Classification and Crossdisciplinary Communication: Breaching the Boundaries Imposed by Classificatory Structure

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Abstract: Categorization is the fundamental cognitive tool that facilitates the organization, storage and retrieval of information. Traditional classification is an arbitrary and artificial tool that is used to structure a specific knowledge domain while ensuring consistency and stability of meaning. Because a classificatory structure serves to identify relationships between entities and to set the boundaries for a specific area of inquiry, it establishes a world view that limits the recognition of similarities. To encourage dialogue across disciplinary boundaries, the specificity of meaning inherent in the classificatory structure must be replaced by more general meanings that function across disciplines.

1. Words and Categories

Words function not only to name individual objects but to group set of entities that share one or more attributes in common. By capturing the commonalities that exist across a set of potentially diverse entities or experiences, words function as conceptual tools that create order out of the diversity of experience. When a word is assigned to identify the common bond that distinguishes a particular group of entities, that word becomes the category label. These category labels, in turn, serve to organize information in that they represent not only the existence of a relation of commonality between the members of a group, but also the particular attribute or attributes that identify group members as similar entities. At the most basic level, then, words generate categories that represent similarity across objects based upon some shared attribute.

Categories are fundamental to all cognitive activities. They are frequently characterized as the building blocks of cognition because they permit the individual to generalize to new experiences the information associated in memory with a particular category label. Categorization is thus the cognitive process of constructing order out of the potentially chaotic environment in which the individual lives by dividing the world of experience into named groups of entities whose members bear some relation of similarity to each other. Without recourse to the cognitive process of categorization, the experience of any one entity would be totally unique: Each separate object encountered by the individual -- each tree, each flower, each blade of grass or drop of rain -- would require labeling and storage in human memory as a singular experience identified uniquely by its own set of defining characteristics.

Categorization is thus the fundamental cognitive mechanism that simplifies the individual's interaction with the environment by facilitating the efficient storage and retrieval of information and thereby reducing the demands for cognitive storage that would otherwise be placed on human memory. In addition, the recognition of similarity across entities and the subsequent aggregation of similar entities into categories promotes the creation of new knowledge: By grouping entities according to observed similarities, the individual generalizes from past experiences to form concepts about the environment that can be extended to new encounters. Without recourse to the cognitive process of categorization, behavior based on learning -- on the generalization of acquired information -- would be impossible.

The acquisition and transmission of information is dependent not only upon the cognitive ability to create new categories through the discovery of relations of commonality, but upon the ability to represent these relations through the medium of language. Because cognitive categories are not rigidly predetermined but reflect the individual's encounters with the environment, they are flexible and capable of responding both to the immediacy of experience and to the discovery of new patterns of similarity. With the accumulation of more specialized knowledge and the creation of disciplinary domains, however, these cognitive categories become formalized. The acquisition and transmission of disciplinary knowledge requires that category terms be specified -- that their boundaries be set through a process of systematic definition and that they be ordered within an overall structure that reflects fixed relationships between entities. The need to ensure that disciplinary knowledge is consistent across individuals favors the stability of reference provided by well-defined, discipline-based classes and forces the surrender of that very flexibility and plasticity that characterizes cognitive categories. As a result, experientially-based categories lose their inherent ability to accommodate new or individualized experiences and are transformed into rigidly bounded and concretized domain-specific classes through a process of formal analytic definition.

2. Categorization and Classification

There are obvious similarities between the cognitive process of categorization and the formal process of logical classification. In fact, within the fields of psychology, anthropology, and philosophy, the terms categorization and classification are frequently used interchangeably. The confusion between these two terms appears to arise from the misconception that they are, in fact, synonymous -- a misconception that is reinforced by the fact that both are mechanisms for establishing order. But there remains a fundamental distinction between classification and categorization that resides in the way in which that order is effected. The traditional process of formal classification entails the systematic arrangement of entities within a hierarchical structure of mutually exclusive and non-overlapping groups or classes based upon a predetermined set of principles or guidelines.
While traditional classification is rigorous in that it mandates that an entity either is, or is not, a member of a particular class, the process of categorization is flexible and creative and draws non-binding associations between entities -- associations that are based not on predetermined principles but on the recognition of similarities between a given set of entities. Categorization divides the world of experience into groups or categories whose members bear some immediate similarity within a given context. That this context may vary -- and with it the composition of the category -- is the very basis for both the flexibility and the power of cognitive categorization.

