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A Dance of Creation and Dissemination: Changing Perspectives on Business System Design and Language within and across Communities of Practice

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A Dance of Creation and Dissemination: Changing Perspectives on Business System Design and Language within and across Communities of Practice

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INTRODUCTION

Evolutionary improvements in day-to-day practice are often paralleled by investments in knowledge creation activities that may result in revolutionary improvements. This is the motivation of a consulting and services organization that funds a research organization.

In this position paper, we describe and reflect on our involvement, as researchers, in developing innovations in specifying and modeling businesses. These developments have challenged the long-held distinction between strategic business design, and information systems design. Changing the categorization of the "system to be designed" impacts practices in both the designs of the social systems of enterprises, and the information systems that support them. This reflection recounts our participation in the creation and ongoing dissemination of a revolutionary perspective on business called Sense-and-Respond. (See Appendix)

The vocabulary and categorization of business concepts for Sense-and-Respond have been precisely defined and represented objectively in publications. However, in the network of communities around business specification and business modeling we have observed that these new terms are opportunistically used and newly interpreted from many different subjective viewpoints.

In this first attempt to reflect on this process, we find ourselves comparing our experiences to Kuhn's observations on scientific revolutions [9], which are widely known in the "hard" sciences. Business modeling can be seen both from the objective perspective of the information system artifact that is created, and the subjective perspectives of the individuals creating it. We reflect on the difficulties of achieving conceptual revolutions in the joint practices of management consulting and information technology services.

We suggest that additional research be conducted on how progress on both evolutionary and revolutionary changes and interactions between them can be fostered.

SEARCHING FOR A NEW PERSPECTIVE

Our initial interest in Sense-and-Respond was peripheral to another, failing effort.

We were faced with a challenge for which neither the conventional language for discussing business strategy nor the concepts of software systems analysis proved adequate. We had been asked to build a reference model of the supply chain in consumer packaged goods. This reference model was to be used as a map for possible software components that could be developed to form a "solution space." As we found it difficult to generalize across the increasing number of ways of doing business within this relatively narrowly-defined domain, we concluded that the language we were using for modeling was not sufficiently rigorous to give us a usable model. The reference model would need to withstand the considerable change and variation in practices and language that we observed within multicompany supply chains, and within individual companies. Our approach left little or nothing behind as a common core around which software might be specified.

Information systems developers are often frustrated in developing clean categorizations in their business models, because the language used in the business community is inconsistently used and often ambiguous. Within the team, we had knowledge in management theory and business specification at the research level. We needed an unambiguous and defensible set of classifications under which the subjects for a business model could be categorized. We decided to get some clues from Sense-and-Respond and its author, Steve Haeckel, of whom we were peripherally aware. Steve appeared to have a coherent set of concepts with consistent language, and set us on a journey through the application of general systems theory concepts in business.

When we concluded that Sense-and-Respond offered the concepts that we needed, we found that the current organizational context did not encourage us to explore or exploit them:

- within the research community, the language used in business models was primarily oriented towards *descriptions* to be used as a foundation for information systems development, rather than *prescriptions* for change in social organizations.
- within the management consulting community, although practitioners were intrigued by Steve's ideas, their

practices oriented around business *process* did not align with Steve's language based on business *systems design*, nor even the need for it.

- within the information systems development services community, work on information technology is considered to be relatively independent of the human organization, although the challenge of bridging the gap to business language is considered to be increasingly important.

CREATING THE CHANGED PERSPECTIVE

Sense-and-Respond has been taught since 1993 as a class to business executives by Steve Haeckel and colleagues. They have also provided personal expertise and advice on the application of Sense-and-Respond ideas to several clients.

In early 1998, David moved to the teaching organization with dual goals: to specify software to support the enterprise governance model of Sense-and-Respond and, more generally, to develop the body of knowledge around Sense-and-Respond to the level that would allow it to be used by consultants. Steve had yet to publish his book on the subject [7]. David was able to apply a researcher's level of rigor to Steve's language, as well as to reconstruct a grounding for Sense-and-Respond in the literatures of business and related disciplines.

We collaborated in the production of information models to improve the quality of Steve's definitions. Steve had produced glossary definitions of the terms that he used. We made these definitions more consistent not only with respect to the literature, but logically in terms of Kilov's approach to information modeling. Information modeling exposes formal (logical) issues about relationships between classifications and between pieces of information thus classified [8]. One classification may be distinct from, overlap with, or be a strict subset or superset of another one. In this context, mechanisms, organisms, social systems and ecologies are distinct kinds of system. Equally, the characteristics of one piece of information may be partially determined by those of another piece. For example, the conditions of satisfaction negotiated for an outcome are partially determined by the conditions of satisfaction of another outcome to which it contributes. The use of mathematically rigorous techniques improved the definitions by raising questions that would not otherwise have been asked, without overwhelming the definitions with unwanted mathematical notation.

