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# A Phenomenological Analysis of Media Transition: The Cases of Digital Photography and E-Mail

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## Abstract

This paper examines the transition process that occurs when digital media appear that share functionality with established analog media. New concepts for how the new medium is represented and produced and its functionality and products may all have to be coined. A non-linear change process is presented which highlights the importance of old media metaphors for making sense of new media, processes and representations. Examples from digital photography and e-mail are presented to illustrate how new technology presents us with opportunities to examine our assumptions about artifacts and the processes that produce them and our relationship to our world.

## Introduction

Advances in IT create new media for communication that extend or otherwise alter the functionality of existing media. As the price/performance ratio for computing technology improves, it becomes more economically feasible to create and proliferate various digitally based media to supplant existing media based on analog technology. Because full functional exploitation of a new medium lags its appearance, effects upon human experience are often overlooked or superficially examined. Likewise, the subtle ways that digital products differ from analog may not be apparent.

In many cases, when transitions from old to new media occur, a new medium is described metaphorically, often borrowing terms from one that exists. For some aspects of the functionality, the chosen metaphor may be apt, but for others, it may be inappropriate. Users of the new medium encounter problems when their assumptions based on the metaphorical description of the new medium lead them to unrealistic expectations about its functionality or its products.

Employing a particular communications medium enables users to perform certain functions broadly conceived. At the onset, we distinguish between the communications medium, processes useful in performing the function, and products (artifacts) that result from the processes. For example, e-mail and digital photography are communications media that produce e-mail messages and digital images, respectively, and use processes such as composing a message and forwarding a message and copying an image and storing an image. We wish to explore three broad questions relating to the transition from analog to digital based media by examining the move from photography to digital photography and from surface mail to e-mail.

1. How does the transition from an analog to a digital medium affect the product(s) of the medium?
2. How does the transition from an analog to a digital medium affect the production processes?
3. How does the transition from an analog to a digital medium affect one's experience with and understanding of the communications medium?

More specifically, we examine media transition through the examples of e-mail and digital photography. In these two examples, metaphors from the analog realization influence the introduction and expectation of the digital realization. In addition, the metaphors reveal some aspects of the digital realization's functionality while concealing other aspects. The remainder of the paper proceeds as follows. First we introduce the notion of seriation and the concept of a skeumorph as a basis for tracking changes in technology. Next we discuss the role of metaphor as a conceptual bridge from one technology to another. Then we present our

analyses of digital photography and e-mail. The final section offers our conclusions.

## **The Process of Artifact Change**

### *Seriation*

Archaeological anthropologists have studied the process of change and developed the idea of seriation to track how technological artifacts change throughout time (Hayles, 1999). From this perspective, artifacts are viewed to be a collection of attributes that change over time. A seriation map shows the pattern of attribute introduction, retention and extinction over time. An artifact's change structure takes on a "patchwork" pattern instead of a progressive, linear one. This process of discarding, modifying, and creating attributes occurs in both physical and ideal realms, as an artifact is defined to be a cohesive collection of attributes. When an attribute ceases to cohere with the other attributes that compose an artifact, it falls away.

From a linear model of change, one can imagine that a series of "new versions" of an artifact would produce a clear progression of change and improvement. However, when viewed from a seriation perspective, an artifact's change does not reflect a neat and orderly progression, but rather a pattern of overlapping replication of the traditional and innovation of the new. When an attribute has no apparent contribution to the new version's functionality and yet still is replicated in the new version, that attribute functions as a skeumorph.

### *Skeumorphs*

A skeumorph is an attribute that contributes no functionality in and of itself to an artifact, but rather refers back to a feature that was functional in an artifact's previous technological iteration (Hayles, 1999). Skeumorphs fulfill social and psychological needs to temper innovation by replicating from earlier versions of an artifact, so that innovative change does not

radically jolt one into "the new" without any bearings. The new becomes more acceptable when it refers back to the traditional that it is displacing, while the traditional becomes more tolerable when it is placed in a context where we can escape into the new. A skeumorph simultaneously focuses on the past and future, while reinforcing and undermining both (Hayles, 1999).

