of big data at human-scale. Where the last few years have been consumed with perspectives on scaling up communication infrastructures, the future of communication design must address the challenges of *scaling down*, of delivering big data in contextual, meaningful, localized forms. Approaching this challenge means designing and conducting novel methods of *ambient research*—that is, exploring ambient data by making use of ambient strategies.

We have reached the paradox of big data: we now generate and collect so much data that the challenge is no longer only quantitative. Instead, the paradox of big data suggests the inverse: we need *more* situated, contextualized, qualitative studies of communication practices in an age of big data, not less. And ambient data means that ambient research is becoming increasingly feasible to operationalize. The committed communication design researcher can develop immersive approaches to gathering and progressively analyzing ambient data about informed and willing research participants (not anonymous to us users whose data we scrape from public APIs). The tools that such participants use to produce big data can likewise be deployed to analyze and better understand their use, in localized, granular, and well-contextualized ways.

Interestingly, Peter Drucker (1998) seems to have foreseen the challenges of balancing big data and the sense we make of it in actual practice. “Information,” he argued, “is data imbued with relevance and purpose. Converting data into information thus requires knowledge. And knowledge, by definition, is specialized” (p. 5). How can we turn big data into localized information?

Sociocultural approaches to communication design provide models for understanding volitional, toolmediated human interaction at the broad levels of activity, actions, and operations. These models can help communication design researchers and practitioners understand how situated users turn data into information within their local contexts. Arguing for methodologies that integrate research scope among the microscopic (operational), mesoscopic (actions), and macroscopic (activity) levels, Spinuzzi (2003) contends that many field methods privilege or even ignore one

level of scope over others. He suggests that levels of scope are in fact coconstituted, and he offers genre tracing as a research methodology and set of heuristics for integrating research scope by collecting multiple kinds of data across multiple instances. Zachry, Hart-Davidson, and Spinuzzi (2010) similarly suggest that exploring networks of activity should involve field methods that gather meaningful data at strategic, tactical, and operational levels. Indeed, as Sannino, Daniels, and Gutiérrez (2009) suggest, “the study of technologies must be embedded in human activities where tools and media are generated, used, and modified. Technological and discursive mediation are unavoidably intertwined in every activity” (p. xvi).

These are the spaces for practicing ambient research. Why not leverage the affordances of distributed databases and data *about* people to address the paradox of big data? For example, studying the communication practices of a knowledge work team using ambient research strategies would collect the various streams of social software data produced by research participants and push that data to the researcher's server. From there, such data will be delivered to desktop and mobile applications that allow the researcher to continue fieldwork even when she is not *in situ*. The application would apply a researcher-defined analytic filter on the data—a qualitative coding schema, for example. The researcher then harnesses ambient data as it hits the server, in a contextual manner, coding communications as they occur, conducting fieldwork as it happens—one progressive and ongoing component of an integrated scope perspective.

Findings from such ambient research strategies might help professionals in communication design better understand participant practices at human-scale and better design applications and documentation by leveraging big data in humane and practical ways.

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Design of Communication

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There is much discussion and debate about what exactly falls within the bounds of what is termed, “design of communication.”

Art, design, and architecture are terms very much in the forefront of any discussion about design of communication. The collection of skills and studies around these three areas brings together abstract reasoning and creativity, as well as logic, intuition, and innovation. From a design of communication perspective:

- Art might comprise the presentation, the format, the look of a Web page, the appearance of UI widgets, and other creative design aspects of what a user “experiences.”
- Design means both the creative and the technical aspects of a planned solution. It might encompass look and feel, but also the detailed plans for a technical solution, such as workflow modeling, sequence diagrams or flowcharts.
- Architecture incorporates both the high level vision of a design and implementation of each component or aspect of a complete use case, project, product, or other form of solution. It attempts to create an innovative, elegant, and practical blueprint structure that ensures a successful delivery of the design and implementation.

Notice that none of these aspects of design of communication even touches on content development or what we might call technical writing, information development, or technical communication.

