

Discovering Information Behavior in Sense Making.

III. The Person

Paul Solomon

School of Information and Library Science, University of North Carolina at Chapel Hill, CB #3360, 212 Manning Hall, Chapel Hill, NC 27599-3360. E-mail: solomon@ils.unc.edu

This article, the third of three, used the methods of an ethnography of communication to explore the individual information behavior in sense making of participants in the annual work planning of a unit of a public agency. In particular, this article focuses on how people capture and process meaning from their situation. The analysis identified personal sense making styles that included cognitive, affective, and conative (action instinct) elements. These styles seem to also reflect a person's role in the organization and the work planning task. Given that participants in the work planning process had their own personal sense making styles and that these styles tended to vary across participants, it is not surprising that there were clashes in style. This fact was both a strength and a weakness in the sense making that was required for work planning, a complex information intensive task. Diversity of approach, perspective, opinion, and interpretation led to the crafting of strategies that served the purposes of the organization in a richer way than did any individual strategy. Diversity of approach also led to frustration over the amount of time that it took to tie together the different senses and points of view into agreement on actions, only to have these agreements unravel as new cues from the environment suggested the need for modification to at least some participants. Understanding the nature and diversity of sense making styles among members of work teams may aid the team in taking advantage of the range of sense-making skills that are present and lessen the conflicts that arise when different sense-making skills clash. The three parts of the study dealing with time and timing, the social, and the personal are brought together in a brief conceptual synthesis at the end.

Introduction

The study is being reported in three parts for several reasons: to provide the rich description that is the hallmark of ethnographic research, to provide details of the data and analysis necessary to allow readers to make their

own interpretations and judgments, and to highlight possible impacts of several different research views on information behavior in relation to other aspects of people's lives. Part I (Solomon, 1997a) provides an overview of the conceptual foundations, background of the study, and methodology covering all three parts as well as the time and timing view. Part II (Solomon, 1997b) considers the social by focusing on organizational properties of sense making and the communicative events that support the creation of common ground and the development of meaning from often widely dispersed facts and points of view. Part III, provided in this article, considers patterns of individual sense making that influenced the work planning process as well as a conceptual synthesis of all three parts. The whole of the study is brought together briefly in Solomon (in press).

The study sought to explore the role and place of information in the annual work planning of a unit of a public agency. This organization provided technical assistance related to conservation and appropriate use of natural resources such as rivers, trails, and open space. Provision of assistance was dependent upon the largeness of the legislature. Thus, the work planning process was uncertain in that there was no assurance of funding until funds were actually appropriated, let alone what the level of funding would be if funds were provided. The process, thus, was one of generating technical assistance project proposals through several regional offices and, then, evaluating and ranking those proposals so that the "best" projects would be funded and work begun. The study continued over three annual iterations of this work planning process to understand how the advance of time and resulting changes from year to year influenced information behavior.

The methods employed were those of an ethnography of communication (Saville-Troike, 1989). I was involved as a participant observer during the process. My role was one of record keeping and facilitation. This role enabled me to collect information, record and observe meetings and other communicative events, ask questions, and oth-

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erwise collect the data underlying the analysis here. It also limited my influence on the process, as I only collected information about the process and did not collect, process, use, or otherwise engage as a participant in the work planning process (WPP).

The analysis was typical of a qualitative study within a naturalistic setting. Basic data were collected including field notes of observation sessions and interviews as well as logs maintained by participants and the products of the WPP (e.g., memoranda, database reports, handouts). This basic data was expanded with my annotations, reactions, and questions. These field notes and their expansions were also coded using categories that were evident in the data. Further details of the background of this study, its methods, and analytical approach may be found in Solomon (1997a).

Sense-Making Styles

Having reflected upon the WPP from the perspectives of a broad overview of time and timing during the WPP, organizational sense making, and communicative events, the focus of the research lens now turns to the individual participants in the process, where the patterns of information behavior and sense making styles of participants are examined.

The fundamental analytical approach employed in this study involved the specification of categories and names for those categories to describe patterns of communication and information behavior in the sense making that influenced the WPP. Because there are potentially many ways to categorize and name these patterns of behavior, it is important to clarify this categorization process in prelude to viewing those styles in use.

Anthropologists employ the terms *emic* and *etic* to denote the distinction between subject and researcher views of happenings (Sandstrom & Sandstrom, 1995). Thus, *emic* refers to the research subjects' sense of the situation; *etic* to the researcher's sense of behavior in the context of theory and research relevant to the research questions. The two views taken together provide a mechanism of checks and balances in the analytical process. Following the lead of anthropology's *emic* and *etic* distinction, my first analytical action was to attempt to understand the similarity and diversity of participants views regarding their information behavior in sense making (*emic*). It was clear from the participants' responses during interviews that they did not conceive of a separate something that information scientists might call information, information search, or information seeking. Different people employed different information strategies in their work, but these were not differentiated by the participants in this study with a distinctive label. Rather, such information behaviors were viewed as ". . . the normal things that I do when I do work planning or any other part of my job." This is one reason why I began to see information behavior as being embedded in sense making.

