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Ingenium and the navigation metaphor: an examination of the power of metaphor as a manifestation of ingenium

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Ingenium and the Navigation Metaphor

An examination of the power of metaphor
as a manifestation of ingenium.

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Introduction

In examining Web site design, one feature remained constant in all of the sites I explored and that feature is navigation. The concept of navigation is pervasive in digital media and human computer interaction (HCI). All user interfaces employ some form of navigation to enable access to different pages of a web site or different web sites on the internet. So how is it we are able to experience a virtual world where we have no physical contact or interaction with that world and still describe our actions as navigation?

In principle, we interact in and with digital media to obtain information or explore new areas based on the concept of navigation as metaphoric, and as such, actions in a virtual world are related to the physical world through a cognitive process. To understand how navigation functions as a metaphor, we need to understand how knowledge of our world is created and what role conceptual metaphor plays in that creation.

Metaphor allow us to comprehend abstract concepts and perform abstract reasoning through the process of ingenium. Ingenium is the cognitive activity by which we interpret and define our experiences so we may develop the connections necessary to comprehend our world. Through ingenium we begin to reason about our world and the events experienced in it.

As a central element in the creation of knowledge, ingenium is manifested in several forms but most especially in the forms of imagination, through image schemata, as well as in the form of metaphor, through language. Through imagination we connect abstract ideas to known concepts and through metaphor we create an understanding of those connections and express them through language.

Our conceptual system is a model of the physical world based on concrete experiences and abstract ideas, which governs our perception of events in the physical world, guiding how we interpret and respond to those events. As such, according to Vico and Grassi, our conceptual system is experiential in nature and founded on a Humanist perspective.

In my research on navigation in digital media, the only study I found that talked about navigation as a metaphor defined it through rationalist means (Hochmair & Lüttich, 2006). To understand how navigation as a metaphor functions as a conceptual metaphor based on experience, we need to understand how knowledge is created based on a Humanist perspective. In this paper, I explore the power of metaphor in building cognition and understanding by examining the cognitive process of ingenium.

I begin with a literature review of ingenium, what it is and how it creates understanding to reveal our world in a cognitive manner. I then explore how metaphor, as a manifestation of ingenium, aids in our cognitive activity by expressing the connections between the experiences revealed through ingenium to expose new meanings and thoughts. I examine metaphor both linguistically and cognitively. Through modern theories of metaphor, I explore how metaphor functions through imagination, image schemata, and language. Finally, I examine navigation and describe the navigation metaphor as an example of the cognitive process in understanding human-computer interactions from an experientialist perspective.

Ingenium

We come to know our world through a cognitive process. That process is embodied in the faculty of ingenium. Ingenium provides us with the capacity to grasp what is common or similar among objects, ideas, or experiences and enables us to formulate new connections and insights thus creating new concepts or ideas. Ingenium provides creative insights through discernment which allows us to distinguish between objects and events and through language and metaphor we are able to create meaning and understanding. Without this discernment, without perceiving connections, a person would not be able to comprehend the world and identify the relationships and order needed for the creation of knowledge. Thus, ingenium is a cognitive process in humans, the spark igniting our perception of the world as something other than noise and light to become something we comprehend and understand.

Cicero was one of the first theorists to discuss ingenium as a cognitive process whereby we discover our world. Cicero viewed the process of ingenium as an interaction between humans and nature that reveals reality "through human activity." Cicero saw this interaction as transforming our reality through our own capacities or *virtues*, which he calls "*semina virtutum*" (the seeds of virtues) (Grassi, 1980, p. 8). Proclaiming these virtues "arise from ingenium," Cicero argued that it is the process whereby through "ingenious activity we surpass what lies before us in our sensory awareness" to discern the world around us (1980, p. 8). For Cicero, the activity of ingenium "consists in catching sight of relationships, of [the] *similitudines* (the likenesses) among things" (1980, p. 8) thus creating relationships and associations that meet our needs in the natural world.

An Italian theorist, Vico (1968), described ingenium as the "original and generating power of the mind" in that, through a cognitive process we transpose what we feel and see through our senses into relationships and thus create order in our world. From this then we are able to translate into words a perspective of our world, as we know it (Verene, p.161). Grassi expanded upon Vico's view of ingenium to describes it as "reveal[ing] something 'new'… something 'unexpected' and 'astonishing' by uncovering the 'similar in the unsimilar', i.e., what cannot be deduced rationally" (1980, p. 92). This "revealing" is derived from the cognitive process to "create and order our lives" by providing the ability "to find those things that are necessary for human life, and [that] finding is the property of ingenium" (1980, p.45).

To understand how it is that we "know" our world, we must understand how it is we relate to that world. For Grassi, the way we know the world is through our senses and our needs. The process we use begins with what Vico called "humanizing nature" with respect to our needs. Grassi tells us the problems concerning humans "are the ones that urge themselves upon us in the construction of the human world" based on our activity. In other words, our basic needs provide the problems we encounter and drives our interpretation of the world around us in resolving those problems. Within these problems, we find the motives to satisfy our needs in nature through connections revealed by our senses. As Grassi states, "Nature appears to us only in its means with reference to satisfying our existential needs" (1976, p. 6).

Through the Latin term *res* [matter or reality] Cicero and Grassi describe how the natural world appears for humans. Grassi tells us that it is through *labor* (work) and *usus* (ingenious utilization) that our needs are met and meaning is derived and expressed

(1980, p. 9). In other words, at a basic level we seek to meet our needs in the natural world through what we perceive of as *res* or matter. It is through *labor* and *usus* that we derive the functionality of *res.* From *usus,* we derive meaning to express those actions and relationships of *labor* and *res*. Thus, "ingenium is revealed through work, through the alteration of the real with reference to human needs" (1980, p. 10).

Through ingenium and the humanizing process of nature, we create relationships between the natural world and our needs, leading us to develop the connections necessary to create an understanding of the world. As Grassi tells us, these relationships are not acquired through inference but rather "through an original in-sight as invention and discovery" (1976, p. 7). In other words, the relationships are acquired not by implying a connection but arise from, "common or shared characteristics in the …senses." Through the shared characteristics we associate what is common and through these characteristics "makes possible the lending of meanings that allow things to appear in a way that is human" and by human Grassi refers to our human needs (1976, p. 7). This is an initial step in the production of knowledge according to Grassi.

The origination of the concept of ingenium has been with us for centuries as both ancient Sophists and modern Humanist perceived ingenium as the root of our comprehension. Hodges (1996), a modern theorist, concluded that both groups perceived the importance of "human perception as the origin of knowledge" (p. 87). She found that while the "sophists practiced many aspects of ingenium, humanist philosophers … recognized and labeled the concept" (p. 91). Although, the main tenants of ingenium have been around for centuries, the concept of it as the origination of knowledge was not conceived until later.

The best way to define ingenium, according to Hodges, is by "unfold[ing] through recursive definitions" (p. 86). It is through these recursions that we are able to build a complete conceptualization of ingenium as an inventive process.

In the first definition, ingenium is an innovating cognitive power, "a human way of knowing that includes the actual in a particular context and the extraordinary with the concrete." Similar to Vico's description, Hodges describes ingenium as cognitive power that combines sensory perceptions with imagination to open the senses thus revealing the world to us.

In the second definition, ingenium is the human capacity which enables words, senses or ideas to have "adaptability, *acumen*, and instantaneousness" (Grassi, *Heidegger*, 1983, p.20). In other words, it is through our language, especially "metaphoric … language energized by ingenium" (p. 87), that our sensory perceptions become adaptable in creating knowledge.

In the third definition ingenium is a cognitive activity "linking a person perceptually with others and with the natural world" (p, 86). Ingenium is perceived as an "intuitive" awareness whereby a person perceives variations "beyond disjunctive hearing" or other senses. There is a closeness between subject and object where, through the immediateness of the variations, change is detected leading a person to new discoveries. Hodges concludes that through the process of ingenium, based on sensory perceptions, intuitiveness and the adaptability of words in discourse, insights are produced that contribute to understanding and knowledge in our world.

To reiterate, as the natural faculty by which humans achieve knowledge, ingenium allows us to grasp what is common or similar among objects, ideas, or experiences to

formulate new concepts and ideas through interpretation, imagination and metaphor. We experience this activity of ingenium through three manifestations in our cognitive process; in imagination through the connection of images; through work in the form of meeting man's needs; and through language as ingenious speech expressed in metaphor.

Through imagination, the creation of new images and relationships are developed. This is not simply the creation of things not present but the ability to formulate new relationships through the process of ingenium. This process allows us as humans to select certain interpretations or create new ones to fit the images we perceive thus defining our world in a manner familiar to us. Grassi cites Vico to explain this point: "Imagination collects from the senses the sensory effects of natural phenomena and combines and magnifies them to the point of exaggeration" thus creating the image schemata that we use for this experience (Grassi, 1976b, p. 173). Through imagination, we select certain "interpretations of sensory experiences and … use them to define or order the world in certain ways" (Foss, Foss, & Trapp, p. 64). Recognizing something as say a house allows us to associate all of the attributes of that concept to each image.

After imagination and the connection of images, there is the faculty of work. Work establishes the relationship between man and his needs and is expressed in language through the transfer of meanings developed in ingenium. These relationships then lead to appropriate actions that satisfy man's needs. In other words, Grassi states, "human work is a response to demands" from our needs based on perceptions that leads to the fulfillment of those demands (1988, p. 104). It is a way of making the connections between the natural world and our experience of that world to satisfy our primary need to survive. Work allows us to take advantage of a situation for our own gain. As an

example, we seek shelter from the elements but in so doing we learn to build a better shelter with certain materials based on how well those materials work in nature.

Another aspect of work is that it is more than a cognitive process; its expression is through activity. Grassi explains it as the "transformation (metamorphose) of any material … [it] does not happen on the basis of the contemplation … of abstract ideas, but of 'usus' and 'experientia'" (use and experience) (1988, p. 105). It can be seen in the development of our tools from the first use of a sharp stick for hunting to the creation of bows and arrows to the invention of cross bows. For each step of the process, a transformation occurred in the techniques and material used to advance the concept of the weapon.

The process of ingenium is also apparent in how we interpret and define experience through language. Ingenium is the process by which we establish the relationship of a symbol to an experience; we create the connection so we may derive a meaning and express it in language. It is through language that we move those relationships into an external expression. As Grassi tells us: "it is in and through language" that we make our world known (1988, p. 108). By labeling an object or experience with a meaning, we create a symbolic abstraction that is separate from the object or experience. These symbols then become the basis used to describe these relationships and through metaphor, they create understandings. Language then becomes an essential means of expressing reality.