As the language became more formalized by the end of 1999, David began to lead the design of consulting methods. These methods not only needed to incorporate the classifications from Sense-and-Respond, but embed them in repeatable practices that would encourage customers to become and not just "talk" about Sense-and-Respond. The glossaries and definitions initially appeared to be acceptable to consulting practitioners. Yet, people were often observed to be missing the point. As an example, while "accountability" is not uncommon in the vocabulary of business, it usually has a secondary emphasis to "capability,"

whereas the reverse is true with the premise that a Sense-and-Respond enterprise is a social system. From this perspective we concur with Bourdieu that "concepts have no definitions other than systemic ones, and are designed to be *put to work empirically in systematic fashion.* [For example, Bourdieu's own] notions as habitus, field, and capital can be defined only within the theoretical system they constitute, not in isolation" [4, p.96, o.e.]. Thus, a set of rigorously defined classifications is not enough. They need to be embedded in a set of practices, as methods that themselves need to be designed and refined in response to their use in practice. As Wenger says, "practice is (among other things) a *response* to design" and not, like software, "the *result* of design" [14].

In passing, it is worth mentioning that the construction of the Sense-and-Respond system of concepts required not only the selection of English terms such as accountability and role and the development of systemic definitions for those terms, but the adoption of a few somewhat contrived technical terms that have been invented to fill gaps in everyday English language. An example of such a word in sociology is "habitus." Similarly, in the context of the systems approach, and thus in Sense-and-Respond, Ackoff introduced the term "mess" to mean a system of problems [2]. While the French language has the word "problematique," the English language is missing a word with this meaning.

DISSEMINATING THE CHANGED PERSPECTIVE

If the language and classifications of Sense-and-Respond were recognized as revolutionary rather than evolutionary, how can they be disseminated across multiple communities? In Wenger's language, was this a new and different community espousing a different approach? Was it possible to legitimize these classifications in existing, "legacy" communities with their intended meanings, to advance the level of knowledge for all? A fundamental challenge remains to overcome the widely differing backgrounds across and even within these groups:

- The community that teaches Sense-and-Respond to business executives is founded primarily in organizational development and management theory. Even within this community there are sub-communities more sympathetic to strategy as social organizations, and strategy as economic institutions. This schism shades the business language between a sub-community focused on the interactions between people inside enterprises, and a sub-community interested in the interaction between enterprises in the marketplace.

- The communities within the formal IBM Research organization includes a broad range of views of organizaitons. Some come from a technological view, marginalizing the organizational. Within those who, like us, regard information systems development as implying an intervention into the social systems that will use the systems, there is a spectrum between descriptive and

prescriptive perspectives. The descriptive perspective for information systems development observes and comments on the consequences of an intervention. The prescriptive perspective is more concerned with what interventions to make in order to achieve desired organizational or social outcomes. Around the fields of CSCW and HCI, the descriptive perspective predominates, and is used to inform designs in information technologies rather than social systems.

· Individuals in the community of managerial practitioners -- IBM's customers -- generally rise in organizational hierarchies by working on business processes, rather than business strategies. When systemic transformation is required, they may knowingly or unknowingly resist both the change. Steve Haeckel describes this attempting to "caterpillar your way into becoming a butterfly."

· With most of their clients demonstrating investments more in incremental improvements that transformations, most management consultants follow. The language and concepts of Sense-and-Respond may be seen as too ambitious, or unnecessary. In the information systems development services consulting community, the primary accountability is to "ship code." Recognition in this community is centered around the information technology artifacts, and not around social change. Often, instead of co-developing information technologies jointly with the community of practice of users, the designs are driven by "industry standards" which represent a "lowest common denominator" onto which the users must construct their own "workarounds." So not only do different communities have different classification schemes. They have differing motivations and concerns with respect to them.

The language of Sense-and-Respond's has a foundation in general systems theory, which helps span these perspectives. In this view, all of the classifications described above can be seen as different perspectives on related systems. Much of the language of systems applies equally to the mechanisms of technologists and traditional management thinkers, and to the advocated view of enterprises as social systems. The concepts of function, structure and process are universal. While the concepts and related issues of "purpose" and "purposefulness" are not equally relevant for all systems, Ackoff's framework using purposefulness as a key criteria for classifying different kinds of systems is usually a successful way of introducing social systems thinking to all groups [1]. A common use of a systems approach has the potential to provide systems language as an both accessible and more evidently a potential bridge between technologists and management thinkers.