And, while we use the term “communication” we are actually more focused on “information” because, say, advertising, and public announcements are just two forms of many types of communication that are outside the scope of SIGDOC. Whether we narrow the scope of communication to digital communication or technical communication or something else, I believe that by design

of communication in the context of the ACM SIGDOC, we are talking about the design, development, and delivery of technical content in some form, for some audience.

User technologies

Design of communication is embodied in the term, user technologies (UT). UT includes both user experience or user-centered design, and user assistance, which is traditionally known as documentation. The usability of a UT implementation is dependent on the quality of the following:

Design for the user

Focusing design on the user in part requires an assessment of the use cases that users will need to know. Use cases are similar to tasks or may be collections of tasks. Thus, an area in the design of communication may include task modeling to create task-based information architectures. Metadata may be used to design and deliver role-based and goal-based technical content. Task modeling may also include combining artistic skills with knowledge of interaction design to contribute to products across a company's portfolio.

By assessing the usability of existing solutions, designers may help enhance the communication of design representations to clients, and work with them to focus on visually enhancing products in a portfolio that meets the needs of and requests from the client.

User interface architecture and design may include work on design elements with specific focus on user interface design patterns.

Development of information

Well-designed user assistance entails DOC keywords such as “information design,” “information development,” “information architecture,” “use cases,” “topic types,” “navigation,” “searchability,” “performance” (for example, the speed and accuracy of the system for users to find the correct information), “presentation,” and “componentization.”

Information development is similar to software development processes in many ways in terms of managing requirements, managing assets, managing change, testing, building, managing customer feedback, doing usability studies or tests, and training. Also included in the development of information are the guidelines, tools, processes, and best practices for developing or writing the actual technical content.

Like the software development model, there may be globally distributed development where some information development tasks or processes may occur in other countries, or tested at other sites. Also, like software that has been localized to non-English languages, information may be translated into different languages, including even more complex layers of building, testing, and delivery the user assistance.

Visual design

User interface (UI) design patterns, widgets, effects, graphics and visual style are reusable elements of design that help ensure innovative, intuitive, engaging, and consumable user interface designs. Design elements can be consolidated into a set of elements to be used to build applications for a more consistent user experience. Designers review, design, and develop UI visual style elements and assess and make recommendations on UI visual styles.

Each of these areas provides many opportunities for innovation in the design of technical communication.

Opinions

Some of the opinions I've received from past SIGDOC conference attendees have shed light on both current confusions and insights on what design of communication means.

Klaus Jantke (Professor of Multimedia Applications, Technical University Ilmenau, Institute for Media and Communication Science) wrote that when speaking about "Design of Communication" within the ACM, we mean mostly digital communication. So, the area we speak about is "Design of Digital Communication". In the field which is named "Communication

Science" in Europe (in the US, they frequently call it "Communication Studies") a large amount of work deals with non-digital communication.

Jantke noted four different perspectives in the design of communication within the context of SIGDOC and for each perspective he noted an example of a potential area for DOC discussions:

- The theoretical perspective - Discuss models of communication, for the conditions of understanding (including aspects of cognitive psychology). Work on designs that aim at security of communication.
- The technological perspective - Discuss the peculiarities of communication and communication design under certain technological constraints or ask for the exploitation of new technologies. Work on the potentials of virtual reality (VR) technologies, but also the problems in VR reception such as inattentive blindness.
- The system-oriented perspective - Discuss all kinds of systems in use including design tools. Work on appropriate designs for "knowledge management" or "information logistics."
- The application-oriented perspective - Discuss the issues driven by application cases such as teaching, learning, entertainment, conflict resolution in enterprises or politics. Work on how might e-learning and gaming be integrated for enhancing application systems with playful learning opportunities.

For every perspective, one could easily list a number of further topics. This illustrates how large, attractive, but also complex the design of communication area is.

Dr. Nicolas Spyrtos (Professor of Computer Science, at the University of Paris-South, and Head of the Database Group, at the Laboratory for Research in Informatics), whose current research interests include information integration (mediators, data warehouses, data mining), conceptual modeling, and logic and databases) agrees that "there is much more to the design of communication than just technical writing. I believe that technical

writing is an important component in the design of communication but it's just one component."