Moving to an *etic* point of view, I characterized the WPP participants' actions in terms of the patterns of their information behavior. I also relied on my sense of the basis of their actions, which I developed by triangulating observations, interviews, transcripts of meetings and conversations, and the documentary remains of the WPP. To test the validity and reliability of my coding and interpretation, I checked them with WPP participants and peers (Guba, 1981). I also followed paths originating in the forest of these data to the theory and research of such fields as anthropology, psychology, and sociology to relate the behavior that I observed and that the participants described to the theories, conceptual frameworks, and research findings of these disciplines and their interdisciplinary combinations. This approach links the current research and conceptualization to that which preceded it. The approach also provides an evaluation mechanism for both current and past research. Correspondence strengthens confidence in the findings of both past and current work; anomalies focus attention on differences requiring analytical attention.

The result of this analysis process was the specification of a set of three interrelated factors that influence sense making and associated information behavior: cognition, affect, and conation. The following provides descriptions of these factors and a discussion of how they contribute to the sense making styles of the WPP participants.

Cognition

In trying to consistently describe the information behavior in sense making that I had observed, that was present in the transcripts of communicative events, and that appeared during follow-up interviews, I eventually realized that much of what I was seeing, reading, and hearing concerned perception, recognition, conception, thinking, and judgment. These processes all seemed to be related to what has been labeled as cognition, where people develop an appreciation of an object in a way that builds on their previous knowledge and experience, cognitive apparatus, and the task and other aspects of the situation. Key aspects of cognition that frequently created an environment for breakdowns in productivity and progress in the WPP included: focus of the field of perception, memory of previous actions and communicative events, differences in information processing and analysis approaches ranging from analytic to holistic, variation in knowledge of organizational rules and procedures, and biases in the evaluation and use of information.

For instance, participants in the WPP seemed to focus and control their perceptive apparatus in different ways: some emphasized internal operations and neglected external (environmental) forces, others focused on external happenings and were inattentive to the internal, and a couple paid attention to both. Individuals frequently forgot the details of previous discussions or interpreted the commitments to action of those discussions in contradic-

tory ways. Action alternatives were sometimes found to be inappropriate due to constraints imposed on communications by the policies and procedures of the parent organization or the legislature. Individual analysis and decision making was also subject to the range of information processing biases or heuristics.

Affect

After coding appropriate behaviors as involving cognition, I revisited the data to consider what other aspects of information behavior in sense making might be present. Most obvious were outbursts of anger and expressions of frustration. Further consideration led to the insight that there were also many instances of positive expressions of emotions: excitement, laughter, and other evidence of satisfaction. Actually, there was a whole range of affective behavior from happy to sad, anxiety to exuberance, and frustration to satisfaction. All participants did exhibit their own characteristic affective behaviors, including differences in the intensity of their reactions.

For the WPP, expressions of emotions, feelings, temperament, mood, and the like seemed to either mitigate or amplify sense making behavior. In anger, positive aspects of the situation were often lost; in joy, the downside sometimes went unnoticed. Thus, cognition cannot be fully understood without understanding the role of affection. The role of feelings and other affects has also been noted in research reported by Kuhlthau (1993) and Mellon (1990).

Conation

Again, I appraised the data. Upon reflection each of the players in the WPP demonstrated their own action preferences. For instance, while some participants resisted change, others sought it. While some were quick to try out an idea, others insisted upon gathering information first. My first thought was to name this phenomenon personality, but personality is too broad a term as it encompasses cognition, affect, temperament, this something that I was trying to name, and their interactions (Messick, 1987; Miller, 1991). That is, WPP participants were sometimes motivated to insist upon some actions to the extent that they would follow their instincts even when faced with widespread resistance. In insisting upon actions, they, in turn, resisted the approaches of others. Alternatively, an individual might also simply accept the actions of others, where neither insistence or resistance was in operation. This acceptance might be viewed as ambivalence, but the contextual and interview evidence from the WPP suggested that, while there were cases of ambivalence, there was also a mediatory position of encouraging consensus.

It is difficult to simply delineate an individual's instinctive likes and dislikes or drives (unconscious) and volitions (conscious) as each WPP participant showed different combinations: Some were compelled to gather information,

emphasizing, for instance, the collection of facts about projects or the opinions of legislators. "Why don't we call all of the regional offices and get their reactions before we proceed?" Others favored information processing or organizing strategies, including the preparation of tables or the sorting and ranking of information. "I've been taking notes and we have the flip chart sheets. Let me put all of this together in a chart. Then we can see if it makes sense." Certain participants emphasized innovation and quick testing of options. "I think that we should test the water with a demo project. We can learn from the experience and fine tune our approach if it works. If it doesn't, we won't have invested much." A few insisted upon carrying a plan through to its fruition, even if changing conditions reduced the expected value of the product. "We are already half-way through our plan. I think we should keep on going and do the allocations as we had already decided."