Skeumorphs can be physical features or ideas or metaphors. When new artifacts are presented to the public, many times they are described with metaphoric allusions that are grounded in prior iterations of that artifact. These metaphors assist people in their transition to using new technological processes and artifacts. When the new artifact is described using terminology from a prior iteration, this influences one's intent and encounter with the new artifact. The new artifact is initially understood in terms of the old artifact, which both aids in the transition to and adoption of the new medium, and after collective learning about the new artifact, artifact users may discover new functionalities and places where the metaphor breaks down.

When the technological media of an artifact changes, some characteristics of previous media are left behind, others are brought forward intact into the new media, while still others are brought forward in a modified form. In the transition between analog and digital media, an evolutionary learning process occurs where users employ metaphors from the analog representation and process to orient themselves to the novelty of the new media. However, in practice the relationship between analog and digital implementations has some overlapping functionality while at the same time retaining media specific functions that are inherent to either the analog or digital implementation alone. After users acquire experience and competence with the new media, they discover functionalities that point to a slippage of consistencies between the analog and digital media. These discontinuities highlight parts of metaphor that breakdown in the translation from analog to digital media. Although more experienced users of digital media know where

the breakdowns in the metaphor occur, common use of the metaphor still propagates the mistaken entailments to the media user. More accomplished users ignore discontinuities, and cover over the literal meaning of the metaphor while novices may expect the media to behave in the “old” way until faced with a situation which highlights the breakdown.

While being aware of the old certain essential and familiar characteristics as metaphors for the new digital implementation, users can become more conscious of the transition phase, and have a better idea of how to interpret it. When recognizing breakdowns that occur when applying metaphors from an analog to a digital medium, one becomes more cognizant of how metaphors can distort perception, expectation, and information about the digital medium.

### **Metaphor Theory and Technological Change**

Traditionally, metaphors are viewed as concerning language but not thought. They are considered to have no legitimate place in semantic theory because any metaphorical expression can be translated into one that is non-metaphorical. In contrast, contemporary theories (e.g. Gibbs 1984; Lakoff and Johnson 1980; Lakoff 1993) view metaphor as fundamentally conceptual. A metaphor is a cross-domain mapping in the conceptual system that has a linguistic expression as its surface manifestation.

A metaphor conceptualizes one domain of experience in terms of another (Lakoff 1993). Since similarity is a fundamental organizing principle for mental life, it is not surprising that devices such as analogy and metaphor play a significant role in the development of science and for developing technology. Science and technology uses metaphors for introducing terminology where none previously existed (Black 1979, Boyd 1979) and for alluding to abstract concepts that are not amenable to clear definition or separation into discrete dimensions (Lakoff & Johnson 1980). The contemporary

theory of metaphor is characterized by the following propositions (Lakoff 1993, pp.244-5).

1. Metaphor is the main mechanism through which we comprehend abstract concepts and perform abstract reasoning.
2. Much subject matter from the most mundane to the most abstruse scientific theories can only be comprehended via metaphor.
3. Metaphor is fundamentally conceptual, not linguistic, in nature.
4. Metaphorical language is a surface manifestation of conceptual metaphor.
5. Though much of our conceptual system is metaphorical, a significant part of it is non-metaphorical. Metaphorical understanding is grounded in non-metaphorical understanding.
6. Metaphor allows us to understand a relatively abstract or inherently unstructured subject matter in terms of a more concrete, or at least more highly structured subject matter.

In many ways, metaphors function as skeumorphs. Metaphors are used to describe new products and processes that accompany the change from an analog to a digital medium; there is no terminology for new technological products and processes that are typically very abstract. Since their functionality bears a strong resemblance to analog technology they are replacing, it is not surprising to find that terms from the old technology are used to describe products and processes of the new. An analysis of the metaphors that accompany such a technological change provides us with a vehicle for understanding the way that new technology is conceptualized. Furthermore, when metaphorical entailments are inconsistent with the characteristics of new technology, we have a basis for understanding some of the mishaps that may occur when the technology is put into use.

### **From Photography to Digital Imagery**

A photograph holds a particular relationship with the world since it is formed by a trace registered from light waves reflected by objects.

As such, it provides a means for people to refer to some event, some slice of space/time. The folk understanding of a photograph is that it provides evidence of “reality.” Digital photography threatens many of our implicit assumption about photography.