In The Order of Things (1970), Foucault observed that a discipline exists through the medium of an ordered language that constrains the space of its representations. Through the agency of such a well-constructed language, a discipline makes of every proposition "an invariable pattern of reality" (p. 136) that is empowered to nullify the perturbations of individual experiences -- those individual experiences, needs and prejudices that, as Foucault points out, would otherwise lead to the creation of "hundreds of different languages - that differ from one another not only in the form of their words, but above all in the way in which those words pattern representation" (p. 158-159). The very possibility of introducing order within an empirical domain assumes that knowledge can be both defined and arranged -- that knowledge is "at the same time describable and orderable" (p. 158).

The metaphysical structure imposed on disciplinary knowledge through the medium of such a well-constructed language not only defines the specific terminology of that discipline but establishes the boundaries of the domain. In this manner, a normalized vocabulary -- a vocabulary in which the meaning of the word is rigidly defined and therefore not susceptible to the vagaries of individual experience or prejudice -- not only formalizes the physical boundaries and the intellectual content of the domain itself but encourages the development of a particularized world view: During the process of identifying and ordering new information, the individual is constrained by the existence of a domain-specific vocabulary that reflects not only the predetermined meaning of a category label, but the relationship that exists between this category and all other categories within the theoretical structure of the domain. In this way, the need for stability of meaning across individuals imposes constraints upon cognitive categories. Categories that were once flexible and plastic and capable both of responding to new experiences and of drawing new relationships are transformed by the imposition of absolute meaning into concretized classes that prescribe the domain of a discipline by delimiting its conceptual content within a cohesive structure.

Traditional classification schemes provide stability of meaning through the systematic assignment of entities to groups or classes according to an established set of principles. But, in so doing, classification involves the systematic creation of
order within a framework that is frequently both arbitrary and artificial: Arbitrary in that it adopts one perspective of the domain to the exclusion of all others; and artificial in that it is a tool or artifact created for the express purpose of establishing order.

This systematic process of ordering knowledge is perhaps best exemplified by taxonomy, the science of classification. The objective of traditional taxonomic investigation is the orderly and systematic organization of knowledge about the biological world. Systematic organization is realized through the identification of those essential or defining characteristics which distinguish a biological entity and the subsequent placement of that entity within a hierarchical ordering of mutually exclusive superordinate and subordinate classes, all of which is performed in accordance with a set of established and universally accepted principles and laws. Within this framework of laws, then, each entity is evaluated, its essential characteristics are determined, and it is assigned to a single unique group or class within the hierarchy. Each class is assigned a Latin name, a unique label that situates that class within the hierarchy and specifies the set of defining characteristics that distinguish this class from all other classes. Each such class has clear and well-defined boundaries: A given entity must display the full complement of essential features to be included in a particular class, and only those entities that display this set of defining characteristics are identified by the unique label assigned to that class. In turn, this label, which is universally employed to identify the members of a particular class, serves as a marker that provides access to information about the entities within that class.

In the plant kingdom, for instance, a plant that is widely distributed throughout various regions of the world will be assigned a scientific name by which it is recognized wherever it occurs; and, because all members of the same class must display the essential features that distinguish that class, each plant so named will be recognizable as belonging to the same species. In this manner, classification serves to ensure the stability of the nomenclature through the aegis of a formalized and universally accepted language that facilitates the transmission of knowledge across the barriers of natural language.

The essential observation, however, is that this process of identification and organization is necessarily carried out within the arbitrary framework established by a set of universally accepted principles. Thus, while others proposed methods for organizing the plant kingdom based upon the identification of differences between individual specimens (Foucault, 1970), Linnaeus advocated a systematic approach based upon the observation of those physical structures specifically related to the process of reproduction. Physical differences existing between two specimens would be irrelevant to the actual process of classification if they were not directly related to the process of reproduction. Thus any differences of leaf, stem or root structure that might distinguish between two plants would be ignored in the construction of
the classification scheme if those plants exhibited similar reproductive structures.