What to name this phenomenon? I have chosen *conation* as the preferred term. Conation had been in general use as a psychological concept earlier in this century, had fallen into disfavor, and then was revived in the learning literature (Snow & Farr, 1987) and in the definition of personality (Miller, 1991) to stand with cognition and affect as factors that impact on learning, productivity, change, and other dynamic aspects of work. Where conation had once been viewed as a specific form of behavior, it was now seen as an aspect of all behavior. Thus, conation, affection, and cognition are not independent sources of behavior.

The term is also used by Kolbe (1993) to describe her KCI™ (Kolbe Conative Index™), which measures, in my words, action instincts. This index is in contrast to a social profile such as Myers-Briggs, which emphasizes how a person wishes to be seen by others. Kolbe defines conation as involving four sorts of instincts: probing, which encourages in-depth investigation; patterning, which makes us seek order; innovating, which leads to experimentation; and demonstrating, which translates abstract ideas into concrete form.

In Kolbe's view, the probe, pattern, innovate, and demonstrate instincts correspond to fact finder, follow through, quick start, and implementor modes of action.

Overall, there was considerable diversity in the expressions of conative behavior in the WPP. Variety in action instincts encouraged diversity in point of view, which encouraged richer and more broadly based solutions. Variety also fostered misunderstanding, mistrust, and the feeling of game playing expressed by participants in the process. Yet, a mutual understanding of these action instincts might mitigate such resulting hostility or feelings of manipulation, while aiding participants in understanding how different action instincts contribute to productivity and quality in work.

Styles

These broad categories of cognition, affect, and conation were not mutually exclusive or independent in their

relation to information behavior in sense making as many data items involved each of the three contributors to learning, progress, and breakdown. Rather, the behaviors that they summarize seem to be the product of their interaction. For this reason, I have chosen to portray the thoughts, feelings, and action instincts of the individual participants in the WPP through sense making styles. Savolainen (1995) writes of something akin to style as: “. . . a profile of information orientation . . . a set of attitudes and dispositions towards information seeking and use in certain problem situations” (p. 265). As Messick (1987) notes:

To the extent that personal styles display generality in the organization and control of attention, impulse, thought, and behavior, they constitute important variables for our purposes because they bridge not only structure and process but cognitive and noncognitive domains of functioning. (p. 37)

I want to emphasize that *no claim is being made as to the generalizability of the styles* that I identified among the participants in the WPP or that the label suggested as descriptive of the style completely encapsulates the rich behavior of participants over a 3-year period. Rather, these designations attempt to seize something of the sense making personalities of the individual participants. At the same time, while we might expect and even desire that sense making behavior will adapt to the requirements of different phases of a task, whether it be work planning or the information search process accompanying the writing of an article, this was not the case for the participants in this study. They seemed to follow their preferences throughout the process. Thus, while an individual’s style might promote productivity at some stages of the WPP, it may be blocking at others. A question for further research involves whether individuals can modify their information styles to better fit with the aspect of the information intensive task that they are confronting. This end seems to be the emphasis of Kuhlthau’s stream of research as evidenced by *Teaching the Library Research Process* (Kuhlthau, 1994).

Table 1 names the sense making styles of the primary WPP participants and provides examples of their associated cognitive, affective, and conative behaviors. The appellations chosen to represent the various styles in a single word indicate the broad impression of effects of consistent patterns of information behavior in sense making in light of the organizational roles occupied by the participants and the influence of the situations and tasks studied. The information style appellation, thus, represents the interaction of individual information behaviors, role, and situation. So, while the cognitive, affective, and conative behaviors of the Technical Assistance Branch Chief and first Technical Assistance Branch staff member are very similar, their roles and tasks led them to be characterized as Analyst and Organizer, respectively, to reflect an overall sense of their behaviors and role in the WPP.

Holist (Chief)

The *holist* scanned the environment seeking “tidbits” of information, used that information to create a holistic view of contextual and situational forces, and employed this “big picture” to generate possible futures and develop associated strategies that allowed the organization to adapt and survive in a turbulent political and social environment. Sense making was directed towards the discovery of a reason to act and follow-up consideration of action strategies. These strategies were tested through abstract simulations, which set up a special form of language game (Wittgenstein, 1958) that was not either familiar or obvious to the rest of the participants in the WPP:

I’ve just heard from [deleted] about her meeting with the committee staff. She says that given the budget targets there is no chance for an increase. There will probably even be a small decrease—part of a small across the board cut—though they expect to recommend continued funding at this year’s level. Given this, I don’t see the point of continuing down the primrose path that we have defined. It makes no sense to waste time collecting information on new projects that we cannot fund. How about simplifying the process substantially by giving the regions a target allocation figure and letting them decide on what old and new projects they can do within the target figure?

Thus, the *Holist* style ensured that futures were evaluated in light of current intelligence through needs analysis and the development of strategies for change. This style’s disadvantage is that it tended to impede progress by interrupting ongoing operations with abstract adaptive strategies. The perception of many WPP participants of this style as “game playing” was brought about by the abstract nature of conversations, which were intended to “. . . toss out an idea to see what the reaction is” and interpreted as “. . . a serious change in direction.” Yet, without this emphasis on adaptation and change, it is doubtful that the study organization could have survived in a time of downsizing.