A DANCE OF CREATION AND DISSEMINATION

Of course, it is not that simple.

In a large organization there are many knowledge creation activities going on at any one time. Many individuals are simultaneously trying to disseminate their own ideas and

approaches into various communities of practice. For example, one colleague, with a background in sociology and library science as well as information management, has developed his own approaches to business modeling as well as definitions of business terminology [10]. His ideas, also founded in systems theory, result in categorizations that are slightly different from those in Sense-and-Respond, and have been well received by some members in the information systems development community.

At the same time, the body of knowledge related to Sense-and-Respond does not stand still. In practice applying the concepts to clients, small adjustments in the model take place. Not only does Sense-and-Respond mean something different from what it meant two years ago, but its particular instantiation in different organizations will vary. The body of knowledge has been created, but the value of its dissemination in any particular instances can not be predicted.

One community's knowledge may be disseminated in the context of another community's creation exercise. With many groups needing to develop solutions for known organizational problems, terminology associated with any approach that has gained credibility becomes appropriated and reshaped to fit into many new situations. Especially in the context of another group's creation activity, the work that went into developing a classification scheme can be largely invisible to the group appropriating it.

In the case of Sense-and-Respond, we have been amazed how widely the classifications have spread. Although it is no surprise, we have been somewhat dismayed about how the classifications are treated as buzzwords rather than as they were originally intended. We have even seen cases where the terminology is used by people who don't understand it to inflict symbolic violence on others that do!

COMMUNITIES AND NARRATIVES OF PROGRESS

On reflection, is the research organization chartered to perform what Kuhn calls revolutionary science, working alongside and in conflict with normal science in the mainstream community of practice, to achieve something like a scientific revolution [9]?

Kuhn draws a distinction between normal science and revolutionary science. Normal science involves the steady accumulation and verification of results within one paradigm. The paradigm may remain largely tacit, yet as an agreement governing what constitutes reasonable scientific activity it is a large part of the identity of scientists active in the field. Revolutionary science challenges the very foundations that enable normal science to take place. It can change what it means to do science and to be a scientist. It demands that existing results be revalidated and determined within a new paradigm. It leads to textbooks being rewritten. Thus the use of the term "revolutionary" is far from an overstatement.

The key conceptual difference, of the Sense-and-Respond perspective, is that business enterprises should not be viewed

as efficient mechanisms, but as social systems that should be designed to adapt to unpredictability's. The use of terms, such as "plan" -- driven by a fiscal calendar rather than events -- or "business process" -- focused on how something is done, rather than why it is done -- reflects the state of the normal practice of business consulting. From this perspective, Sense-and-Respond's emphasis on "system design" and "accountability" is revolutionary thinking.

Kuhn presents science as being very much bound to a narrative of progress. In his descriptions of scientific practice, Latour demonstrates this aspect of science, showing how scientific papers are full of references back to earlier works, either to raise or lower the work of others. The inclusion of others work both within research papers and texts narrates how a scientific community has progressed to its current understanding. But this is a narrative from within. It is distinct from that of the sociologist of science or the modern historian of science who may focus on conflicts and practice as well as evidence for a current consensus. Revolution involves the rejection of one narrative in favor of another one. Acceptance of Sense-and-Respond and unpredictability as a paradigm requires rejecting a premise that the business world is predictable.

A difficulty with using Kuhn's language of conceptual revolutions is that the set of communities that we are seeking to influence do not share a narrative of progress. The situation is more like those in the art world as described by Danto [6]. Except, perhaps in the modern "Age of Manifestos" (1879-1960) narratives of progress had very little direct effect on artists. Constructing such narratives was the game of the historian or the critic, not that of the artist, and so had little impact on practice.

In the context of a large enterprise, the construction of a narrative of progress around convergent organizational change initiatives such as Sense-and-Respond is a role for senior management.

INQUIRING SYSTEMS AS AN INTEREST IN CHANGES AND VARIATIONS IN KNOWLEDGE

Are we discussing an old problem, or a new problem? The distinction between objectivist views and subjectivist views of the world is not new. Social systems design is not new. Categorization within information systems is not new.