For example, Cornus florida, the American dogwood, is a small deciduous tree native to the eastern sections of the United States that can reach twenty to thirty feet in height and is well known for its profusion of large white blossoms in spring. Less well-known is the tiny Cornus canadensis, an evergreen groundcover that grows from five to nine inches in height. While these two plants exhibit similar flowering and fruiting structures, differences in physical appearance are more dramatic and accordingly more obvious than any similarities of reproductive structure. For the botanist, the similarity of reproductive structures is more important than the obvious disparity in the physical attributes of height or foliage. For the horticulturist, however, these latter characteristics take precedence and the distinction between evergreen or deciduous foliage, between a tree and a groundcover, becomes the paramount consideration for classification.

The world view of the horticulturist allows for the construction of multiple classification schemes based upon immediate context and/or need. But the more constrained perspective of the botanist demands a relatively more rigorous process of classification that entails the one-for-one slotting of objects, events, or properties into mutually exclusive classes. The structure imposed by this predetermined ordering of reality mandates that an entity either is or is not a member of a particular class. In similar fashion, the classificatory structure inherent within and perpetuated by a domain-specific vocabulary not only defines the subject content and determines the physical parameters -- the boundaries -- of the individual discipline, but fosters a discipline-specific perspective or world view that is reflected in the way the individual discipline conceptualizes the phenomena of investigation. This classificatory component of disciplinary languages is evident in the development of specialized, domain-specific vocabularies that serve not only to organize the subject matter within a bounded and cohesive intellectual domain, but to effectively isolate specific concepts, theories and bodies of knowledge within the individual disciplines. Thus the meaning of any class term within such a disciplinary framework can only be comprehended as a part of the whole within the specific context of that discipline's classificatory structure. And, because words conceptualize objects, there can be no neutral words within such a context. While there may exist competing words that identify the same object within different disciplinary classifications, each such word is tied to, or represents, a conception of its object that reflects, in turn, the world view of the discipline to which the word itself belongs. For example, the plants known commonly as "azaleas" are actually members of the taxonomic genus Rhododendron. But, for the horticulturist or the amateur gardener, the distinction between "rhododendrons" and "azaleas" is based upon habit of growth and cultural criteria. Because this extra-classificatory distinction is significant, it is reflected in the use of the category labels rhododendrons and azaleas. More importantly, however, the formalized and authoritative
definitions represented by domain-specific words actually serve to confound dialogue. Thus the codification that characterizes domain-specific words precludes active understanding across domains and impedes communication between members of distinct disciplines precisely because it demands the passive reception of a rigidly defined and predetermined concept.

3. Classification and Communication

The inhibiting effects of codification are exemplified by the conventional interpretation of communication as the unidirectional transmission of information. In a paper published in 1979, Reddy described the conventionalized representation of communication as embedded within the metaphor of the conduit. This conduit metaphor is illustrated by the schematic model of signal transmission developed by Shannon and Weaver (1949). Initiated and transmitted by the sender, a signal flows across a channel to the receiver, whose participation in the act of transmission is that of a passive receptor. In Shannon and Weaver’s model that the conventional representation of communication depicts information as being packed into a word or a sentence and then shipped across the communication channel -- the conduit -- where it is to be unpacked intact by the recipient.

The conduit metaphor emphasizes one aspect of the communicative process -- that of the one-way transmission of a message -- but it ignores the potentially interactive nature of communication. What is lost in this representation of information transfer, then, is the understanding that communication is a process that necessarily involves at least two active participants -- the transmitter and the receiver, the speaker and the audience, the author and the reader -- both of whom are intimately involved in the process of information transfer. Within the framework of the conduit metaphor, this human component is effectively excised from the communicative process, and the message -- the word -- becomes the primary, if not the sole focus. Communication is characterized as successful if the message that is received is identical to the message that was originally transmitted.