Manager (Deputy Chief)

The concern underlying this style was production and performance. Change was something to be managed. Completion of a product by a deadline was a source of satisfaction; impossible or sudden deadlines were sources of frustration. While perfection was felt to be unattainable, incremental movement in that direction was one emphasis of this style. In particular, the *Manager* style consisted of listening to all of those involved in the situation to obtain necessary facts and processing those facts to create innovative solutions that bring people together to enable progress. Sense making aimed for the resolution

of conflict is indicated by this statement at the opening of a meeting:

We need to get things moving again. I guess there hasn't been any progress over the last month? I'd like to start by going around the table and get your comments on the hold-ups and any concerns you have. Let's do this without interruption the first time around. Then, we can see if we can get things moving again.

This style has the advantages of providing bridges between different viewpoints through their airing and encouraging the development of common expectations and commitment. This style promoted various strategies including operational testing of change proposals, consensus building, and compromise that led to constructive and consensual change. Thus, the style aided in developing a shared vision of the issues that needed to be faced. The rub here was that the *Manager* style only came into play when the planning process suffered from close to terminal breakdown in communicative relations among its participants, as the Deputy Chief role was primarily devoted to other tasks. Still, the style enabled the process to begin moving again.

Analyst (Technical Assistance Branch Chief)

With this style, tasks and problems were broken down into their component parts. Key parts were, then, selected for further treatment. The remaining parts no longer received active attention. Thus, the *Analyst* focused attention on those aspects of the situation that were felt to be critical. Information gathering emphasized collection of facts about those critical aspects. Information processing emphasized entry, editing, sorting, filtering, and presentation of key facts. Lists were created to assure attention to details. Accomplishment was measured by checking items off a list. Sense making aimed for understanding discrepancies between planned and actual performance:

We have on our schedule that we are gonna send the allocation process instructions to the regions next Wednesday. I don't see how we can make that deadline. We haven't received input for the bits [activities] managed by either the Land or Water Resources Branches.

Attempts to move attention to anything beyond the key parts was seen as an unnecessary diversion and were resisted. Such attempts to refocus were sources of anxiety and frustration. The advantage of this style was its strong commitment to production. The disadvantage of the style was that it discouraged consideration of the adaptive strategies that proved to be critical in a turbulent environment.

Organizer (Technical Assistance Branch Staff)

This style stressed order, organization, standards, plans, and consistency. Deviation from order encouraged

efforts to return to order. Sense making aims for making the subjective objective and for replacing the fuzzy with clear well-defined edges:

I'm not sure what they really mean with some of the entries on the project status forms. Certainly, if we entered what they put down, we would never be able to retrieve records by different sorts of project characteristics. So, I've set up codes that cover the kinds of queries that have come up and apply them to what the regions give us. If their entry really doesn't make sense, I call them up and get them to explain. Then, I fit their explanation into my codes.

Actions to organize tended to breed structure and limit flexibility. The systems of categories and associated classification decisions for technical assistance project attributes that were developed through the *Organizer* style sometimes did not fit with the issues of interest in prioritizing and selecting projects for funding. In fact, some important issues were hidden from view by a category system that directed attention away from some of the fundamental project selection criteria. For instance, while projects might be described as fitting into land or water categories, that category scheme led discussion away from important issues of project impact and significance towards turf battles:

OK, the project clearly fits both land and water categories. Why argue about fitting a square peg into either a round or triangular hole? The important thing isn't whose list the project goes on. Where does this one rank in relation to others? How do we know that?

In addition, such difficult to specify selection criteria as public support, resource significance, tangible impact, and appropriateness were not defined through a category structure. Thus, an organizing process that was very rigid contributed to frequent back tracking to either reclassify or gain information about characteristics that were essential to keep the discussion moving towards commitment to action. This style was reinforced and, perhaps, amplified by the use of database management software to maintain project information. That is, the existence of the database with its data elements and formats structured the *Organizer's* actions.

The *Organizer* style's advantage was that it enabled quick access to a large collection of information on technical assistance projects and their characteristics. Its disadvantage was that variations from the expectations of the staff member doing the organizing regarding access to information often could not be accommodated without additional information gathering. This is, in short, the dilemma of information organization.

Processor (Technical Assistance Branch Staff)

This style gives weight to the processing or manipulation of information. The emphasis in this style was on

TABLE 1. Sense-making styles of WPP participants.