To better describe how language functions in conjunction with the other forms of ingenium, Grassi references Dante's claim that, "language arises as a question or an answer … in the context of some material or spiritual imposition of need. The imposition

manifests itself as a task, and it is only in reference to this task that reality, as it is open to our sense organs, receives its meaning" (1980, p. 76). This 'task' is equivalent to 'work' in that the 'need' spoken of "is an immediate situationally-based one that must be dealt with in the here and now" (Graham, p. 3) and it is through the 'task' that we apply 'work' to meet that 'need.'

Thus, through language, we are able to describe the 'task' and the 'work' involved to complete the 'task.' Language then becomes central to all of our interactions. Without language, without words we would not be able to describe our experience to ourselves or share that experience with others. As Graham states, "all our endeavors involve the use of language and we need to use the language appropriate to the endeavor" (p. 1).

Language then becomes the basis for our thoughts and concepts. Our concepts are built through language and form the foundation for how we perceive the world through ingenium. Grassi describes two forms of thought based on different approaches to how we discover and perceive our world. These thoughts are distinguished by the types of language used as either; rhetorical, based on ingenium or; rational, based on a priori knowledge.

In the same vein as Vico, Grassi argued, "that it is rhetorical language that precedes rational discourse." For Grassi it is through rhetorical language supported by the cognitive process of ingenium, whereby all new things are invented that come before rational thought. Grassi found that critical and rational modes of thought that have dominated philosophy since Descartes (1980, p. 36) rely on "philosophical premises and principles in order to erect a systematic structure of sciences. This enterprise leads to the idealistic effort of achieving a priori derivation of the structure of natural science" (1980,

p. 38-39). Grassi and Vico tell us that we must first experience the world before we can rationalize about it.

Ingenium vs. Rationalism

It is through a mental process that we perceive our world. But there are varying definitions of that mental process. On the one hand, there is the western scientific framework of the rational process based in the sphere of proofs whereby "assertion and contradiction are possible only in a context of a system." This tradition is supported by Descartes and the Cartesian system and is known as rationalism or objectivism (Grassi, 1980, p.5). Then there is the Humanist tradition supported by Vico and Grassi whereby through "original insight as invention and discovery" we can discover the arguments for knowledge (1988, p. 97). This tradition based on ingenium, is known as the experientialist perspective.

Vico believed that ingenium is the foundation of how we come to knowledge and is prior to rational thought or formal logic because it allowed humans to come to know the world based on engagement rather than on rational deduction. This engagement occurs through our senses, allowing us to experience the world initially and providing the concepts used to reason about our world not the premises based on a priori knowledge. "Ingenium is synonymous with nature—Ingenium is the nature peculiar to man—Only man sees the measures or proportions of things—God is the artificer of nature, man is god of artifacts" (1988, p. 97). In this light, Vico detached himself from the rationalist tradition and introduced a view of thinking conditioned by its divine nature, which he described as action, invention, and *ingenium* (1968, p.114).

Descartes valued reason over experiential knowledge because he based rationalism on original premises deduced from objectivity and valued intellect over bodily experience when it comes to knowledge of the world. For Descartes, the sensory knowledge of the body was prone to doubt whereas he saw reason as the absence of doubt and the basis for absolute certainty. The goal was to find one absolute truth based on "claims which can be verified with proof containing no grounds for doubt," then through deduction make inferences from that truth (Golden, Berquist, Coleman, 1976).

Vico contrasted ingenium to rational thought by arguing that a faculty of comprehension he called genius is prior to a rational system of deduction. As Vico stated, "the ingenious faculty assumes the important function of supplying arguments which the rational process itself cannot discover" (1968, p. 112). For rational thought, the premises or presuppositions upon which the system is based cannot be founded on the system itself. Grassi argues, "The original 'finding' … never can occur within a deductive process because it cannot reach beyond its premises" (1980, p. 44).

Grassi continues to distinguish between rational thought and ingenium by stating "Providence has well arranged human things by awakening in the human mind first topics, and then critique, just as cognition of things precedes judgments about them" (1980, p. 45). Grassi explains 'topics' as "the art of inventing" and 'judgments' as the deductive or what the Stoics called dialectic. "It is dialectic to draw conclusions by means of rational deduction, while topics represents the art of invention" (1980, p. 44). Grassi supported Vico's view of rationalism by stating, "Ingenium is the 'grasping' rather than the 'deductive' property. The grasping, however, precedes the deduction because we can only draw conclusions from what we have already grasped" (1980, p. 45).

In this light, rationality never discovers anything new but relies on what is already given in the premises; for Grassi, ingenium is the art of invention, how we conceive of new ideas. By rejecting the objectivist view about truth and replacing it with an account of human experience and understanding, both Vico and Grassi show that it is through the experiential process that we come to know our world and it is through the cognitive process of ingenium that we are able to find the relationships between those experiences. Through metaphor we are able to express those relationships in language. As Graham states, "Ingenium finds relationships between inner experiences, which are then moved externally into language by metaphor" (p. 3).

Imagination

Part of the power of metaphor lies in the structure of imagination through the connections made between images and image schema in ingenium. Based on these connections, we are able to create new images. Each relationship creates multiple interpretations that we select from to fit the situation or experience encountered. These multiple interpretations are like the difference between describing a relationship as a "partnership" or as a "duty." Each new interpretation provides the ability to formulate new images of a concept, such as relationships, based on the process of ingenium. This process allows us as humans to select the right interpretation for the situation so we may define our world in a manner familiar to us.

Imagination then becomes an important element in developing our concepts and conceptual system in that imagination provides a "faculty for combining sense impressions into a unified image that can be 'brought under a concept'" (Johnson, p. xxviii). To restate, concepts are structures that characterize a category of experiences in

the external world, and our conceptual system then is a model of that physical world based on abstract ideas developed through ingenium. Imagination is the "bridge … between the formal and the material sides of cognition," and through combination of images, we can recognize and conceptualize an object for what it is (Johnson, p. xxviii). Through metaphorical projections based on this combination of images, more abstract concepts are created.

To explain imagination as more than the mindless fancy of children, Johnson described imagination as "central to human meaning and rationality" in that the new ideas and connections that we create through metaphor come "from the imaginative structures that make up our present understanding, from the schemata that organize our experience and serve as the basis for [the] imaginative projections" (p. 170). Johnson explains that to understand these imaginative structures, we need to understand the four related functions of imagination that are foundational to and significant to metaphorical projections. These functions are all related in that "they all involve the structured order of mental representations into meaningful unities within our experience" (Johnson, p. 166). When combined, these functions give us a complexity of meaning that we would not otherwise have.

Johnson describes these functions based on Kant's account of imagination and explains their role in organizing our mental representations. The first function is *reproductive*: "it gives us the unified representations in time, and unified, coherent experiences over time." The second function is *productive*: "it constitutes the unity of our consciousness through time" (Conscious imposes a structure on all experience). The third function is *schematizing*: "imagination mediates between abstract concepts and the

contents of sensation, making it possible for us to conceptualize what we receive through the sense perception." The fourth function is *creative*: "imagination is a free, non-rule-governed activity by which we achieve new structure in our experience and can remold existing patterns to generate novel meaning" (p. 165).

As a reproductive function, imagination unifies and orders mental representations into a more general representation through a synthesizing act. This unity is understood through a "three-fold synthesis" composed of a generalization of an object to understand the underlying representations, an image of that object over time and the ability to distinguish one unity from another (Johnson, p. 148, 149).

As a productive function, imagination is "what makes it possible for us to experience public objects that we all share in our common world" (Johnson, p. 151). This function is a "synthesizing activity that gives the general structure of objective experience." Johnson describes this as the "unifying structures of our consciousness" and fundamental to our objectivity.

As a schematizing function, imagination is the process of establishing an order between the reproductive and the productive functions of imagination. For Kant, it is a "procedure of imagination for producing images and ordering representations" (Johnson, p. 155). In other words, schematizing provides a bridge between concepts and images. It is not ingenium but functions under ingenium in a manner that provides a connection to the experiential in an organized manner.

As a creativity function, imagination is the capacity to find new orderings from existing concepts. There is no fixed stock of concepts from which we operate, the mind engages in "the creative act of reflecting" on what is already represented to search for

"novel orderings" in order to create new meanings for new experiences. Through this process, the mind reflects on or "plays over" various representations (percepts, images, concepts) in search of possible ways that they might be organized to represent a new or unique experience (Johnson, p. 158). This is the function that provides the interpretation for each relationship found in ingenium.

Imagination is central to structuring human understanding in that what we experience and how we think about it are dependent on the functions of imagination, especially the functions of schematizing and creativity. Johnson tells us, "Creativity is possible, in part, because imagination gives us image-schematic structures and metaphoric … patterns by which we can extend and elaborate those schemata" (p. 169). In other words, through an image schema and with the aid of metaphorical projections, we can creatively structure different interactions into many non-physical, abstract concepts.

Through metaphor and metaphorical projections, we are able to see an example of imaginative schematic operations, because metaphor "allows us a glimpse of the creation of meaningful structure via projections and elaborations of image schemata" (Johnson, p. 100). In addition, through imagination we are able to create a new connection to our experience that we then express through metaphor. Johnson explains it as, "Imagination is central to human meaning and rationality for the simple reason that what we can experience and cognize as meaningful, and how we can reason about it, are both dependent upon structures of imagination that make our experience what it is" (p. 172).

Imagination in concepts – image schemata

One of the ways we create connections and build understanding through ingenium is

with schemas. Schemas are "structures of activity" where order is constructed, not passive receptacles of vaguely similar and haphazardly combined experiences. Schemas are dynamic structures that fit many varying contexts based on "a recurring underlying structure" (Johnson, p. 29). A schema is "a theoretical construction" (*Oxford English Dictionary*) that is the basis for our conceptual framework or system and provides the underlying structure for understanding the events we experience. Philosophically, a schema is:

> Any one of certain forms or rules of the 'productive imagination' through which the understanding is able to apply its 'categories' to the manifold of sense-perception in the process of realizing knowledge or experience. (Kant, *Oxford English Dictionary*)

Therefore, schemata become the framework for the concepts used to formulate new ideas and make connections through metaphor.