Several other components have emerged in recent years, and continue to emerge. In fact, I believe that design of communication is THE weak point of information technology today. If I were to summarize my criticism of information technology, I would say that information is useful only if you can get to it easily - unless you believe that "surfing" on the information ocean is sufficient.

I strongly believe that getting to the right information easily has a lot to do with the design of how to communicate with information sources. And I would dare say that even web surfing becomes more enjoyable with good design of communication.

He believes that design of communication is the weak point of information technology today. Specific areas where he sees much room for improvement are:

- Searchability and retrievability – "Information is useful only if you can get to it easily."
- Interface design
- Personalization or customization of information content
- Context sensitive information gathering

As a former SIGDOC Chair and senior technical writer, Kathy Haramundanis, wrote, "Design of Communication encompasses both the work of the technologist as well as the writer, and as such it has broad application. Technical writing is a craft and computer science is engineering. Some merging of these occur with those who examine the interactions between users, information, and technology, but we need more rigor and experiments to learn what is optimum, or perhaps more usefully, to learn what to avoid. And the results will probably depend to some extent on the technology itself, and what it enables the user to do. We should not forget that both writing and technology have both vertical and horizontal implications in the marketplace, and ways to strengthen the active matrix in both these dimensions would be useful."

"I think design of communication includes all the technical writing, user-oriented technology, and human-

computer/computer-human interaction topics that we can list. My main thought is structure: how should we structure the information the user needs? Note that we need a variety of structures to accommodate the needs of the several vertical and horizontal cells in the marketplace matrix. For example, if we are writing for a medical audience, a vertical column in the matrix, certain structures will apply more commonly than if we are writing for an audience of auto mechanics who need to repair a vehicle. Also note that the technologist approaches design of communication based on a desire to expose the capabilities of the tool developed. This desire may not consider how the tool is to be used, which may be a contribution that the writer can make. ('Tool' is used here as a generic word and could mean any hardware or software application.)"

It is clear that SIGDOC and the concept of design of communication cover a broad array of potential areas for research and discussion, which travels far beyond the bounds of developing technical content. It will be of much benefit to better define and classify the areas of design of communication.

Designers of communication may work in computer science or other fields besides technical communication. Our conference attendees include researchers and practitioners in usability and human computer interaction, computer science, design, information architecture, and technical writing and many of these people are asking for more clarity on what topics comprise the "DOC" in SIGDOC.

Visual Rhetoric and Big Data: Design of Future Communication

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The hype machine—media, corporate communications, and futurist prognosticators—are hard at work promoting Big Data. There are computing and storage resources that, like the “dark fiber” installed at the turn of the millennium that now carries streaming video, are looking for huge data sets that require the powerful processing and tremendous storage capacity of the new infrastructure. And there is no better confluence than that provided by the impetus to rearticulate *Communication Design Quarterly Review* in an age of Big Data. *The New York Times* has been running articles about Big Data for some time:

“Big data is all about exploration without preconceived notions.”

Indeed, big data is about finding patterns in the proverbial noise of vast, unstructured data sets.

Sound familiar? Pattern recognition, data mining, machine learning: all are antecedents. Here, Steve Lohr quotes Boris Evelson in a September 2011 story titled “Big Data: Sorting Reality From the Hype.” February 11, 2012, Lohr published a Sunday review article titled simply “The Age of Big Data,” which is an updated state of the field. IBM, HP, Cisco, and others have joined McKensie & Co. and Forrester Research in pursuing Big Data, and research grants specifically mentioning Big Data are appearing with greater frequency. Data visualizations have grown increasingly common—from GPS-mapped Superbowl tweets to attempts to understand the economic collapse of 2008—well-designed audience-centered graphical presentations of data seem able to penetrate the overwhelming fog of input from broadcast, social, and other emerging media. Big Data brings data visualization together with large databases and presents relationships existing deep within the data. Representations appear in a dizzying variety of cultural

artifacts: the book (and movie) *Moneyball* which narrates statistically-based major league baseball team-building, to Google's collaboration with the CDC that tracks the spread of flu through search engine analytics, to IBM's THINK exhibit of real-time traffic, solar energy production, and air quality data in New York's Lincoln Center. What makes these hybridizations possible are freely available data sources provided by the US Federal Government, United Nations, European Union, World Bank, and others. These relationships are then wed to analytics and presented using the tools of data visualization. And they work, capturing attention and testifying to the power of revealing systemic relationships. It is also an opportunity for visual rhetoric and information design specialists to participate in this hyped but powerful emerging field.