Information style	Role	Cognitive behaviors	Affective behaviors	Conative behaviors
Holist	Chief	Perceptual system is open. Scans for events likely to influence the organization. Generates many possible actions. Waits until the final moment to commit to action.	Appreciates feedback, even when critical. Seldom indicates frustration. "Cannot suffer fools": avoids contact with those who have lost his confidence.	Probes environment for changing conditions; compromises on order and record keeping; offers adaptive strategies; views the consequences in abstract terms.
Manager	Deputy Chief	Develops indicators of organizational status. Collects information to evaluate these indicators of progress. Uses the indicators to point out problems and possible solutions before they become costly. Relies on intuitions: "They have never failed me."	Avoids quick judgments. Listens to all sides of a dispute. Tries to find common ground and use that common ground to mediate. Personally frustrated by the slow pace of the WPP and the rehashing of points previously discussed.	Collects facts to support actions; listens; develops record keeping approaches to supplement inaccurate "official" systems; quick to try new approaches; demonstrates innovations with a product oriented approach.
Analyst	Chief, Technical Assistance	Methodically processes information collected and received by summarizing and making follow up lists. Processes all informational input for fear of missing something. Uses this information to specify goals.	Overtly displays dissatisfaction and frustration. Confrontational in approach. Outspoken.	Initiates information collection; consistently organizes information in lists, tables, and charts; resists change except when convinced that it is essential; sets agenda.
Organizer	Staff, Technical Assistance	Information analysis focused on detecting inconsistencies and inaccuracies. Information collection focused on correcting errors or finding missing data. Emphasizes summarization, categorization, and classification.	Frequently displays dissatisfaction and frustration with any change in direction. Responses in these situations are emotional, reflecting changes in voice and body language from usual demeanor. Often negative.	Edits collected information; emphasizes order through data collection forms, databases, tables and other reporting formats; resists change; plods through task process, while maintaining order.

Processor	Staff, Technical Assistance	Collects data to meet the requirements of the plan. Processes data in conformance with established procedures. Presents information in specified formats.	Confident, pleasant, and unaffected by appropriate modifications to plans. Expresses objections to changes in plan in a positive, friendly manner. Constructive.	Enjoys the search for information; fine tunes plans, maintains systems; mediates between the vision and the real world; works toward actualization of approved plans.
Presenter	Chief, Land Resources	Data collection emphasizes status of ongoing activities. Processing is superficial. Status is passed on with justification for delays. Decisions are made and problems are solved when forced.	Avoids emotional displays. Forcefully and positively presents point of view and tries to influence actions. "Bones" are "picked" in public and not behind someone's back. Outspoken.	Raises pros and cons of information collected by others; resists being boxed in by others' agendas; emphasizes practicality, while trying to assess implications of innovations promoted by others; manages implementation of plans.
Transmitter	Chief, Water	Information gathering focuses on a small number of personal contacts. The views or anecdotes supplied by these contacts are employed as a rationale for supporting or rejecting positions on agenda items.	Withdraws from tense or uncomfortable situations. When corralled expresses frustration and hostility. Silent except when encouraged.	Collects facts to support position; resists order on a personal level, tolerates order generated by others; resists innovation when in conflict with agenda, accepts innovations of others when they fit with personal agenda; rarely meets deadlines.

getting the job done. Sense making aims for successful translation of plans into action or task completion. Thus, production was the overall concern:

I'm not into policy and fighting over what needs to be done. Just tell me what you want and I will do it. I enjoy getting things done.

The "worker bee" who follows a plan of action and asks for guidance when problems arise was critical to the success of the process.

Communicator (Land Resources Branch Chief)

For this style, readily available information was selected and summarized to develop a statement, usually oral, that provocatively addressed, with rhetorical prowess, some issue of concern. The patterns of information behavior that were associated with this style did not show systematic gathering of information. Rather, search was usually confined to selected pieces of reports, memos, conversations, and the like that were readily at hand. The processing of information selected in this way involved plausible rather than logical reasoning. That is, the selected pieces of information were brought together in a creative way to make a persuasive and plausible argument in support of a position. The process involved manipulation; the product was a good story. Sense making emphasized the social in planning and rehearsing an approach for persuading others that the espoused position was the best. The process started with the desired end and proceeded to find facts that supported that end position.

These skills present in the *Communicator* style were particularly beneficial when they were channeled towards support of the entire organization and were sometimes disadvantages when they promoted self interest. In sum, the arguments were persuasive, yet they were incomplete, trying to shine a favorable light on the desired outcome.

Transmitter (Water Resources Branch Chief)

The emphasis of this style was the selective transmission of information from external contacts to influence policies, procedures, and decisions of the study organization and from internal contacts to inform external cooperators. This style almost singularly involved message delivery. Sense making involved selection of messages for transmission.

It was beneficial in that it brought different views into consideration that otherwise might not receive attention. Because the message transfer was not systematic, it tended to provide a slanted view that excluded other positions. This selection information behavior is a critical aspect of sense making.

Together with Table 1, the brief synopses of styles attempts to highlight the nature and contribution of cognitive, affective, and conative information behaviors associated with sense making in the WPP. As each of the styles made both significant contributions and at other times contributed to breakdowns and slowdowns, it would be inappropriate to interpret the analysis presented here as promoting some styles over others. The implication of the analysis is that no single style is likely to be "optimal" in a setting where work requires the collaboration of multiple participants. Rather, the mix of styles contributed much to the study organization's success in gaining support for its technical assistance activities. Yet, the recycling of issues, the frequent proposals for change, and the delays resulting from unmet deadlines, all worked together, at times, to impede progress and raise the general anxiety level. The challenge for organizational design, especially with reference to information and communication systems is to reduce the conflicts that different styles produce when they act in association.