Scitex is a brand name that's become a catch all term for computer retouching systems. These systems have changed the way that fashion magazines retouch color photographs. Before, retouching was a time-consuming process, involving hand painting or airbrushing the color transparency or print and re-photographing the photograph. It could take days, even weeks. Now an art director can have changes made overnight. If a change doesn't suit, it can be undone. Because with the computer, none is fixed, all is flux. (Tannen 1994)

Digitizing a photograph and then altering it jolts our conception of the credibility of photography (Mitchell 1992). This enables the advertiser to manipulate our self-concept and desires, the journalist to manipulate our interpretation of events, or the artist to activate our imagination in new ways. Digital imagery produces products that are indistinguishable in appearance from photographs. However, the technology differs in some critical ways. Each successive copy from an analog photograph loses some information from the original. With digital imagery, the nth copy contains the same information as the original. Manipulation of a digital image by altering dimensions, tint, hue, erasing parts, adding parts, and rearranging the components is very easy. Not only are the original digital image and its nth copy visually indistinguishable, but the nth copy can be manipulated in all of the ways that the original can.

Problems arise because the term photograph is used metaphorically for the image produced using digital technology. A professional photographer for the Oakland Press in Pontiac, Michigan, indicated that he refers to both images produced photographically and digitally

as “photos” or “pictures.” We also refer to “taking pictures” with a “digital camera.” Successful communication requires that participants share a common ground that includes an understanding about the conventions and a context for the conversation. Photographs can fulfill a reporting function, capturing and communicating visually what the photographer witnessed at some time and place. For the reader of a fashion magazine who thinks of the digital image as a photo realistically representing the appearance of a model, the Scitex-doctored image is deceptive by violating the common ground assumptions implied by the photograph metaphor. It omits relevant information such as minor blemishes, gaps between teeth, etc. Some relevant information is omitted and some is altered. This process of factoring out the “noise” in an image and highlighting the “signal” creates an ideal or “hyperreal” artifact (Borgmann 1993).

The use of digital imagery can produce creative expression and expanded meanings by allowing the image creator to play with our concept of reality. The ease with which these sorts of images can be created raises issues of journalistic ethics. Training the public to distinguish between images which report and images which are enhanced or constructed will become an information literacy requisite. Journalistic images that are doctored are supposed to be labeled “photo illustrations.” However, as the line between news and entertainment blurs, it may be difficult for the ethical journalists to determine when to apply truth in labeling, and easy for the self-interested deceiver to avoid it.

Clearly informing the populace about the context and level of image manipulation applied to editorial content will become crucial in a world where referential commonality has been splintered and visual imagery has become so malleable. Without this assurance, trust between people and institutions will further erode just as lying in other forms erodes trust or as counterfeit money devalues real money (Bok 1978). Not being able to depend on the accuracy of the images one encounters weakens

self-confidence and causes a distrust and suspicion of one's environment.

Shenk (1997) raises the issue of how an individual perceives and at what point one accepts or rejects a proposition. Spinoza (1982) postulates that we understand and accept a notion simultaneously, and only after we have accepted a notion, are we able to "unaccept" it or reject it. This view has been verified by modern psychology. In light of this finding, if people living in an information dense environment are presented with varying levels of manipulated imagery, they may not be aware that they are encountering distorted visual information and thus will accept it as accurate representation of a space-time event. Further, if they do not have adequate means to interpret their visual environment, they will hold phantom images to be realistic representations.

### From Mail to e-Mail

When we use the term e-mail, we are using mail as a metaphor for describing a nearly ubiquitous digital communication function. For those who matured before the wide spread proliferation of microcomputers, the term mail

evokes the first class letter\*. Therefore, mail is understood as a private communication between two individuals. As a written communication, it represents a higher level of personal commitment than oral communication since there is a tangible record of its having occurred.

Electronic mail is one of the most common applications in modern organizations. E-mail shares some features with "regular mail" in that it is a non-synchronous form of text-based communication. Many have assumed that the mail metaphor held in other ways to their detriment. For example, there are implicit assumptions about the privacy of mail. Although it is possible to steam open a letter, read it, and then reseal it, we operate under the assumption that our mail will be opened and read only by the recipient. E-mail differs in that it is very easy to forward a message to a large number of people almost instantaneously. A message that someone intended to be private can be publicized widely in a short time. In addition, because of the relative ease of monitoring computer systems activities, some employers have chosen to monitor the contents of e-mail messages under various guises.