I shared my first experience of the seductive power of Big Data with the rapt web audience of Hans Rosling's June 2006 TED Talk. Rosling launched Gapminder software as well as the UN's data site during his riveting presentation of UN data of health and wealth. Rosling inspired me—and many others—to think about information design and architecture and its role in engaging an audience with statistics. The design of communication, whether part of technical communication, web design, UxD, or an as-yet emergent future configuration, is necessarily a rhetorically-based field, whether it is explicitly named such or not. And it is Aristotle's linkage between rhetoric and probability that empowers this linkage between Big Data and rhetorical studies—the very definition of the occasion of the restart of *Communication Design Quarterly Review* (CDQR) and ACM SIGDOC. The SIG's full title, "Design of Communication," will serve this community well in the development of the future of visual rhetoric and information design.

Remember that Richard Saul Wurman, coiner of the term "information architect," is the driving force behind the TED Talks. Those hugely popular talks are palpably accessible information design. They harness the social power of the web to make available some of the most complex research in many veins of inquiry: they are an antidote to the hyperspecialization of the information age and act as clearinghouse and community, bringing people and

ideas together to form a powerful connector node in the global network of innovators and spawn further hybridizations and catalyzations using visual design practices. It puts visual rhetoric more on a path towards becoming a disruptive technology reminiscent of breakthroughs in science, agronomy, and engineering at land grant institutions of higher learning in the United States in the late nineteenth and early twentieth century.

Data, statistics, visualizations, InfoGraphics, Big Data: this group of emergent genres knits together invention, arrangement, style, memory, and delivery in ways that challenge conceptions of print-based literacy and textuality. More powerful still is the braiding of statistical evidence with visual presentation—Big Data adds dimensionality by making humongous datasets available to analysis. Statistical analysis challenges ludic postmodern rhetorical constructions and pokes more holes in intellectual paralysis and reunites rhetoric with probability: where linear typographic literacy requires whittling all possible narratives down to a single representative anecdote, the database sustains multiple narratives, allowing for comparative analyses.

Comparisons across space, culture, time, support for multiple minoritarian representations, and sustaining counter-narratives and counter-histories: where Big Data is the commercial face of networked data visualization and probability analysis, there are historical, intellectual, pedagogical, and programmatic datasets worthy of analysis and visualization. Examples I've encountered reveal the ability of these aesthetically powerful and user-centered, audience-responsive representations to cut through the clutter of information glut. And that is the potential for *The Design of Communication* to play not just a part but a central and pivotal role in the future of technical communication, information design and architecture, and structure careers and commercial as well as academic work, programs and research agenda into the next generation of symbolic-analytic work.

The data is collected by organizations like the UN and Federal Government, by Google and FaceBook, and used to provide the next-generation socially mediated services that feed data-driven organizations, reminding of Aristotle's definition of rhetoric as probabilistic assessment and articulations of the variety of the

available means of persuasion. It offers no assurances even with its guise of clarity, complicating action rather than offering assurances of infinite scientific repeatability. The processes of visualizing huge data sets open the door to rhetoric, and invite questions about cultural and communicative context, of network flows and connections among nodes, of correlation and causation, and of effectively cutting through the clutter of our (over-?)production of data and calling attention to truly powerful relationships that exist, waiting to be unconcealed. Data Visualization is distillation. The world(s) we inhabit are as complicated and challenging to traverse as we have always asserted, and multitudes of answers always “depend.” To sophistic rhetoricians goes the advantage, having never accepted easy answers.