Presentations of styles (e.g., learning, personality) typically attempt to encapsulate a great deal of variability in data into a small number of dimensions. Given the small number of cases, the speculative and preliminary nature of interpretations of the data, and the interest here in the level of individual differences, the exposition emphasizes the diversity of approach that is likely to be found in the ongoing operations and interactions of an organization. When people come together to work cooperatively, they naturally bring differences that either impede progress or must be accommodated. Forcing someone into a corner by making them operate in an uncomfortable manner usually worsens the situation. Such individual differences need to be recognized and positively employed to benefit both the individuals involved and the organization. Thus, basic to conflict reduction or productivity improvement is simply an *understanding that different people gather, process, use information, and make sense in different ways.*

This individual view of sense making styles suggests that people's instincts or action preferences lead them to target particular information actions, which lead to individually characteristic patterns of information behavior. For instance, the *Holist* style emphasized repeated cycling between gathering information, defining the situation, brainstorming options, evaluating options, and acting if the evaluation was successful. The result was that some desirable information strategies were not used or employed infrequently, while a sequence of information behaviors was often repeated.

In the next section, the individual focus is continued with some reflections on the incompleteness of a "least effort" explanation for sense making and associated information behavior and consideration of sense making opportunities lost.

"Least Effort" and Opportunities Lost

A fundamental deficiency in our understanding of sense making and associated information behaviors involves an appreciation of why people avoid opportunities to fill a gap in their understanding or reduce the ambiguity within a situation. While the analysis here has already led to some suggestions regarding why some potential information behaviors are not selected and others are selected repeatedly (e.g., sense making styles) the concern in this section involves the question of why people refrain from taking sense making actions even when they are aware of the importance of such action and these actions conform to their instinctive sense making strategies.

Some of this appears to be due to habit or, in a negative sense, skill. That is, productivity and performance improvements may be limited due to inefficient information seeking strategies or lack of knowledge of possibilities as, for instance, when a relevant database is unknown or when short cuts or retrieval features of an information system are available, but are not evident without considerable effort by the user.

Another explanation relates to the accessibility of an information source. This least-effort view (Zipf, 1949), where people take the course of least resistance, does not explain why someone will not ask for or offer a key piece of information when engaged in a conversation or meeting with people who are likely to possess or need that information. Like many single variable explanations, the least-effort account hides factors of situation, personality, and sociality. It also hides the possibility that there may be several aspects to the idea of least effort (e.g., physical access versus cultural access). Too, people sometimes go to great lengths to avoid the simple and easy source to perform a roundabout series of cycles and recycles as they try to develop meaning. Such behavior in violation of least effort certainly took place during the WPP.

Frequently cited as evidence of least effort in guiding information gathering or search is that people talk to those who are close by (e.g., Harris & Dewdney, 1994) or use materials that are close at hand (e.g., Poole, 1985). These strategies were also employed during the WPP. What seems to be lost in the least-effort explanation is the dynamic aspect of sense making: it is a process that unfolds over time and space. Participants in the WPP often consulted colleagues, friends, and significant others. They also at times went far afield and to great lengths, for instance, to get missing information or find out someone's position on an issue. The dynamic analysis of the WPP shows a pattern of sense making behavior that suggests evolution and movement through time.

Sense making seldom began with anything more than cursory thought on the parts of the study participants about their information behaviors. Often, there was a leap to action or at least to propose an action strategy, which was followed by initial attempts to (1) develop a rationale for the action, and/or (2) to gain the support or commit-

ment of others. An alternate explanation for these very accessible interactions with those people or resources that are physically close by could be closeness in terms of task involvement and understanding of the situation or environment: we are familiar with them; they provide a bridge founded in past experience and understanding; we are playing the same language game.

They all [the participants in the WPP] think that my ideas are off the wall. Admittedly, I don't spend much time thinking about impacts or implications of my ideas. Somehow my sprouting them helps me see them and their impacts more clearly. The looks of incredulity that I usually get are actually funny. After a bit I get some comments and we discuss and then I know what is good and bad about my idea and I can toss it out or make it better. Really, it isn't my idea anymore. It is a different one that incorporates the reactions of the folks that I've talked to about it.

Sometimes these sorts of discussions are enough. Occasionally, this understanding and definition process indicates a broader need for information, perhaps requiring new previously unidentified sources of information. Once again, the patterns of information behavior employed in sense making may ultimately cycle many times moving from colleagues and cooperators to strangers in far away places, documents and other information sources that are spread across the globe. Thus, as close and comfortable interactions are completed or exhausted, either the situation is resolved and sense is made, further consideration is abandoned, or additional information behavior initiated.

While this sense making process can lead to understanding, consensus and commitment, it may also identify gaps of uncertainty or ambiguity in information that require the casting of a broader net:

After discussion with the staff, I came to the conclusion that the best approach would be an amendment to the legislation. But I had no idea, nor did anyone I know, whether there might be any interest in the legislature to do so or even who to talk to about the change. So I just began by calling the legislative office, which helped a bit in understanding what was involved and which led to some suggestions of committee staff to contact to see if there was interest. When I did that I found out that there was some interest in changes and, to make a long story short, was able to influence what those changes were.