**TABLE 1 Comparison of Attributes for Photography and Digital Imagery**

Attribute	Analog Photograph	Digital Image
Reproducibility	Degradation occurs with multiple copies	No degradation between 1 <sup>st</sup> and nth copies
Verifiability	Physical negative	None
Colors	Continuous blending	Boundaries to where pixels are placed; neighboring pixels influence each other and the viewer's eye blends the RGB dots to produce color
Adding to image	Difficult	Easy through overlay process
Deleting from image	Difficult	Very easy
Modifying and enhancing image	Can digitally enhance photographic printing process with airbrushing and touch up	Easy to blend, edit and modify images, hue, shadow: however, as the number of details in the image increases modification becomes more difficult
Quality of media	Fixed	Fluid and plastic

Another difference between e-mail and “regular mail” is the speed of delivery and the associated capability of carrying on an interchange that more closely approximates oral communication. People often refer to their messages using verbs associated with speech such as “you said” or by calling the rapid interchange of messages “chat.” Frequent misunderstandings and rapid-fire emotional outbursts are not uncommon during interchanges that take place over List Servers. Thinking of electronic communication using a speech metaphor could be a source of misunderstanding when those who send a message expect the recipient to understand their intent to be sarcastic or ironic.

E-mail is a less rich medium than face-to-face speech because it lacks inflections and body language for communicating intent. To remedy this, some have suggested the use of “emoticons” and abbreviations; symbols especially designed to communicate the intent or mood of the message’s author. Some examples look like faces when rotated 90 degrees in a clockwise direction. :- ) means the author is pleased. ;- ) shows a wink of an eye. (It is interesting to note that MS Word automatically replaces a colon followed by a dash and a right paren with ☺) A statement may be preceded with the hedge, IMO, in my opinion to reduce the chance of dispute.

## Conclusion

Technological change includes changes to products, processes, and the way people understand themselves in relation to the tasks they perform with the technology. We discussed change from analog to digital based communications technology using e-mail and digital photography as examples. Consistent with contemporary theories of metaphor analog-based technologies are used metaphorically to describe products and processes of digital technology. Thus we use analog terms such as “mail,” “cc,” “photography,” “photographs,” “taking pictures,” “camera,” and others to describe products and processes in the digital environment.

As a thought experiment, it is interesting to consider the extent to which people are committed to the products they produce in the surface mail world versus the e-mail world, or the photography world versus the digital photography world. E-mail has been touted as a “productivity tool.” Yet how much of our time is spent clicking the delete button to get rid of junk e-mail? What do we have in our “Inbox?” What have we “Filed” and forgotten? Likewise, our new found ability to symbolically possess and process people and places in digital photographs opens up a new world of junk imagery or “eye candy.” Whereas photography has enabled us to parse reality into an infinite number of free-standing time/space slices (Sontag 1989), digital photography allows us to subdivide those images into an infinite number

**TABLE 2 Comparison of Attributes for Surface Mail and Electronic Mail**

<b>Attribute</b>	<b>Surface Mail</b>	<b>Electronic Mail</b>
Disposability	Can destroy	Virtually impossible to destroy
Delivery mechanism	Physical	Electronic
Routing	Untracked	Tracked
Personalizability	High	Low
Retention	Moderately difficult to store and retrieve	Easy to store and retrieve
Forwarding	Rarely forwarded	Unlimited forwarding possible
Copies	Rarely copied	Easy to make unlimited copies
Cost and effort	High	Low

of components that can be individually altered, and then recombined to form a higher order infinite set of image possibilities.

Metaphors from older technology can include entailments that are unconscious or unexamined, but nevertheless shape our expectations about the use of new technology. Just as learning a foreign language or experiencing another culture leads to viewing one's own language and culture in a new light, encounters with new technology conceptualized metaphorically in terms of the old forces one to examine the entailments of the older technology. For example, mail metaphors include assumptions about privacy and property values and photography metaphors include assumptions about the veracity of images. When confronted with the possibilities of these new technologies, we are forced to re-examine many of our comfortable assumptions about our relationship with the world.

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\* In cognitive psychology, current theories of categorization suggest that people identify categories in terms of prototypes. A prototype is an exemplar that best represents a category. The first class letter is a good candidate for prototype for the category of mail as is the "snapshot" for the category of photograph. See Lakoff 1987 for a discussion of categorization and Rosch and Mervis 1975 for a discussion of prototypes

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