Mark Johnson argues that human understanding comes from metaphorical projections of image schemata. As recurring structures or events in our cognitive process image schemata are non-metaphorical physical experiences that "operate one level of generality and abstraction above concrete, rich images." Consisting of a "small number of parts and relations," schemata can "structure indefinitely many perceptions, images, and event" (p. 29). Operating at a level between "concrete rich images" and "abstract propositional structures," schemata become dynamic structures that organize our experiences and comprehension thus becoming a distinct level of cognitive operations in and of themselves. In doing so, schemata become a means of creating order in our experiences (Johnson, p. 28).

Understanding metaphors as a projection of image schemata reveals only a part of the power of metaphor. Metaphors "contribute to the process by which our experience and our understanding are structured in a coherent and meaningful fashion" (Johnson, p. 98) in a manner that expands our understandings of a concept in both a physical and an abstract manner.

The way these metaphoric contributions are accomplished is through two levels in our conceptual system: a) at a base level that allows us to distinguish the most basic of events such as walking from running, and b) at an image-schematic level whereby we develop structural concepts such as *Container*, *Journey*, or *Balance*. Johnson describes this as, "the level that defines form itself, and allows us to make sense of the relations among diverse experiences" (p. 208). Image schemata then provide the groupings of similar experiences that we comprehend through metaphorical concepts.

Take the schemata of the *In-Out* orientation as an example. Johnson's description of the *Out* schema includes three modes and means of expression as identified in a study by Susan Linder (p. 32). The three basic image schemata as viewed on a physical level include leaving a defined area, expanding from an area, and as motion along a path (Figure 1). In the diagram in Figure 1, the landmark (LM) defines an area or starting point while the trajector (TR) describes the action or motion. In the first example, *Out* describes an action where the TR leaves a container LM, "John went out of the room." In the second example, the trajector (TR) expands the area of the container LM, "send out the troops." Finally, the third image portrays *Out* as a motion or projection, "the train started out from Chicago." These are all characteristics of how we perceive the concept of *Out*.

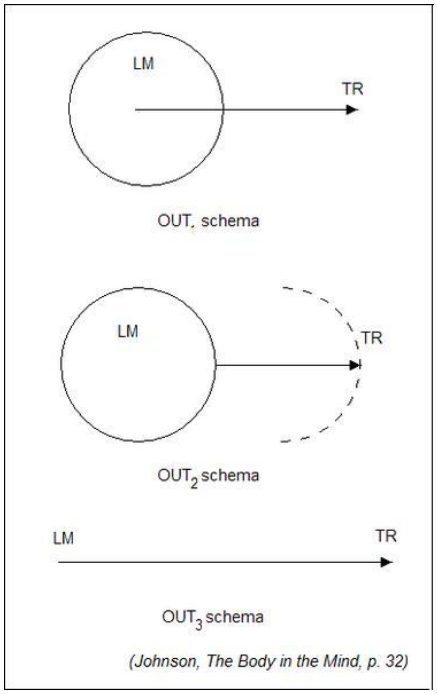


Figure 1: Image schema for *Out*
(retrieved from http://en.wikipedia.org/wiki/Image_schema)

A schema can be metaphorical as well as physical. By extending the schema of *Out* from the physical to the nonphysical, the landmark and trajector roles are filled with figurative and abstract entities and processes, as in "Tell me your story, but *leave out* the minor details." Here the expression "*leave out*" is a "metaphorically oriented mental action" that has the same general sense as the physical schema of say "*leave out* that big log." We cognitively place the "minor details" in the same role as the "big log" using the same schema for both expressions and thus metaphorically projecting the same action onto the "minor details." Through metaphorical projection, our understanding of the image-schema *Out* is expanded to an imaginative action that is an abstraction of the original physical schema.

Every time we recognize a structure, a schema, in a new experience we are being "imaginatively creative." Johnson tells us "imagination is our capacity to organize mental

representations into meaningful, coherent unities" (p. 141). Those unities are the concepts that are used in creating conceptual metaphors. Through the cognitive process of ingenium, we are able to metaphorically project from a previous experience onto a new image or experience using these unities to create new connections, meanings, and concepts. Johnson tells us that “metaphorical projections … are one of the chief means for connecting up different senses of a term” (p. 34).

Metaphor

How we come to know our world is through the cognitive process of ingenium. Ingenium as the art of invention is aided by imagination through the connection of images and image schema. Ingenium provides us with the capacity to interpret our experiences and establish relationships between those experiences. In so doing, these relationships are expressed in language through metaphor. As a cognitive element, metaphor is “the main mechanism through which we comprehend abstract concepts and perform abstract reasoning” (Johnson, 1989, p. 39). Through ingenium, we develop the nexus between our internal and external worlds; through metaphor and language, we come to understand that nexus.

Metaphor as an epistemological construct

Ernesto Grassi viewed metaphor as a basic element in language and an important component in the creation of knowledge. For him, metaphor lies at the root of our human world for it provides “the original form of [the] interpretative act itself” (Grassi, 1980, p. 7). This interpretive act makes connections and transfers meaning from the external world to our internal world. It provides the insight into our experiences and observations

that becomes the basis of our understanding. It represents the cognitive process through which we make connections and relationships. This "transference of meaning" is the essence of metaphor and the root of our knowledge (Grassi, 1976a, p. 215).

Identifying metaphor as a component of our cognitive process helps us in understanding the power of metaphor as more than a fanciful element in poetic speech. At the most basic level, metaphors grasp similarities between two unrelated things enabling us to express the unfamiliar in terms of the familiar (Grassi, Richards, and Johnson). This representation enables us to "understand and experience" one kind of thing based on examples and terms from another thing (Booth, 1978; Giles, 2008; Lakoff and Johnson, 1980). A good example is '*Love* is *Madness*' where when describing a couple as 'being crazy about each other,' the metaphorical phrase refers to the exuberance they have for each other that resembles but is not an insane obsession.

Metaphors are a rhetorical tool used to aid in understanding of the unfamiliar by providing familiar terms for actions and experiences that are new to our way of thinking or acting. Our perceptions are influenced based on the associations metaphors create in language. To help us understand our experiences, rhetoric acts as a lens that enables us to interpret our perceptions and create understanding. As an element of rhetoric, metaphor becomes the tool that transforms language in the development of motive and purpose in our discourse with our audience (Foss, Foss). Our perceptions of and the motive for our discourse are dependent upon the metaphor used in that discourse.

Another aspect of metaphor is they are generative. Through discernment, and the use of imagery, we form new concepts on the basis of our previous thoughts and actions, our values and beliefs. There is a different image projected when describing someone as

‘having eyes like diamonds’ as compared to ‘having a cruel glare.’ Each expression projects an image of a person as being either ‘shiny and alluring’ or ‘hard and repelling’ with each expression having a different motive in the meaning.

Through ingenium, we gain new insights into our surroundings. Each new experience provides a new cognitive connection that is related to other experiences, building on our knowledge by giving meaning to these insights. These insights are the basis for concepts and foundational to metaphor in that through similarity we are able to discover a familiar nature between objects and thus make visible their common quality. An example is “I’m happy. Things are looking up today” contains the common quality of “*up*” for both ‘*happy*’ and ‘*more*’ (things are looking up). It is through this quality of being able to make visible a “common” quality between objects to “show” something once concealed and “which is not rationally deducible” that metaphor makes a fundamental contribution to the cognitive structure of our world (Grassi, 1976a, p. 215).

Once we are able to make connections through insight then we begin the process of “transferring” of meaning of sensory phenomena through what Grassi calls “reduction.” This reduction is the convergence of our empirical observations through the senses to the different types of meanings existing in our cognition. It is through this “transference,” Grassi tells us, that what we observe “can be recognized as similar or dissimilar, useful or useless for our human realization” (1976a, p. 215). In order to make “sensory” observations, we are forced to “reach back” for a transposition, for a metaphor.

Through ingenium and metaphor, we formulate new thoughts that are abstractions of what we already know. These new thoughts combine to form the basic structure of our conceptual system, our model of the world. Our conceptual system then is a model of the

physical world based on abstract ideas, which governs our perception of events in the physical or natural world thus guiding how we interpret and respond to those events. These interpretations are expressed by metaphor through language, whereby one meaning is transferred from one insight to explain another, from one concept to elaborate on another. This transference describes the two sides of a metaphor that provide the basis for interpretation, thus helping to explain the power of metaphors. I.A. Richards explains it as, “For the whole task is to compare the different relations which, in different cases, these two members of a metaphor hold to one another” (p. 96).

Linguistic metaphor - Vehicle and Tenor

How we describe our world is based on how we make connections between our perceptions and the outside world. These connections, made through language by metaphor, provide the basic knowledge of our world. At a basic level, metaphor is a means of resemblance arising from language. Yet by examining language, we can see the natural practice of metaphor to be generative. As Richards states, “It is the word which brings in the meaning which the image and its original perception lack” (p. 131).

Although Richards does not talk about ingenium, he does describe its power when he states; “The mind is a connecting organ, it works only by connecting and it can connect any two things in an indefinitely large number of different ways” (p. 125). It is through these connections that the relationships between experience and understanding are revealed and knowledge of our world at a higher level is created. And it is in language through metaphor these relationships are expressed.

Metaphor "is the omnipresent principle of language" in that we cannot get through most sentences in ordinary speech without it (Richards, p. 92). For Richards, all of our thought, our cognitive process, is metaphoric and based on comparison. Through these comparisons, we must "raise our implicit recognitions into explicit distinctions" thus elevating our mind's activity to improve our skill in thought. (p. 95). By raising our skill and increasing our cognitive activity, we are able to formulate more abstract concepts. The more abstract the concept, the more we rely on metaphor to direct our thoughts.

Metaphor functions as an epistemic element because it is comprised of two different components, the vehicle and the tenor. As Richards tells us, "When we use a metaphor we have two thoughts of different things active together and supported by a single word, or phrase, whose meaning is a result of their interaction" (p. 93). In other words, metaphors are not just a comparison showing similarities between two things but a combination of thoughts that form a new meaning. This places metaphor as an active element in language wherein both sides of a metaphor contribute to the meaning created from the combination.

This transaction is based on the two components that distinguish the different aspects of a metaphor and help explain the transference from one concept to another. Richards tells us "A first step is to introduce two technical terms to assists us in distinguishing … the two ideas that any metaphor, at its simplest, gives us. Let me call them the tenor and the vehicle" (p. 96). To make any analysis of metaphor, we need to distinguish between these two halves so there is an understanding of how, through combination and comparison, metaphor generates meaning. These components also help explain how

metaphor works to create meaning and knowledge beyond simple comparison through mapping.

