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A Theory of Metaphors in Information Technology

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Without metaphor there could be no software and no theories of mind. - Tim Rohrer

Abstract

This paper offers a philosophical analysis (rather than an empirical study) of metaphors in connection with information technology. A tripartite typology of metaphors is presented along with an explanation of their role in information systems and related fields. A metaphor may be (1) a figure of speech, (2) a symbol for something, or (3) a semi-metaphor, a comparative verbal or visual device that is, for all practical purposes, self-explanatory, and hence relies less on imagination or aesthetic intuition for its effect. It is suggested that the impact of a metaphor on an individual is similar to experiencing a gestalt. The field of IT is rife with metaphors; many examples are discussed or categorized in connection with the theory introduced below. This theory can have an influence on how best to create metaphors which facilitate greater understanding of what a product can do with respect to developers, new users, and customers.

Types of Metaphor

Figure of Speech

A literary metaphor may initially be defined as a figure of speech containing a word or phrase that makes either an implicit or explicit comparison; greater subtlety carries greater literary force. A metaphor operates by applying a linguistic unit that ordinarily designates or applies to one thing and redeployes the description to something much different. This mental process suggests an overlay or amalgam of images and concepts. Thus a phrase like “my marriage is just a sea of troubles” implicitly evokes the feeling of woe from being in a threatening, turbulent, and engulfing sea, where it is hard to get one’s bearing. The more straightforward metaphor in All the world’s a stage invites us to think of the human situation as involving role playing similar to the theater, possibly with a scripted destiny. In this example, we have the artistry of a nested set of figures of speech, for the word stage is itself a metonymy for theater. Because metaphors are so striking and common, many writers (carelessly) use the term to signify almost any figure of speech. Most commonly, a metaphor contains a term or phrase that is applied to something to which, strictly speaking, it ought not to be applicable; the intent, of course, is to evoke an incisive mental image. Naturally in the course of time, if a metaphor is overused, the keenness of the original metaphor may become dulled and less appealing.

Metaphors consist of two parts known as the tenor, which is the object to be described, and the vehicle, which is the rhetorical phrase making the creative comparison. The tenor is the subject of the comparison, while the vehicle is the predicate. The structure of an explicit metaphor is generally of the form: Tenor + Verb (optional) + Vehicle. Metaphors are valued not only for their emotional weight but also their great suggestive and explanatory power--this latter function renders them especially advantageous in IT.

Symbol

Common parlance extends the meaning of metaphor further: it has come to denote any token of some other entity comprehensible by imagining similarities or, simply, a sign of some other phenomenon irrespective of similarities. For instance, a syndicated newspaper columnist (Lawrence) commented on House Speaker Newt Gingrich’s prime time TV appearance and "President Clinton’s conspicuous absence: ‘It was a metaphor for the shift in control of the political agenda to congressional Republicans,’ said William Connelly . . .” Here metaphor seems to mean an indication or symbol from which we can infer something below the surface appearances of a phenomenon.

Investigating the subsurface referents of a vehicle is, in fact, a tool employed by anthropologists to recreate the mythology of primitive cultures. For instance, the ritualistic metaphors surrounding the wearing of animal costumes in male initiation rites is interpreted as reliving ancestral hunting and being the prey of wild beasts (Anonymous)

Semi-metaphors

In this type of metaphor, the demands on the audience’s imagination are much less, for the metaphor is practically self-explanatory. Normally full metaphors require more imagination to appreciate and understand them. In semi-metaphors there are verbal or pictorial clues. There seem to be three varieties of semi-metaphor.

Purely verbal. Frequently, the word ‘virtual’ precedes the metaphor’s vehicle, as in ’virtual machine.’ In a virtual machine system each of many users of one computer can imagine being in command of a single machine all to him/herself and act
accordingly. Here is a case where a metaphor is potentially misleading. Before hearing this explanation, the intended audience could have fancied that something "unreal" is being used as a computer—the details, however, would still need to be forthcoming for complete comprehension.

For most people in the IT field, aware of what "virtual" usually signifies, this did not have to be explained. However, certain semi-metaphors like virtual storage and virtual memory (note the metaphorical nesting) may require some technological explanations, but the value of the metaphor is that the explainer does not have to start at ground zero.

**Mixed origin verbal.** Some metaphors attempt to explain themselves by combining literal or non-literal verbal components into one semi-metaphor, for example, freeware, software that is, of course, available free of charge.

**Non-verbal.** The most common non-verbal metaphors are visual. Langham refers to a "conceptual visual [which] is 'a picture that encapsulates the essence of a concept'" or, one can add, not just the essence of a concept but of an entity or even a process. In IT, the most striking example of this is the use of icons in graphical user interfaces. A good example of a semi-metaphor is the virtual desktop. Normally, it involves a pictorial semblance of a desk (perhaps with blotter and trays) and icons (visual, self-explanatory metaphors) such as folders and trashcans (though this screen picture is not a perfect semi-metaphor, since we do not usually have trashcans on our actual desktops). The trashcan icon is intuitively suggestive of disposing things like files, and that corresponds well to deletion, but in some GUIs the trashcan is also used for ejecting disks. That presents a nightmarish dilemma (see Rohrer) for those users unaccustomed to this defective semi-metaphor. Intuition and experience lead us to think of the trashcan solely for deletion, not harmless removal. Thus in IT and elsewhere, a metaphor should be field tested so as not to be counterintuitive.