In short, sense making involves movement through time and space until a point of satisfaction is reached, time runs out, or something else diverts attention. Sense making is satisfying, not optimizing. Sense making and its associated information behavior may expand or contract to fill the time depending on personal interest and external pressure. While we as researchers and professionals in the information field may promulgate an idealized progression of information behavior or strategies,

there was no such idealized sequence of information behaviors in evidence in the sequence of information behaviors of the participants. During the WPP, many sense-making situations were resolved locally with easily accessible information or interactions. The point, though, is that these interactions were governed by task needs, roles within the organization, and the participants' sense-making styles. These local interactions were occasionally followed up by information gathering and seeking that went further afield to uncover sources that were not readily accessible, but that offered the promise of information that might reduce uncertainty or ambiguity of information employed in the sense making process.

Too, there were many sense making situations where initial or follow up actions were not taken when such action appeared to be a logical next step. This observation leads finally to consideration of why seemingly appropriate information behaviors are not taken. Certainly, there were cases where the press of work caused some initiatives to be put aside in favor of more critical events, only to be either forgotten or superseded.

Why didn't we follow up on those open items from the Chief's meeting? To be honest, there have been so many new things to come up, I haven't been able to ask anyone to get the missing information for the continuing projects table.

Beyond the "press of time" and "overcome by events" explanations, there were also occasions when important information was withheld or the search for critical puzzle pieces was shunned or explained away. The explanations given or inferred from discussions of such action avoiding situations suggest that people shun the sharing of information when doing so would violate a previous commitment or confidence, or be in conflict with their perceived self-interest.

I knew the answer to Sam's question. I couldn't respond because it was given to me in confidence and it was important to me to maintain that confidence.

I decided not to pursue the possibility of involving [deleted] because I thought that it might backfire by getting them upset. Actually, it was a mistake on my part. After the legislature voted down the amendment, [deleted]'s lobbyist called me and said that he thought the program might have been good for their members and he wished that they had known about it. An opportunity lost, but we're gonna have lunch and see if there is some common ground.

Other situations were of a more personal sort with staff members not wanting to open up their interests or share their ideas for fear of losing the credit or of sounding foolish. All of this hints at the sense of loss to an individual or organization that may result from a conscious denial of information behavior. Consequently, communica-

tive events that allow individuals to share experience and the organization to make sense simply do not take place. The result is the self-construction of information poverty.

This behavior brings to mind Chatman's (1996) identification of an insider-outsider effect and concepts of deception, risk taking, secrecy, and situational relevance as leading to poverty in the information behavior of disadvantaged people. Such matters of reference group and weighing the consequences of information actions seem to be strategies common to both people struggling at the bottom of society's socioeconomic ladder and those struggling to protect themselves in organizational life. In short, while the WPP participants might recognize that they ought to move forward in search for information related to their work, they may choose to avoid such action because it requires them to step out of their organizational roles or provide someone with a clue regarding interests and intentions that they did not wish to provide. Too, the status quo may be comfortable.

Conclusion

This article reports findings about individual factors and patterns of behavior found during this study of work planning. The mapping of people's information behavior in connection with sense making provided by their patterns of information behavior indicates that this behavior does not necessarily follow an idealized logical process from knowing that information is needed through information gathering, organizing, use, and deciding to act.

Rather, for the WPP, the most typical pattern was to make a decision and then follow up with a repetitive sequence of information behaviors that seek to justify the decision, but which often lead to refinement. Thus, information behavior seems to be dynamically associated with an individual's place in sense making. Analysis of the patterns of information moves in sense making led to insights into people's sense making styles. The results of the analysis, further, suggest that cognitive, affective, and conative factors interact to form styles of individual sense-making and information behavior. As people with various styles interacted during work, misunderstandings and conflicts in approach occurred. Recognition of such gap producing differences in style may allow their attenuation by fitting them into a coordinated team effort.

This look at individual sense making offers a map of understanding to guide further investigation. It brings together: (1) the idea of styles as reflections of the sense making preferences of individuals with (2) the dynamic and nonlinear patterns of information behavior, and (3) the protective behaviors of deception and secrecy that reflect the risks and relevance of roles, norms, and task requirements and lead to information poverty within organizations.

Overall for the time and timing, social, and person elements of the study report, sense making is the way that we make it through life. Information behavior is an

intrinsic aspect of sense making. There is a constant competition for our sense-making resources as time moves on. Social constructions such as communicative events and norms and roles within organizations and society both help us make sense and provide constraints on who, what, where, when, and why sense is made. The cognitive resources, emotional reactions, and action instincts of people aid us in sense making and structure our sense-making approach.

In compressing 3 years of the participants' work lives, this research report can only lay a foundation for information design and management principles and strategies, which must fit with particular situations and settings. One key is in understanding how individual sense making and associated information behaviors come together through various communicative events in a process of structuration to create the organization. This interactive process of making order and creating chaos (Dervin, 1994; Thié-tart & Forgues, 1995) and of recursive movement between structure and action (Giddens, 1984) was often characterized by some of the participants in this study as information games.