To reiterate, as a figure of speech and at a basic level, a metaphor is a comparison of two unlike things to suggest a resemblance. A metaphor expresses the unfamiliar in terms of the familiar. In so doing, metaphor takes from one familiar idea – the vehicle – to illustrate the other, unfamiliar idea – the tenor. The vehicle becomes the source of the ideas or words for the comparison while the tenor is the receptor of those ideas or words. Richards states it as "a word is normally a substitute for (or means) not one discrete past impression but a combination of general aspects" (p. 93). These general aspects provide the meaning that is used as the vehicle side of metaphor while the receptor or tenor, in Richards terms, is the borrowed side of the thought. To illustrate:

metaphor:

vehicle ↔ tenor

Figure 2: Example of vehicle - tenor relationship. (Johnson, p. 27)

Understand, not all attributes from the vehicle are used to describe the tenor; it is in the subtle comparisons that the metaphor is created. The differing relationships of the vehicle and tenor create the different means and modes of metaphor. Richards explains it as, "the co-presence of the vehicle and tenor results in a meaning (to be clearly distinguished from the tenor) which is not attainable without their interaction" (p. 100). The relationship between the vehicle and tenor is flexible, it is in the differing of their interactions that different metaphors arise.

At times, the vehicle will modify the tenor to provide it a more powerful meaning. At other times, it supplies only a commonality, to aid in what is already present in the tenor. It is the differing relationships of the vehicle and tenor that create the different means and modes of metaphor. As Richards describes, on a basic level "metaphor involves a comparison," whether it is a putting together of "two things to let them work together" or in studying them both "to see how they are like and how unlike one another" (p. 120), each interaction generates a different conception and mode of a metaphor. This interaction between the two creates a meaning more powerful than the "figurative word" alone can present. As Richards explains, the "vehicle and tenor in co-operation give a meaning of more varied powers than can be ascribed to either" (p. 100).

Metaphors power is not always in the likeness of the two ideas but more so in their unlikeness. Also, if the vehicle and tenor are too much alike or if the vehicle and tenor are completely without a relationship then there will not be a metaphor. As Johnduff (2009) explains, "the metaphor is the name for the copresence of the two elements in the form of the two sets of ideas being related, and never is reducible to either one." As an example, when Richards is discussing lines from John Denham's poem "Cooper's Hill" (1642), Richards describe the vehicle as the river and the tenor as the mind showing the relationship as "the senses and implications of *deep*, *clear*, *gentle*, *strong* and *full* as they apply to a stream and to a mind."

> O could I flow like thee, and make thy stream
>
> My great exemplar as it is my theme!
>
> Though deep, yet clear; though gentle, yet not dull;

Strong without rage; without o'erflowing, full.

This comparison works because both objects, 'river' and 'mind,' have similar qualities that when combined make each stronger by the comparison. However, if the vehicle were to be changed the relationship between the elements would change. Richards explains, "The river is not a mere excuse, or a decoration only … the vehicle is still controlling the mode in which the tenor forms. That appears at once if we try to replace the river with, say, a cup of tea" (p. 122-123). Changing the comparison changes the emphasis of the meanings generated and thus would change the metaphor.

Although metaphors are able to create understanding of one idea through the lens of another, that understanding is dependent on what connection the mind makes. As shown above, by changing one element or emphasis, the whole metaphor is changed. Richards describes this as, "the mind will always try to find connections and will be guided in its search by the rest of the utterance and its occasion" (p. 126). Therefore, the mind is active in the creation of the metaphor and has an influence on what is projected. This choice in making connections is the process of ingenium and as Richards tells us "though we may not discover its aim, the mind is never aimless" (p. 125).

Metaphors are expressed through words or phrases that help us describe one thing in terms of another. It is with words that we are able to understand a concept and formulate a new idea or concept. As Richards describes it:

> [W]ords are the meeting points at which regions of experience, which can never combine in sensation or intuition, come together. They are the occasion and the means of that growth which is the mind's endless

> endeavour to order itself… It is the instrument of all our distinctively human development (p. 131).

Through the connections made in ingenium, and how we choose to express those connections based on context, we create metaphor through language. This choice of words is the minds effort to express how we wish to order our world. Our intent, our wish, and our desire to express what we perceive then become the word choices used to create for ourselves the world as we see it. Richards tell us, "A command of metaphor – a command of the interpretation of metaphors – can go deeper still into the control of the world that we make for ourselves to live in" (p. 135).

Richards provides a foundational means of understanding how metaphor functions as a literary and rhetorical device. His theories provide a basis for how, through ingenium, metaphor and language, we begin to understand our world and create knowledge. By comprehending that a metaphor is more than a transferring activity of the two parts, vehicle and tenor, Richards shows us that metaphor is a mapping of correspondences between the two components. Through these mappings, connections are established creating new perceptions of the related ideas that expand upon the original ideas to establish a new idea or concept, thus contributing to our epistemology.

The conceptual domains used in current theories of cognitive linguistics and conceptual metaphor derive from Richards's theory of metaphor. Through this theory, the concepts of 'source' and 'target' domains evolved to encompass the ideas of the 'vehicle' and the 'tenor' respectively. Within the domains of 'source' and 'target,' the ideas of the 'vehicle' and the 'tenor' become attributes of their respective domain. The conceptual domains of 'source' and 'target' function similar to the 'vehicle' and the 'tenor' of

Richards's theory in that conceptual metaphor draws from the source domain to describe or create understanding of the target domain. I explore the connection between 'source' and 'target' and 'vehicle' and 'tenor' later in this paper.

Conceptual Metaphor

Metaphors are a manifestation of the cognitive process of ingenium and as such, are an epistemological construct, demonstrating how we create knowledge and understanding in our world. As a linguistic element, a figure of speech in language, metaphor enables us to "understand and experience" one kind of thing in terms of another (Her eyes are like glistening jewels). As a cognitive element, metaphor helps in defining new abstract concepts by mapping a set of corresponding entailments between two conceptual domains, a source domain and a target domain, as in '*Love* is a *Journey*'(Lakoff and Johnson). Conceptual metaphors also help to explain abstract thoughts such as the concept of the atom through mappings of the concept of the solar system.

A conceptual metaphor expands the linguistic role of metaphor into the realm of thought wherein understanding is based on a broader organization of experience categorized as concepts. A concept, as defined by Lakoff and Johnson is "a mental structure that characterizes a category of personal experiences or occurrences in the external world" (1980b, p. 205). In other words, concepts are a class of objects that represent coherent segments of experiences and are organized into what are call conceptual domains.

Conceptual domains are a broader composition of a coherent organization of human experience. These domains, such as *Journey,* contain many similar concepts that

characteristically pertain to the main concept. As an example, a *Journey* contains more than the act of traveling, it has a component of time, distance and progress. A *Journey* can also be a quest, an excursion or walkabout. It can be the path our lives take or the road we travel with a friend. How we express this *Journey* depends on the context and the metaphoric expression used. Therefore, through conceptual domains, the necessary context or elements for the mappings are drawn upon to create a conceptual metaphor (Lakoff, 1992).

Through the metaphorical transference of image schemata in concepts, we are able to create new ideas and build a foundation of understanding for new concepts such as new media (Lakoff & Johnson). Metaphor not only frames how we view the world but also acts as an epistemic element, building on our previous knowledge to create new perceptions and concepts. Johnson describes metaphor "as a pervasive, indispensable structure of human understanding by means of which we figuratively comprehend our world" (p. xx). This comprehension is achieved through corresponding mappings.

Concepts and our conceptual system function to provide the mappings necessary for conceptual metaphors. As explained earlier, as a cognitive element, metaphors map a familiar source domain onto a more abstract target domain based on image schemata which are expressed in language. Lakoff explains, "metaphor is conceptual; it is not in the words themselves, but in the mental images. The words are prompts for us to map from one conventional image to another" (1992, p, 26). The power of a metaphor then is as much in the cognitive activities and entities used to create an image as it is in the language or the words used in that expression.

Metaphors are mappings from one conceptual domain to another and involve the corresponding entities of both parts to create the metaphor. As in *Love* is a *Journey* when talking about the relationship of two lovers experiencing the process of romance where the mappings can include such correspondences as "the lovers correspond to travelers" or "the love relationship corresponds to the vehicle" (Lakoff, p. 5) creating the image of the lovers as travelers in a carriage of love. These correspondences map knowledge of one domain onto knowledge about the other domain to enhance the understanding of the entity of "the traveler" becoming the entity of "the lover." This brings many of the associations of "the traveler" to represent "the lover." Lakoff describes this as a "set of conceptual correspondences," not the words used to describe the correspondence (p. 5). Do not confuse the mapping with the names associated with the mapping: the meaning of the metaphor goes deeper than the words convey.

Our conceptual system is primarily metaphorical in character wherein, "our concepts structure what we perceive, how we get around in the world, and how we relate to other people." These concepts govern our everyday actions "down to the most mundane details" (Lakoff and Johnson, 1980a, p. 3). Our conceptual system is made up of two domains that are fundamental to conceptual metaphors where one domain is understood in terms of the other domain, those domains being the source and the target.

Conceptual Domains

As stated earlier, our conceptual system is our model of the world based on physical experience and abstract ideas. This model governs our perception of events in the natural world and directs our response to those events through the connections made in ingenium and expressed in language through metaphor. Understanding the power of metaphor as a

cognitive process requires understanding the interactions of the two conceptual domains, the source and the target, used to create a conceptual metaphor.

It was Richards who showed that metaphor is more than a transferring activity of the two parts, vehicle and tenor; he showed metaphor to be a mapping of correspondences between two components, two concepts. Through these mappings, connections are established creating new perceptions of the ideas being related which expand upon the original ideas to establish a new idea, a new concept. Within the domains of source and target, the ideas of the vehicle and the tenor become attributes of their respective domain. The vehicle and tenor become the more specific components that are the focus of the metaphor wherein the tenor is the idea or subject to which attributes are ascribed while the vehicle is the idea or subject from which the attributes are derived.

The source domain contains concrete structures or abstractions of concrete structures from our experience and surroundings while the target domain is understood through the source domain or in combination with the source domain. These domains provide the attributes and entailments used for the mappings generated in a conceptual metaphor. Concepts in the source domain are mapped onto corresponding concepts in the target domain to create an abstract concept expressed by the conceptual metaphor.