**Philosophical Considerations**

Certain purely philosophical points are worth considering. These involve mainly deeper conceptual matters, especially, non-literary and even ethical issues.

1. **Since metaphors attribute something that is not literally applicable, are metaphors factually deviant, linguistically deviant, misleading, or even lies?**
   
   A piece of accepted wisdom about language is that literal utterances are immediately clear at least to those who understand the words and context. However, we actually resort to metaphor to enhance clarity and draw on images to be created or recalled by the audience. The metaphoric phrase is the preferred vehicle to stimulate communication and is expected not to be naively taken at face value. The wielder of a metaphor, of course, hopes that it will be a more effective mode of truthful expression, given the circumstances in which it is used, than a more literal alternative.

   In a sense, even the words we now regard as literal are former metaphors, as revealed by their etymology. For example, a "program" in ancient Greece was a public notice or list. Now, through a nonliteral progression in usage, it has come to mean a list of instructions to be carried out by a computer.

2. **Where does the metaphorical change in meaning take place?**
   
   The import of a metaphor is actualized in the experience of having the tenor and vehicle snap to one as in an overlay of two or more images. Consider the phi-phenomenon, where, for instance, a rapid succession of still pictures is interpreted as a motion picture. Our perception of this movement emerges not from a sequential processing of isolated pictures, but from a merging or overlapping of images. This type of perception of motion is really an emergent quality of our perceptions. Just as the mind does not preoccupy itself with the isolated stimuli presented by physical perception, but creates a whole new field for organizing the stimuli; so metaphors are understood by the mind's suddenly merging relevant images and feelings into a new field (analogous to a Gestalt). This process perhaps repeats a mental operation learned and performed in the past when confronted by other metaphors.

3. **What is the relation between metaphor and ordinary comparison?**
   
   When one realizes the similarity (not necessarily objective) between two things, there is often an "ah-hah" experience. The realization of the art and aptness of a metaphor thus enhances the whole communicative experience intellectually and emotionally.

4. **Why use metaphors?**
   
   We often try to use words in a nonliteral way (a) to achieve an effect beyond the range of ordinary language, (b) to save writing or saying so many words, when an idea can be communicated in an imaginative, concise manner, (c) to cause the audience to see something in a new light, or (d) to achieve elegance. Such desiderata no doubt lie behind the use of icons in software, when more straightforward dialogue boxes might also be used.

   Metaphors guide theory creation in several research areas. Tubes of force were enlightening to Faraday in explaining a magnetic field. Kuhn employs a metaphor for what he calls the endeavor of "normal science," namely, solving a puzzle. The same might be said, incidentally, for software design. A great deal of computer research has been guided by the thinking machine metaphor. Metaphors are, moreover, valuable guides to practice. Consider the "virtual conference," which might take the form of an active web site. Conference "papers" could be made available to all participants just as is the case with a physical conference, except they would be primarily in electronic form. Thinking through this metaphor and finding other similarities to a physical conference, the organizers of a virtual conference could permit registrants to log onto the web site at any time during the
conference period, read whatever papers they wanted, and send e-mail comments to authors of the papers, to which the authors could reply. Such interplay could also be publicly posted on a bulletin board, with even greater academic effect, since all registrants would then be able to see and evaluate the interchange. Finally, a registrant could read and react to all the papers in a virtual conference, not just one per time slot. It is characteristic of a successful metaphor that it be similarly fruitful in theory and practice.

IT employs numerous picturesque metaphors such as (only the more unusual ones will be explained): architecture, client, server, thin/fat client, master, slave, filter, critical mass (the number of technology adopters that determines a product's real acceptance), finger (a compute program that allows a network user to pinpoint another user’s public login status), gatekeeper (device for accepting/rejecting communications), firewall, gateway, and (the most famous of all) virus. Some interesting IT semi-metaphors (self-explanatory) not mentioned previously are virtual office, virtual reality, infobot (program that automatically sends a certain category of information via the internet to individuals who so request it), netiquette, and emoticons (primitive pictures constituted of punctuation marks that communicate an emotion in email, e.g., a smiley face consisting of a colon and a right parenthesis).

**Conclusion**

In literature and art a metaphor supplies an enhanced emotional experience; in IT and scientific theory, it provides insight; in IT practice, it supplies a clever imitation of reality by technology.

An already extant understanding of some object (e.g., "desktop"), which because of its familiarity, smoothes the transition of new users to an unfamiliar technology. To achieve such transition, it is desirable for companies to choose metaphors or create semi-metaphors, where there is similarity of use between the tenor and vehicle, not merely a similarity of appearance (as in the case of "Windows"). All too often, in IT, choice of metaphor is governed by marketing appeal. Additional research might uncover (a) which metaphors are most effective in helping users and (b) in inspiring developers as well as (c) exactly how to create effective vehicles for IT tenors.

**References**


Lawrence, J. "AP news analysis: making the most of it," *The Ruston Daily Leader*, Sunday, Apr. 16, 1995, p. 4A.


Rohrer, Tim. "Metaphors we compute by: bringing magic into interface design," found at: http://metaphor.uoregon.edu/ui4web.htm, (as seen on 3-10-98).