When we accept the premise inherent in the conduit metaphor of communication that the word as message has both a meaning and an existence that is independent of speaker and audience, the influence of immediate context or individual experience becomes little more than noise on the channel -- noise that has the potential to distort the signal and impede successful transmission of the word. Such an interpretation is possible precisely because the conduit metaphor, like the classificatory structure imposed by a domain-specific language, assumes that words and meanings exist independently of the influence of immediate context. Because words are not influenced by the intentions and experiences of the communicants, they have the ability to convey meaning directly and immediately without the need for interpretation on the part of the hearer.
The metaphorical representation of communication as conduit adequately describes the mechanical transfer of a signal from transmitter to receiver. But when communication is viewed as an interactive process whereby information is to be shared between two or more individuals, it is neither feasible nor realistic to equate the dynamic process of communication with this static model of information transference. It is more appropriate to view communication as a shared commodity in which the word belongs to both the sender and the recipient -- as a process wherein the message that is transmitted has the potential not only to change but to be changed by the receiver. Such a process cannot be passive. It demands, instead, active participation on the part of the receiver whereby the word that is transmitted is not only received but integrated within the existing conceptual framework of the receiver.

Dialogue demands just such an integration on the part of both speaker and audience, for dialogue must be essentially interactive in nature. Dialogue is appropriately conceived of as a continual process of becoming in which meaning is determined not by the authority imposed by a predetermined classificatory structure but, as Bakhtin pointed out, “by that which has not yet been said” (1981, p. 280). This process of becoming demands that the meaning of the word is not concretized but remains flexible, plastic, and responsive, capable of incorporating, or being incorporated within, the as yet unspoken response. Bakhtin observed that dialogue “lives, as it were, on the boundary between [one] context and another, alien context” (1981, p. 284). Dialogue between two disciplines exists at that point where the word is shared in common by two domains. This point of commonality exists as the object itself; and it is at this point where two classifications -- two domain-specific world views -- come face-to-face and the word as it conceptualizes the object is “determined by that which has not yet been said” (Bakhtin, 1981, p. 280).

Building on Brenda Dervin’s image of the message as brick and the individual as bucket (personal communication, March 21, 1994), it is possible to distinguish between two models of communication -- between Shannon and Weaver’s static approach to information transfer and Bakhtin’s dynamic approach to dialogue. The static model of information transfer sees the word as a brick or final product that is tossed from the source (the transmitter) into the empty bucket that is the receiver. When information transfer is interpreted as a dynamic process of becoming, however, the word is seen as raw clay that will be given form within the bucket itself in that it will be shaped by the conceptual framework that the receiver as bucket brings to the communicative interchange. Within the format of an ongoing dialogue, then, the raw clay never achieves the rigidity or fixedness of a final and constant form but is continually being shaped by the needs and intentions of the speaker.
4. Conclusion

Domain-specific languages are constructed out of Dervin’s information bricks in that they use words as bounded blocks of rigid meaning to give shape to the conceptual structure that is the discipline. These languages solidify the exclusivity of disciplinary structure and either inhibit or actively prohibit the recognition of a commonality that exists across disciplinary boundaries. But if the creation of new knowledge is acknowledged as the recognition of new patterns of similarity that cut across seemingly disparate domains -- if the creation of new knowledge is viewed as the molding of new forms through an interactive process of shaping the raw clay that is the word -- then the exclusivity of disciplinary structure and the boundedness of classificatory, domain-specific languages must be breached.

Crossdisciplinary dialogue invites the exchange of information across competing disciplinary structures; and its success is contingent upon the relativization of rigid disciplinary classifications within a broader context that can not only accommodate competing definitions, but can provide for the creation of new associations of similarity. Within the arena of interdisciplinary dialogue, then, the specificity of absolute classes must be rejected in favor of a more generalized definitions that exist at that point where the two domains meet. Because domain specificity confounds crossdisciplinary dialogue, efforts to identify new relations of similarity and to create new forms of knowledge requires the rejection of rigid, formalized classificatory schemas in favor of more generalized structures that will accommodate the transfer of information across domains and facilitate dialogue across domains.

References