Recognizing that these information games are part and parcel of the process that people use to simplify their worlds and protect themselves, what might be the implications of meeting and conversations about the rules of these games? If people who are brought together to complete some task find that they are suffering from feelings of manipulation, anxiety, and the like, what would happen if they got together and collectively tried to make sense of what was blocking their progress? If we can understand the rules of the game that each participant is using, perhaps, we can begin to understand how to design and manage. For instance, while the participants in the WPP never were fully able to understand the rules that the different participants were using to "play the game," ultimately all participants understood that the process was consuming too much time and effort. Their agreement to compress the WPP and wait until the legislature had made some commitment freed the participants from the prison that they had collectively created.

Ultimately, it seems that efforts to build teams and focus on total quality management within organizations, while promoting shared understanding, really need to emphasize sharing of experience in the sense of understanding what each participant is able to contribute and how they prefer to make their contribution.

Why is charting the human side of the information field critical? The natural tendency of participants in the WPP was to ask for everything they could think of and then discover after collection and processing that much of what they had asked for was not used and much of what they wanted was missing. Issues of selection or coverage (e.g., include everything or select by principle), representation (i.e., what pieces of information to include and how to represent them), information organization (e.g., controlled or free text), retrieval strategies (e.g.,

browsing or direct entry), and display approaches (e.g., graphic or textual) all influence an information system's ability to support people as they make the sense that is fundamental to interpretation. Understanding people's life and work problems, tracing their information behavior, and discovering the changes, which result as people progress through time and space all offer the possibility of inspiring design. Such inspiration is often critical to system success, even though such details will likely complicate the design process.

How might the findings of the research reported here influence systems design? I suspect that the primary implication is the need for periodic collective reflection on the nature and characteristics of the task at hand, its interactions with other tasks, the cycle of the task, the various relationships of participants in the task (e.g., superior/subordinate, internal/external), and the sense making styles of participants as a start. We need to understand what individual participants see as the ends of the task, along with the rules of the varied games in play, and the strengths and weaknesses of the resources available to us before we can effectively begin to design the process. This is something more than stating goals or objectives but a frank sharing of insights, possibilities, implications, probabilities, intelligence, and constraints. Such strategic sense making is difficult to achieve. It is not just a piece of paper with a mission statement and some goals. Rather, it is the achievement of the understanding that went into the creation of that piece of paper along with appreciation of individual positions and a common commitment to courses of action. This was something that was achieved from time to time during the WPP, especially when the participants gathered to meet a clear threat. Fundamental, then, is clarity of the reason and circumstances for action. It may be that the last thing that we need to do at the beginning is to start a comprehensive information collection process.

Too, it is important to keep in mind that the system, once it is in place, structures and guides its users by both constraining actions and focusing attention in a way that often prevents the recognition of environmental and other stimuli that may be essential for survival, particularly in a turbulent environment. What benefit is an efficient process if the product is worthless?

Participants in the WPP did not consciously reflect on the issue of productivity. While rationality was emphasized through, for instance, the surface systematicity of information collection and processing, or the specification of evaluation mechanisms, there was no evidence of related ethics of productivity enhancement, team work, or quality management. Thus, information is collected at considerable cost even though it is never used or if it is used it is out-of-date and "smelly, like a day-old fish." Being able to present the appearance of rationality has emotional as well as dollar costs. Ultimately, productivity may receive its due when it is seen as more than a measure of output per unit of labor, but a process, where learning

is the key element and the expectation is not only improvement, but sense making that promotes adaptation to meet the information worlds of the future. Thus, productivity may in its simplest form pertain to learning by individuals, teams, and organizations. Learning as a trial-and-error process seems close to the idea of sense making. Perhaps the subtle difference is that in a learning organization sense making incorporates conscious reflection and evaluation.

Conceptual Synthesis

Overall, in its three parts this study avoids a focus on information or information seeking to try to begin to map the role of information in people's lives. While we tease out some of its elements when we focus on information and information seeking, this act creates an artificiality that causes us to lose sight of what information systems are about. This has led to the idea that information behavior is intrinsic to a process, which is labeled sense making by the participants in this study. This process unfolds over time, is structured by the norms and resources (culture) of the organization and by the devices of communicative events. The contribution of individuals to the social in sense making and the way that people develop meaning is influenced by their sense making styles, which brings together the influence of organizational norms and roles with the cognitive, affective, and conative (action instincts) of people.

A fundamental insight of all of this is that information is embedded in people's lives. The purpose of the sense making conceptualization is to capture how information behavior creates meaning. As long as we focus on information and information seeking in our theory, research, and practice, we are creating a divide between people and information systems, information specialists, and information institutions. What do we need to do to bridge this divide? Design systems and services that are subtle, intrinsic, and natural. How might we begin to do this? Ground our designs in an understanding of the variety, uncertainty, and complexity of the role of information in people's lives.

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