To begin, domains differ from concepts in that a domain "is a structured whole within our experience" (1980a, p. 117), a realm of knowledge concerning an organization of experience such as *quantity, quality* or *directionality*. Concepts are the building blocks for knowledge in a domain and as such help in creating an overall understanding of that domain. *Up* and *Down* are concepts in the domain of *directionality*.

Domains structure our experience based on concepts through what Lakoff and Johnson label as “complex experiential gestalts” defined as “a multidimensional structured whole arising naturally within experience” (1980b, p. 201/202). Gestalts are structures or configurations of phenomena (experience) integrated to constitute a functional unit that is greater than the whole, such as the gestalt of human consciousness. By viewing domains as gestalts, we are able to conceive of the domain structures in our experience based on more than the sum of the parts. This way of looking at domains provides for a broader definition and a better understanding of that domain.

Concepts are categorized in two forms, as non-metaphorical and metaphorical. As explained in the discussion on image schemata, non-metaphorical concepts are clearly structured, concrete elements in our natural world that provide a foundation for creating abstract ideas and concepts through the process of language and metaphor. By focusing on a few attributes of the non-metaphorical concept, we can define an abstract concept based on different metaphors. Metaphorical concepts are those structures understood in terms of other concepts and are primarily abstractions of non-metaphorical concepts that “arise naturally from physical and cultural experience” (Lakoff and Johnson, 1980b, p. 201).

Metaphors cannot be comprehended outside of their experiential basis, because a “metaphor can serve as a vehicle [instrument] of understanding a concept *only by virtue of its experiential basis*” (Lakoff and Johnson, 1980b, p. 204). In other words, it is on this basis, through ingenium, the connection from one concept to another is made. There has to be a connection to something we have experienced before we understand the metaphor.

The experiential basis is structured such that the metaphorical concepts parallel the non-metaphorical concepts of such elements as *spatial orientations* (e.g., up-down, near-far), *ontological concepts* (e.g., entity, substance), and *structured experiences and activities* (e.g., eating, moving) (Lakoff and Johnson, 1980b, p. 195). Represented in the diagram below, where each experiential comparison emphasizes a different aspect of the spatial concept of *Up* or *Down*, the comparisons are between the substantive quantities of *More* or *Less* and the emotive qualities of *Rational* or *Emotional*. Changing the basis of the comparison changes the emphasis of the metaphor.

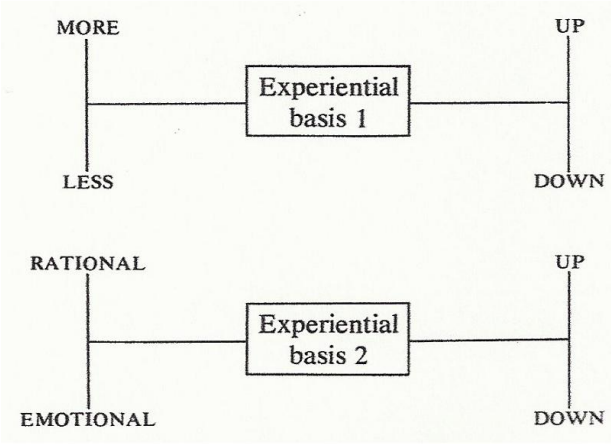


Figure 3 Experiential basis of metaphor (Lakoff & Johnson 1980a, p. 20)

Through the experiential nature of metaphor, we are able to distinguish between the substantive base of *More* is *Up*, "Business is rising," as compared to the physical domination base of *Rational* is *Up*, "He couldn't rise above his emotions." Both of these metaphors employ the concept of *Up*; however, the experiential quality used in each evokes a completely different image. One emphasizes the motion of the source concept as rising, while the second metaphor places the source concept already on top. By

distinguishing between metaphorical and non-metaphorical concepts, we are able to perceive metaphorical concepts as the basis for source and target domains.

Source and target domains

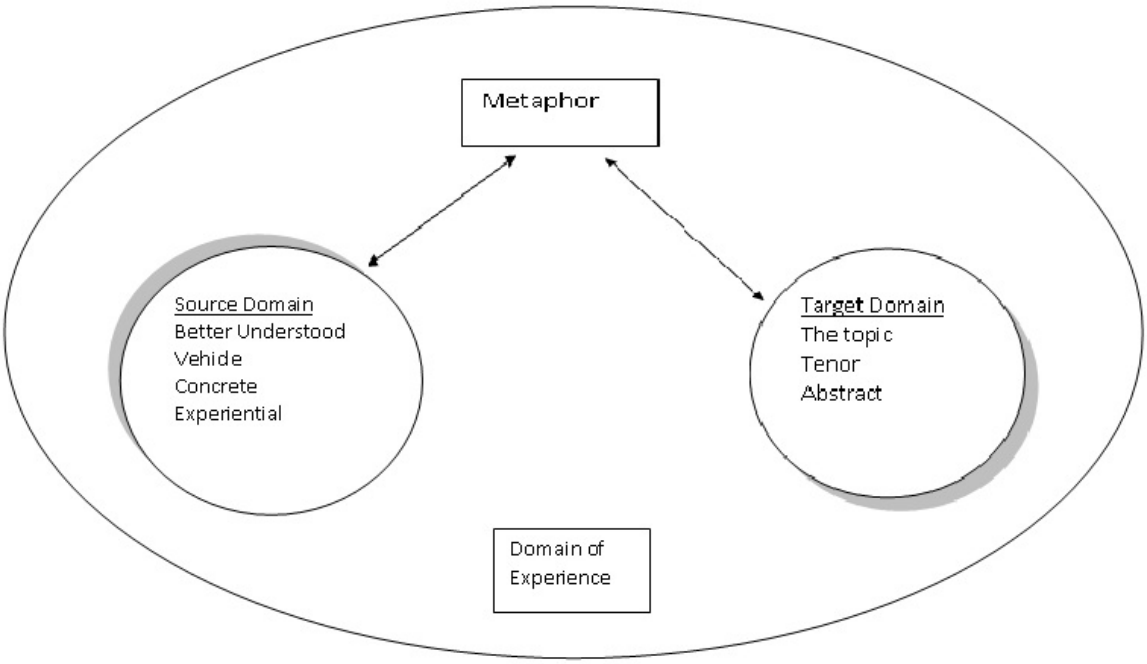


Figure 4 Source & Target

Conceptual domains provide the necessary context, attributes, and entailments used for the mappings generated in a conceptual metaphor. The mappings, based on conceptualizations derived from the two domains of source and target, are facilitated by the image schemas in each domain and provide the common characteristics used in the conceptual metaphor. Through metaphor then, we are able to understand one domain in terms of another based on common characteristics from each image schema. By examining each of the domains to understand how it functions within a metaphor, we can better understand conceptual metaphors.

To reiterate, source domains are concrete structures or abstractions of concrete structures from our experience and surroundings. They include such things as "*Time, Space,* or *Motion,*" wherein *Time* is a physical attribute measured with the passing of the sun while *Space* and *Motion* are bodily experiences, we feel every time we move. Source domains are composed of non-metaphorical concepts and image schemata.

Concrete structures are based on non-metaphorical concepts whose elements "emerge directly from our experience and are defined in their own terms" (Lakoff & Johnson, 1980b, p. 195). Concrete is defined as something that is "Combined with, or embodied in matter, actual practice, or a particular example; existing in a material form or as an actual reality, or pertaining to that which so exists" (*Oxford English Dictionary*). In other words, what is concrete constitutes an actual thing or instance that we can see, feel, taste or touch.

Target domains are the domains to be understood through the source domain or in combination with the source domain in a conceptual metaphor. Concepts in the source domain are mapped onto corresponding concepts in the target domain to create an abstract concept that is expressed by a metaphor. As an example, understanding *conversation* as *war* in the conceptual metaphor, *argument* is *war*, "your claims are indefensible," where the target domain *argument* is a concept in the domain of *conversation* and is being understood through the source domain of *war*.

By projecting the whole of a concept, the whole structure of a source domain onto a target domain, we are able to extend and elaborate on those structures through metaphor. By utilizing the whole of a concept, we are able to recruit any aspect needed to build new meanings and thus create new understandings. The example above can be viewed in other

terms such as attack, retreat, victory, or defeat. Through changing the source image, we change the target image projected through the metaphor.

It must be understood that not all of the structure of the source domain is transferred to the target domain; "The image-schema structure of the source domain is projected onto the target domain in a way that is consistent with inherent target domain structure" (Johnson, p. 39). However, to understand conceptual metaphor, we need the whole of the source domain and the target domain to create the meaning necessary for the target domain to be clear. By using the whole of a concept (the source), we can characterize certain aspects of the thing to be understood (the target).

As an example, the concept "*Money* is a *Limited Resource*, and *Limited Resources* are *Valuable Commodities,*" describes a non-metaphoric concept of *Money* as being limited. By understanding the concept of *Money* as a *Limited Resource*, we can structure other abstract concepts around certain aspects of *Money* based on different metaphors (1980b, p. 197). From this come abstract concepts such as *Time* is *Money*, "how do you spend your time" or the concept of *Ideas* are *Money*, "here is my two cents worth." Therefore, when we talk about "*Time* is *Money*, which entails that *Time* is a *Limited Resource,*" some entailments that correspond between *Money* and *Time* allow *Time* to be discussed as a *Limited Resource*. These examples show how a metaphor uses only a portion of the source concept to help build and define the target concept.

Understand though, a single metaphor does not fully define an abstract concept. Concepts are composed of multiple metaphors, each metaphor covering only a portion of that concept. Lakoff and Johnson argue that, "no single metaphor even comes close to

being definitive. It takes many different and inconsistent metaphorical perspectives to comprehend each abstract concept" (1980b, p. 201).

When we compare such metaphors as *Love* is *Health* – 'they have a healthy relationship,' to *Love* is *Madness* – 'I'm crazy about her,' there is no correlation between the metaphors of *Health* and *Madness*. Each metaphor contributes to our comprehension of the concept of *Love*. Yet, when combined with other metaphors of *Love*, they overlap to provide an overall view of the abstract concept of *Love*. This is only one aspect of our conceptual system.

Through the cognitive process of ingenium and metaphor, we build a conceptual system to create knowledge of our world. Our conceptual system then is a model of the physical world based on abstract ideas, governing our perception of events in the physical world and guiding how we interpret and respond to those events. Through the interaction of source and target domains, we are able to formulate new metaphorical concepts based on experience.