What *is* new is a conscious effort to simultaneously work on two concerns: the speed at which (objective) knowledge representations change over time, and the variability in (subjective) interpretations of artifacts across individuals within a community, and between communities.

The first challenge is an appreciation of subjectivism as a perspective. Information systems developers often seek the "right" way to represent business concepts, as a single artifact representing the state of the world. Just as we have experienced that producing a single "industry reference model" was an ineffective pursuit, developers need to accept that multiple perspectives are valid and, indeed, desirable.

The second challenge is to find a method that bridges the subjectivist perspective with objective artifacts of knowledge representation. One method that we have found helpful is the multiple perspectives Singerian inquiring system approach suggested by Churchman in the 1970s [5], and revisited by Mitroff and Linstone in the 1990s [11]. This method recognizes multiple perspectives, encouraging organizational learning by first identifying a vector of progress and then staging multiple debates (or dialectics) so that more knowledge is swept into learning conversations. If properly executed, this promotes knowledge sharing in a "safe" environment, where ideas are debated and debate is not seen as consisting of personal attacks.

This, however, does not solve the issue of the change in communities over time. Although the "what" and "how" of a debate can be objectified in an artifact (e.g. minutes to a meeting), the "why" is often lost. In a Sense-and-Respond context, after a debate, the participants could come to an understanding that accountability might be a more central concept than capability. However, a person not involved in the debate would have to climb a similar learning curve. They might still come out with a different personal understanding than was generated in the original group.

Finally, for researchers to create classifications and practices and disseminate them to practitioners they must be legitimate peripheral participants in that practice [14]. How can the practitioners feel that the person coming into the sphere of discussion isn't a crackpot? On the other hand, how might we recognize that the knowledge within an existing community has or has not become stagnant, and needs an injection of innovation from an outside source? Progress along these dimensions will require additional research into shared communication spaces, in which the categorizations are "accepted" by the community of practice, yet can flow and change according to new learnings.

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APPENDIX: SENSE-AND-RESPOND -- A CHANGED PERSPECTIVE ON STRATEGY

Sense-and-Respond is an approach to business strategy for enterprises that have discovered that the method of "strategy as plan" is no longer appropriate. It follows the premise that the world -- and in particular, individual customer requests -- are so unpredictable that it doesn't make sense to forecast them [7]. Traditionally, companies have banked on the ability to predict. It is no longer reasonable to first forecast and then design an efficient plan in response to that forecast.

The strategy to be adaptive is largely centered on developing a system structure that adapts to individual customer requests, rather than ones that responds to types of requests predicted in advance. Adaptiveness requires that the company operate at a more abstract level. Practices become more "meta", flexible and reflective. People are organized for the negotiation and accomplishment of each distinct outcome in terms of highly generic and explicit concepts such as accountabilities, commitments, capabilities and roles. This contrasts to when outcomes are predictable and repeated on a large scale, in which case outcomes are less explicitly discussed by most people -- instead they focus on the less generalized and more detailed language associated with mass production of a single thing.

Members of an adaptive enterprise are required to recognize their organization as the social system that it is, and to expunge from their mental models the metaphor of the organization is an efficient machine. Since ends are typically more stable than means, adaptiveness requires richer notions of accountability and authenticity of communications than are found in more traditional view of business strategy and governance. The idea that the employee closer to the customer may know better what is an appropriate structure of action than might a presumed omniscient manager, requires that cascades of commitments are negotiated from the "customer-back." In the practice common to most managers today, the questioning of the key concept of "strategic plan" requires deep self-examination and deep cultural change.

Sense-and-Respond builds upon a broad literature, including:

· rigorous systems design language, particularly in the use of the terms "function," "structure" and "process" across all types of systems. Purpose is at the center of social systems thinking as espoused by Russell Ackoff [1,2]. Ackoff draws a distinction between mechanical, organismic, social and ecological systems (that we used above) that is particularly effective in helping managers see employees as people rather than as ineffective mechanisms

· the design of inquiring systems, as developed by West Churchman [5,11]. This emphasizes how various philosophical approaches towards inquiry, typified by the work of Locke, Liebnitz, Kant, Hegel and Singer, differ in their positions towards the subjectivity and objectivity of knowledge. Churchman's work had been applied to marketing inquiry by Kusnic and Owen at General Motors and elsewhere [3]

· categorizing conversations as speech acts, based on Allan Scherr's thinking [12]. This was founded on Scherr's interaction with Flores and Winograd's work, which in a different application, was instantiated as The Coordinator [13]

· marketing science, which brings the customer's perspective to business strategy.