Metaphor is more than a fanciful element in poetic speech. At the most basic level, metaphor allows us to grasp similarities between two unrelated things, enabling us through language to express the unfamiliar in terms of the familiar. At a conceptual level, metaphor defines new ideas and concepts using the cognitive process of ingenium. Metaphors are not just a linguistic element through which a comparison shows similarities between two ideas but also a cognitive element whereby through a combination of thoughts new concepts are formed.

As an example of metaphors power and ability to build knowledge and create a connection between abstract ideas, I examine the navigation metaphor, especially in how

it creates understanding in digital media. At a basic level, the navigation metaphor builds a cognitive model for interacting with an abstract environment, in this case digital media, enabling us to negotiate a virtual terrain to reach a goal or desired outcome. Understanding navigation in digital media requires us to examine it from an experientialist perspective.

The Navigation Metaphor

Navigation is a central element in Human Computer Interaction in that the majority of our actions in digital media consist of metaphorical acts of navigating. As a metaphor, navigation provides the means to interpret the image schemata presented in digital media as connections to new pages or paths to new information through the projection of those image schemata as a means of action in this virtual environment. As a concept, navigation provides a foundation for understanding our actions in this virtual environment in a way that is creative and imaginative, based on ingenium, to satisfy our primary need. Through *labor* and *usus*, we perceive our need as a 'task' that we apply 'work' (*labor*) in order to complete that 'task.' Through *usus* (ingenious utilization) our need is met and meaning is derived and expressed in language.

By using our familiarity with the natural world, the navigation metaphor builds a cognitive model for interacting with digital media by creating in the user the perception of action and motion of the self. Through the cognitive process of ingenium and imagination, the user associates images on the Web interface with perceived pathways that connect the user's actions to their goals (Benyon, Giles, Juvina & van Oostendorp). This association humanizes the process of interaction to satisfy our need in nature to

reach a goal through the connections revealed by our senses, thus creating a relationship between the natural world and the virtual world. As Grassi states; “nature appears to us only in its means with reference to satisfying our existential needs” (1976, p. 6).

Navigation is more than the act of getting from one point to another; it entails the interactions taken during that journey. Benyon tells us that “people navigate *through* places, so navigation is not always directed toward a destination” and as such it becomes the activity of perceiving and interpreting the information available, shaping our experience by influencing how we perceive that information. Through acumen and instantaneousness in ingenium, the navigation metaphor connects “the extraordinary with the concrete” (Hodges, 1996) in how we interpret icons and hyperlinks as the ‘road signs’ of Web navigation. In other words, if our discernment of an image as a ‘road sign’ is not sharp or clear then our perception of the image as a means to an end will not be instantaneous and the connection will not be made that this is the path to take.

Metaphorically then, navigation invokes the users pre-existing knowledge to direct them in digital media through images and image schemas. These schemas are the arbitrary projections that create in the user the experience of ‘navigating’ in digital media. Stated another way, through imagination and ingenium, the sense impressions created by icons and other visual enticements become the attributes of the target domain associated with the concept of navigation. These visual aids are the elements we associate as the ‘road signs’ of digital navigation. As Johnson stated, imagination is the “bridge ...between the formal and the material side of cognition” and as such, we are able to conceptualize the images and text presented on an interface as navigational aids.

Imagination plays a major role in creating what Cicero called the similitudines – the catching sight of the likenesses among things. This process can be seen in the navigation metaphor through the four functions of imagination. Johnson described these functions as the *reproductive*, the *productive*, the *schematizing*, and the *creative*.

The *reproductive* function gives a unified representation in time and a coherent experience over time. What this means is that through initial experience and repetition, icons are recognized as symbols of navigation in digital media. The *productive* function constitutes the unity of our conscious through time in that we can recognize multiple icons as being representative of navigation not individual symbols. The *schematizing* function mediates between abstract concepts and contents of sensory input, to aid in the process of conceptualizing. This is the function where images are associated with non-metaphoric concepts that provide a connection to the experience in an organizing manner. The *creative* function of imagination is our capacity to find new orderings from existing concepts and through new experiences create new meanings.

The connection made in ingenium through the functions of imagination determines what action we will choose in planning and executing our task. The image schemata presented on the interface are part of the source and target domains of the navigation metaphor and as such build the framework for our interactions. Hochmair and Lüttich describe this cognitive process wherein "to make a decision, the agent matches the perceived … information with [the agent's] knowledge about the world, i.e., with concepts in its cognitive map" (p. 238) and transports those concepts to the image schemata in digital media as navigation.

Another aspect that influences our perception of the navigation metaphor is that our experience is based on human orientation. This orientation is founded on spatial perceptions, whether in the real world or a virtual environment. In their research, Maglio and Matlock (1998, in Hochmair and Lüttich, 2006) found that "Web users think of the Web as a kind of physical space in which they move" (p. 236), and explain that the use of spatial metaphors becomes extensive when people talk about using digital media.

In this respect, many scholars (Lakoff & Johnson, Hochmair and Lüttich, & Giles), describe navigation in digital media as an orientational metaphor based on spatial perception. As Johnson tells us, we structure orientational metaphors based on our physical experience in that "our reality is shaped by the patterns of our bodily movement, the contours of our spatial and temporal orientation, and the forms of our interactions with objects" (pg. xix).

As an example, motion is relevant to our bodily actions; we speak of *going the distance* when we talk of finishing a project or task, which brings to mind images of running a race or climbing a mountain. The same holds true for *going online* or *going to a new page* (in digital media), which brings up images of our-selves going to a location, albeit virtual, or going from one place to another in digital media.

From this humanizing aspect, the navigation metaphor provides a foundation for understanding our actions in digital media through *labor* and *usus* based in ingenium. Through our actions (*labor*) and ingenious utilization (*usus*), our need is met. Through imagination and image schemata, we are able to connect our experience to our actions to create new meanings. By humanizing the metaphor of navigation, we are able to project

our actions in a virtual environment as real, giving ourselves a perceived physical connection with the media.

The navigation metaphor captures our skill of movement based on a human perspective and brings it into conscious awareness. Through the image schemata presented on the web as abstracts of space, time, and motion, the navigation metaphor creates for us a perception, an image in our minds of virtual space as real. To better understand this, we need to understand how the conceptual domains of source and target function in the navigation metaphor.

Navigation in Digital Media – the Source domain

Understanding navigation as a conceptual metaphor requires that we first understand the non-metaphorical or source aspect of navigation in the real world. Navigation is a basic concept in our language that describes actions used to determine ones position in the physical world while planning and negotiating a path or course through a space to reach a goal or destination. The *Oxford English Dictionary* defines navigation as "the process or activity of accurately ascertaining one's position and planning and following a route," while the National Research Council adds that navigation is the process of following a course from one place to another (2005, p. 22).

As a non-metaphoric concept and a major component of the source domain in the navigation metaphor, to navigate entails many elements such as the planning of a route or course through specific terrain while navigation is the physical and mental actions used in directing a vessel or entity on that course. Some attributes of navigation include such terms as steering, piloting, directing, or guiding. Another way of viewing navigation is as

a voyage, an expedition, or a journey. In computing, according to the *Oxford English Dictionary*, navigation refers to "the action or process of moving around a file, file system, website, etc." In short, navigation is the act or practice of traveling, including all that entails, by negotiating a path or course to reach a destination.

The act of navigating plays a role in many aspects of our lives by presenting choices that determine not only where we go but how we get there. In other words, whether it is in the physical world (navigating a city) or the virtual world (navigating a web site), our destination and means of getting there are influenced by the choices made along the way. In the physical world, there are road signs, directories and guideposts to assist our actions and decisions. Metaphorically, the same holds true in digital media.

Although we may not perceive our actions as navigation, many of our activities involve some form of navigating to direct ourselves through a space with the possibility of reaching a goal. Whether it is using a map to plan a trip or looking up information resources in a library, these behaviors include some form of navigation to aid in reaching a goal. Through activity, a user will focus his or her efforts on finding the desired resources needed, using the road signs and other aids, to complete his or her journey.

In this respect, navigation is a spatial metaphor in that it contains elements of space, distance and location. Hochmair and Lüttich (2006) saw spatial metaphors as a key element in human-computer interaction in that "metaphors map features of the physical space to an abstract computational domain and allow the user to apply previously experienced concepts in the target domain" (p236). By applying our previous knowledge of space to a virtual space, we are able to interact in digital media without having any real physical connections to that space.

One way the navigation metaphor is able to map these features for users in digital media is that it answers certain critical questions such as:

1. Where am I?
2. Where did I come from?
3. Where is (such & such)?
4. Where can I go from here?
5. How do I get there?

These questions help the user to more effectively orient their selves and provide the planning and direction need to follow a route (Nielsen, 1999). The navigation metaphor makes digital media usable by connecting the user to the media through imagination and work by associating the image schema presented to answer the questions of location (where am I) and fulfilling the need of a demand (where can I go).

We must understand, however, that there is no real-world movement in digital media. There is no movement of "self" nor is there a "change of location" when a user "goes online" or "travels to a new page." The only connection we have with computers, digital media, and the internet is made by our actions through the physical devices we interact with through the monitors or display screens, which present to us the information we seek in digital media. There is no "turning of the page" as with a real book or manual. There is no real "retrieval of files or documents" when we open a new document in an application. These actions are all extensions of perceptions based on metaphor that create a symbolic representation analogous to the original concepts so familiar to us. Yet, we still navigate in cyber space. We pilot our craft (our cognitive selves) to explore new worlds in digital media by finding the extraordinary (hyperlinks in image schemata) in the concrete (as

road signs). Only then through the process of ingenium, manifested in metaphor and language, do we associate our actions as real.

The navigation metaphor is founded on the concept of human action where we determine what our position is and the acts of planning and following a route. Through the Web interface and with the aid of image schemata, we map a target concept to a know source concept of navigation.

The Web interface – the Target domain

The primary means of navigation in digital media is with hyperlinks presented on a web page as image schemata in the form of icons, directories, and menus. These schemata convey more than the connections suggested by the image or text they become the elemental projections from a source concept, of a 'road sign', that we come to associate with a target concept of 'navigation aid' in digital media. As a metaphorical element, image schemata become the conceptual images of navigation within digital media thus are perceived as the fundamental means of negotiating a path or course to reach a goal. That is why actions such as "moving the mouse pointer on hyperlinks and clicking the mouse button is considered navigation" (Hochmair and Lüttich, p. 237).

As stated earlier, icons, directories, and menus are the main components of the target concept and become the primary means of visualizing navigation in a Web interface. These components are the symbolic means of accessing digital content through hyperlinks, and they are the attributes used to connect a user to source elements in the metaphor. Image schemata evoke in the user the perception of navigation by using familiar images or structures to create in the user a connection with and thus a

relationship to the source elements of the metaphor.

When we speak of “going to a new page” in digital media, we are expressing a metaphorical conceptualization of navigation. The source concept of “going to” is a bodily experience which shapes our experience of the target concept of “new page.” The target element of “new page” is a space which has depth and location. By conceptualizing our body “going to” this location we “travel” to this space by means of “piloting, directing, or guiding” to explore or find information in this space. Therefore, we metaphorically navigate to a new location.

One thing to understand about digital media is the actions used to interact with these hyperlinks are the perceived means of navigation but are not navigation. These actions, include clicking a link, scrolling, dragging a control bar or selecting from a menu, are related metaphorical concepts but are not navigation. As metaphorical expressions, these actions contain their own attributes that when combined with expressions of the navigation metaphor project the act of navigating.

An example is when we use the term “link” to express a connection to another site. A “link” is a metaphorical concept in that as a source concept it references a physical connection between two items in the real world, i.e. a link in a chain. As an abstract or target concept it references an arbitrary ‘connection’ made between two abstract ideas. Metaphorically, this shapes our experience in digital media by providing an image of an association, a connection, through a “link,” to another location.

Metaphor structures our experience in digital media by drawing attention to the similarities between the source domain and the target domain. The navigation metaphor does this in digital media in a way that creates in the user the experience of travel with

the Web interface metaphorically depicted as a landscape. This power of metaphor to create in a user the understanding of a virtual environment and instill the feeling of familiarity in that environment is achieved through the process of transference in ingenium through the image schemata. What the user gains is naturalness in their interaction with digital media based on a familiarity with everyday events in the physical world (Dourish & Chalmers, 1994).

Navigating the Web interface

The Web interface is the portal for all interactions in digital media where the modes and means of navigation are represented by image schemata and semantics. At a basic level, these images enable us to connect our actions to our goals by mapping the target concepts to known source concepts of navigation in the real world. As a metaphor, navigation has many more implications. How we use it isn't just a simple action; it's actually part of user experience; it's part of an argument; it's part of the meaning we're making in the Web interface and so it has far greater impact than simple ease of movement.

Through the Web interface, navigation builds an overall experience for the user by interacting with other metaphors on the interface to build meaning and create an argument for a site. Thus the user's experience is enhanced by the perception of the image schemata as more than a connection to information, the images become a message, an argument for what the site represents. As an example, the 'WaterLife' web site is based on a water metaphor where movement on the interface is reminiscent of water

flowing in a lake. One view then is of navigation as a process of floating from point to point as if one was drifting in a boat or flowing with the current.

Understand though, that the Web interface enforces the metaphor but is not the metaphor. The interface becomes the argument that is shaped by the different metaphors interacting on that site. These metaphors shape the users experience of the site to create in the user the feeling of familiarity and acceptance. The experience is not just about ease of movement, it is about the cognitive activity of ingenium and the power of metaphor to create in a user the understanding of this virtual environment in relationship to our human endeavourers.

Metaphors build the framework for our everyday actions that eventually become our habits. Once a metaphor such as navigation becomes accepted and in-grained into our actions, it takes on the equivalence of a natural condition. This condition is a product of familiarity that, over time and use, takes on the qualities of an intuitive act. By appearing as a keen insight, an intuition makes our actions seem spontaneous and natural.

Through the prevalent and pervasiveness of navigation in digital media, the nature of our actions becomes unquestioned, to the point that these acts are not just intuitive, but doxa. We don't even think about how navigation works or what it does for us and to us or why we use it; it just is. Doxa, as Pierre Bourdieu (1977) describes it, is "that which is taken for granted" (p. 166). By taking something 'for granted' the experience becomes an unquestioned truth. We are so conditioned today to perceive the hyperlinks displayed on a Web interface as navigation that the metaphoric connections become irrelevant. We don't even question how it works or why it is there; it is just accepted that it is what is used.

As digital media evolves, and the modes and means of navigation change, the navigation metaphor will remain as a constant presence to guide users by suggesting analogous, "real-time" experience developed through a cognitive understanding of the media. At its basic level, navigation creates for the users the ability to move, to orient them-selves and to project a course of action. At a deeper level, navigation is adaptable by creating an experience, an argument, and a meaning in the Web interface. At this level, the navigation metaphor provides us the ability to complete a task without knowing the underlying principles or operations of the media (an abstract concept.) Boroditsky (2003) explains our ability to connect to abstract concepts as, "a hallmark feature of human intelligence is its adaptability, the ability to invent and rearrange conceptions of the world to suit changing goals and environments" (p. 65).

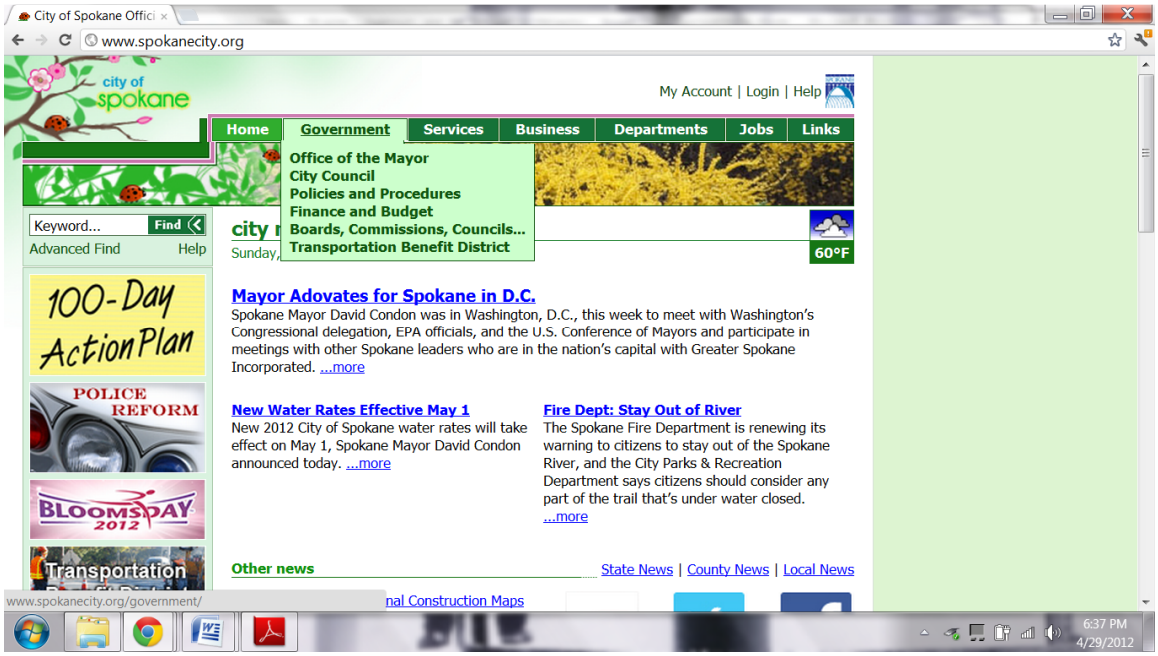
In digital media and human computer interaction (HCI), the use of the navigation metaphor is a widely used concept for what it means to interact in a digital environment. Through an analysis of the concept of navigation as a manifestation of the cognitive process of ingenium, we come to understand such abstract concepts as HCI as something having substance and about which we can reason. Ingenium provides the cognitive ability for us to understand our actions in an environment with which we cannot physically interact. The power of metaphor to make connections between the real world and the abstract then lies in the power of ingenium as the art of invention.

Analysis of current web design

To show the power of the navigation metaphor in digital media, I examine three web sites with varying navigational means, elements, and structures. Rather than analyze every element on each web site, I look at the metaphorical perception of each site with

respect to navigation. What is the experience that is created? What are the relationships and the connections people are making in this site? How does the site convey the navigation links? What are the image schemata being exploited? Does this site use imagination well?

City of Spokane http://www.spokanecity.org/

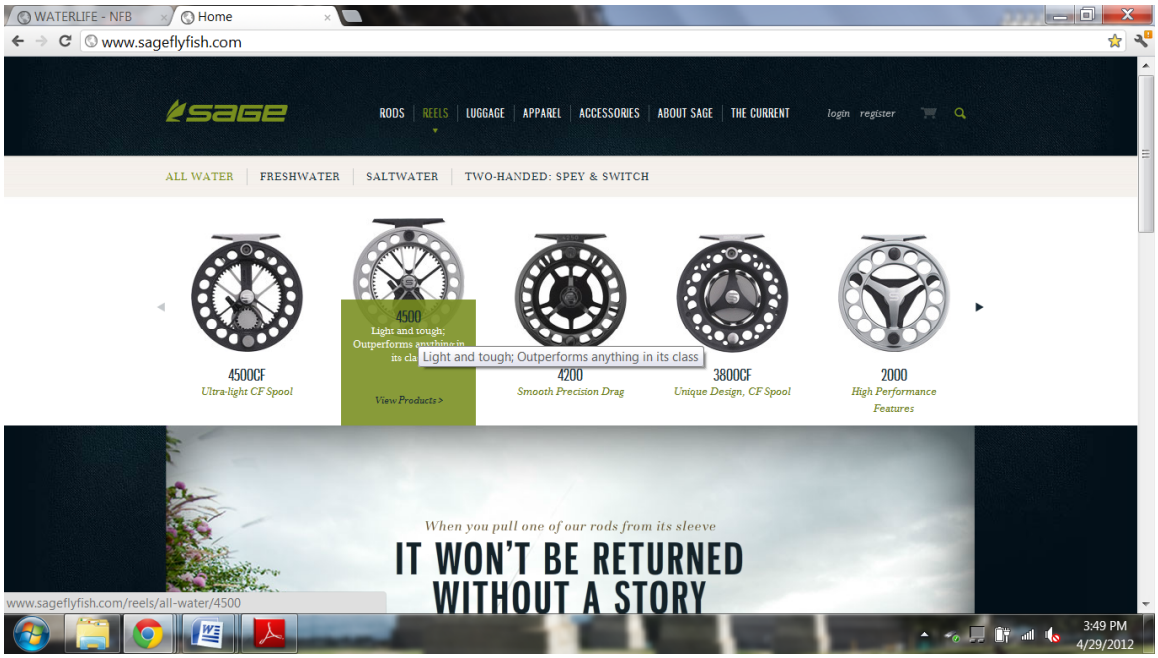


I picked the City of Spokane site as a typical example of a traditional navigational design. This web site is information intensive with almost every item on the first page being some form of hyperlink. The first impression is as a *gateway* to other pages, not as a 'home page' where you can rest without interruption. The 'gateway' metaphor evokes the desire to go 'somewhere' else, somewhere other than here. Therefore, navigation is everywhere, making the experience of the Web site hectic and not very engaging or clear. I liken this site to being on an LA freeway at 80mph and having to decide on an exit from a list of 10, all of them coming upon you at the same time.

To navigate this site requires the user to explore almost every element on the page before making a choice. The types of image schemata used are typical for most web sites today (main menu and left side bar) including images and hyperlink texts. What makes this site difficult is that the semantics of most of the links is not easy to decipher nor are they clear in building a connection to other information. In this respect, this site does not answer the question “where can I go from here?” very well. Metaphorically, it would be better to have a broader category to direct the user to such areas as 'City Business' and 'City Services' with most of the links listed under these labels.

Imagination wise, the source-target concepts of navigation are basic but simple to discern. Where ever the cursor is placed there is a ‘portal’ to another page supporting the transference of a target concept of ‘directing or guiding’ the user to a source concept of ‘new site.’ As for enhancing the user experience, the navigation metaphor is clearly not used well.

Sage fly fishing http://www.sageflyfish.com/



The Sage Fly Fishing site is a better example of intuitive navigation. The navigation metaphor is more in play here than in the first site analyzed. While still maintaining some of the navigational features of a traditional site, such as a menu bar and obvious hyperlinks, there are navigational target elements that have an intuitive feel and appeal.

To start, the first impression is of an experience of 'fly fishing' and of 'being there.' The underlying metaphor evokes a *location / moment in time* concept as the source-target pairing. As such, this site appeals to a user to 'come join us in the moment' through the association of the image schemata and links presented. This experience is reinforced by the images that scroll through the screen at a moderate pace depicting different locations with a 'sign' (link) in the image saying 'learn more' enticing the user to explore the site.

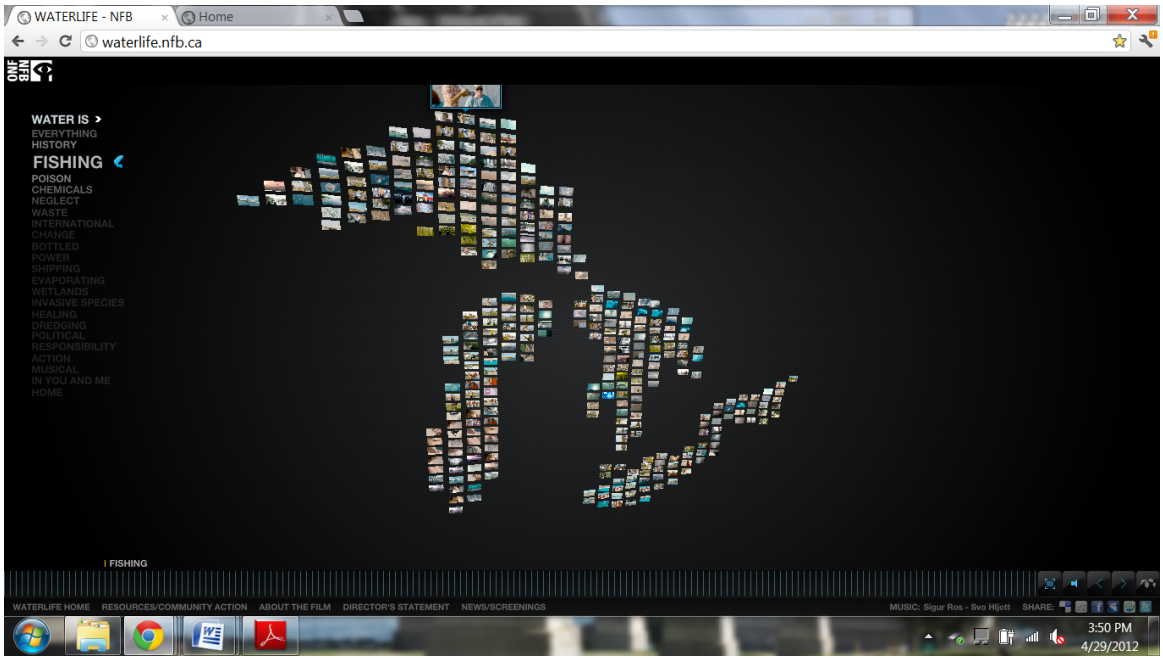
Other navigational elements creating motive and purpose in this site include the organization of the navigation aids and the images used to connect the user to the

different locations. The limited choice of options focuses the user's attention to specific locations within the site, connecting the user to the different pages, such as the equipment needed to 'join in' or to the experience of 'fishing the world.' By simplifying the connections a user needs to sort through the site, the navigation metaphor increases the cognitive recognition and appeal of each of the navigational link. This simplicity makes the navigation more intuitive to the user by making the links more recognizable.

Another element that connects the user is the images of the products available, i.e. the equipment needed to 'join in.' These images increase the cognitive connection of the links by forming an instantaneous connection to items familiar to the user. All of these elements combine to work within the navigation metaphor to build a cognitive model for interaction in this site.

By using visual elements and simple text, the navigation metaphor works with the 'fishing' metaphor of the site to create an image, a conceptualization of this site as something familiar, something coherent, 'the fishing experience,' to enhance the users experience in this site.

Waterlife: The story of the Great Lakes http://waterlife.nfb.ca/



The Waterlife site is the most interactive and intuitive site to use, navigation wise. The overall metaphor of this site is *Water*. The *Water* metaphor influences all aspects of the site, especially the navigation metaphor, by creating an experience of flow within the site. Navigation then becomes the flow of the elements to connect the user to the argument of the site.

The first page is an overview of the story with only one option, enter the site. However, once a user has entered the site, the metaphor of *water* takes over. Everything has a feel of the gentle flowing of water, immersing the user in the experience and thus structuring all aspects of navigation. From the center image; representative of the Great Lakes and made from small pictures; to the lower navigation image, that when the cursor is moved through it rolls like a wave; or the left menu labeled ‘water is’ where the links

rolling into place underneath; the navigation metaphor is part of the overall experience of water.

The source-target connection is enhanced with clear semantics, images, and the interconnectedness of the navigational links. Beginning with the left menu, the link labels finish the sentence of 'water is' (fishing, change, political, etc.). Another metaphorical connection is made when the user selects an option from the left menu, the same option will be highlighted in both the center image and the lower menu bar. This illustrates the connectedness of the navigation images and provides for the user the keenness and depth of perception of the association of these elements. Although these images are different, they are the same.

The overall effect reinforces the association of the target elements (as a path or stream) to the source elements (directing, or guiding) and enhances the cognitive perception of the navigation metaphor as a creative activity rather than a connection to a new location. This site invites exploration through this connectedness

Another feature that makes this site appealing is that the user remains on the main page. In other words, the background remains the same for any link selected producing the effect that the user remains in one place while information "flows" to the user. Each new segment is "built" in front of the user in a dynamic way that produces the feeling of remaining stationary.

This all adds up to making the navigation metaphor more effective in connecting the user to the site through the relationships, the similitudines of Cicero, created in imagination and ingenium. The metaphor of *water* structures the whole experience of this

site and influences the perception of the navigation metaphor as an integral component of the experience.

Summary

The sampling of Web sites presented here provides a wide range of digital media navigation currently available on the internet. These Web sites show the range of navigational elements and design currently used in digital media. The power of the navigation metaphor in each of the Web sites is dependent on how well the associations created by the image schemata are in creating the connections necessary to express their functions. In other words, are the connections clear and instantaneous and do they create a connection with the user?

Other factors affect how well the navigation metaphor works in each site including does the navigation metaphor integrate with the metaphor of the site. How well does the navigation metaphor build a cognitive model for interaction in the site? Being a relatively new medium, digital media is still developing new methods of navigation that may eventually lead to the interactions becoming "natural and realistic."

Conclusion

Web navigation is a cognitive process and an essential component of digital media in that it provides a means for the user to explore an information space without understanding the underlying processes of digital media. As a component in digital media, navigation includes the events that happen from start to finish of an exploration on the Web. As a metaphor, navigation is an essential part of digital media in that it creates a

greater experience beyond exploration in a Web interface. Navigation is the total experience, the argument and the meaning a user encounters in a Web interface.

While navigation is talked about in Web design and Web sites, I found only one study of navigation as a metaphor done by Hochmair and Lüttich. These authors focused their study on a rationalist perspective based on axioms and proofs. My research on metaphor showed that metaphor was a manifestation of ingenium and as a conceptual element, fundamental in creating knowledge of our world.

To understand navigation as a metaphor then, I looked at metaphor from a Humanist perspective rather than from a rationalist point of view. As a humanist / experientialist element, the navigation metaphor relies on previous experience and knowledge to create a connection with something new. Based on our bodily experiences, navigation as a metaphor becomes an internal event rather than an external deduction.

The power of metaphor lies in its ability to connect the unknown to the known through the process of ingenium. As a cognitive process, "ingenium finds relationships between inner experiences, which are then moved externally into language by metaphor" (Graham). As a manifestation of ingenium, metaphor expresses the connections made in ingenium through language and words. In so doing, metaphor works through ingenium's elements of imagination and image schemata in order to create the connections necessary to develop understanding and knowledge of our world.

Ingenium provides the creative insights into our world and connects us internally to abstract events outside of our bodies. Based on our experience, these insights are the foundation of our knowledge of the world. Ingenium therefore, provides the cognitive ability for us to understand our actions in an environment with which we cannot

physically interact, by interpreting what we see and experience into something we know and understand.

In digital media, metaphors enable us to understand something virtual that we have no physical interaction with, and yet are portrayed as real. By establishing a metaphoric connection to the activities in digital media we are able to create an understanding of that world to the point that our actions becoming intuitive, unquestioned and eventually doxa. The power of metaphor then becomes the means to connect with what is imaginative and artificial and make it appear as natural, real and understandable.

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