

Information and the Experience of Wonder

A Rhetorical Study of Information Design

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Abstract

In the last two decades, emotion has emerged as an important theme in discussions of design. However, there is no framework to date that encompasses both emotion and information design in a single theory. This dissertation was motivated by a lack of substantive theory that would allow design researchers and educators to model the relationships among information artifacts, audiences, and designers in specific contexts. This demand for work in this area also calls for a reconsideration of the current scholarship of information design by shifting its focus from objects to people, from technical rationality to value-laden human communication, from efficiency to holistic experience and effectiveness.

Through examination of existing views about information design and the nature of information, this work advances the idea that information can be better conceptualized as a medium in which designers have the ability to influence situated and value-laden human actions, as well as a medium in which designers can be influenced by situated human actions. This conceptualization of information as two-way mediation between designer and audience allows us to reconsider information design as a meaningful social activity, of which designers are an integral part.

This research consists of two parts. First, it proposes a framework called Modes of Wonder that allows designers to model an audience's emotional experience in relation to information artifacts. Through examination of four thematic variations of wonder (wonder, astonishment, amazement, and sublimity), Modes of Wonder provides a meta-language that is able to model one's emotional experience in relation to information artifacts. Furthermore, it may be used by designers in the planning process when solving a design problem, and by educators as a tool for critique.

Second, this research presents a Point of View framework, which allows us to describe design strategies used for creating information artifacts. While Modes of Wonder, in Chapter 3, focuses on the relationship between information artifacts and audiences, the Point of View framework in Chapter 4 – which includes person, perspective, mode, and principle as the primary frames – illustrates the relationship between information artifacts and the designer who has created a specific response to a particular design problem. In order to demonstrate how these two frameworks can help us uncover plausible design strategies in a particular context of information

design, I examine three cases of information artifacts that respond to specific design problems through use of the thematic variations of Point of View and Modes of Wonder as conceptual tools for analysis.

This research makes the following contributions: it provides a theoretical framework that models the relationship among information artifacts, audiences, and designers in specific contexts. Specifically, Modes of Wonder allows design researchers and educators to articulate the relationships between information artifacts and audiences. In turn, the Point of View framework provides an approach for modeling design strategies that are often implicitly used by designers to create information artifacts aimed at producing a particular emotional effect for an audience.

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Chapter 1

The Problem of Information Design

Introduction

In the last two decades, emotion has emerged as an important theme in discussions of design. Central to this idea is the notion that emotions play critical roles in the way that humans interact with information, products, and the surrounding environment. Human factor analyst Patrick Jordan argues that usability based approaches are limited because they regard products merely as tools and users as cognitive and physical components of a system. For Jordan, products are living objects with which people have relationships, and which can make people happy, sad, or anxious.¹ In addition, Donald Norman approaches emotions as human attributes from three different levels, which are visceral, behavioral, and reflective. His framework provides different ways of shaping one's emotional experience of a product and the implication in the creation of a product that can evoke specific emotional responses from the user.² As discussed above, it is significant to take into account the emotional aspect of design when creating any information artifacts and products in context because of the shifting focus of design from objects to people (Jordan 2002).

Despite the increasing interest in developing frameworks, techniques and methods for emotion research in design related fields, such as communication design, product design, and human computer interaction, discussions of emotion have not been fully integrated into the domain of information design. There have been numerous articles and books on information design, but none of them shed light on the emotional aspect of communication, or more specifically, on the emotional connection among information artifacts, audiences, and designers. Existing literature on information design discusses issues that are related to its cognitive aspects (Frascara 1997; Zwaga et al. 1999; Albers and Mazur 2003) or focuses topics on a compositional level (Pettersen 2002), such as making the complex clear, efficient, or attractive. A unifying theory of information design that encompasses both cognitive and emotional aspects of information design is needed

¹ Patrick Jordan, "Human Factors for Pleasure Seekers," in *Design and the Social Sciences: Making Connections*, edited by Jorge Frascara, 9-23. (London: Taylor & Francis, 2002). 11-12. See Patrick Jordan. *Designing Pleasurable Products: An Introduction to Human Factors* (London: Taylor & Francis, 2000).

² Donald Norman, *Emotional Design: Why We Love (or Hate) Everyday Things*. (New York: Basic Books, 2003).

at this time in order to better examine how the audience experiences various kinds of information artifacts.

This research is motivated by a lack of substantive theory that would allow design researchers and educators to model the relationships among information artifacts, audiences, and designers in specific contexts. As the complexity of information design has increased in an inter-cultural and global environment, I argue that there is a room for a theoretical framework that will help design researchers, practitioners, and educators articulate the complex relationship between information and emotion. How can we describe the audience's emotional experience to information artifacts? How can we articulate design strategies that are often implicitly used by designers to create information artifacts aimed at producing a particular emotional effect for an audience? These are key questions to examining the relationships among information artifacts, designers, and audiences, and more specifically how they are emotionally connected one another.

In this study, I define information design as *the creation of inquiry through the information artifact that supports human action in response to a specific situation and produces a particular emotional effect for an audience to make a discovery*. This definition will be examined in detail in comparison to other views of information design in the chapter that follows; yet what distinguishes this approach from others is the consideration of information design as a mode of communication that supports human actions in functional contexts.³ In other words, conceiving information as two-way mediations between designer and audience allows us to reconsider information design as a meaningful social activity, of which designers are an integral part.

Conceptualizing information design this way is useful to highlight its close relationship to human action beyond the notion of information graphics.⁴ In this dissertation, I do not distinguish information design from communication design as

³ Among multiple standpoints from which design and the way it is experienced can be described, existing views of information design tend to look at one aspect over the others. For example, the artifact becomes the primary focus from the analyst's standpoint, while the designer's perspective attends to the intent and the process of design, and the audience's perspective illustrates the effect and the experience with information artifacts.

⁴ In this study, I use the term *information design* as distinguishable from *information graphics*. The latter is concerned with the formal presentation of information by making the complex clear. According to Lester, informational graphics (called info-graphics or news graphics) are "visual displays that can be anything from a pleasing arrangement of facts and figures in a table to a complex, interactive diagram with accompanying text that helps explain a complex story's meaning." His definition is built on Edward Tufte's remarks, "the task of the information graphic designer is to give visual access to the subtle and the difficult, that is, the revelation of the complex." Paul Martin Lester, *Visual Communication: Images with Messages*. (Belmont, CA: Wadsworth Publishing; 4th edition, 2005), 176.

two different types of design. Although some have generally considered information design to be a subcategory under communication design (Frascara 2004; Lester 2005), I argue that information design and communication design provide different understanding to communication. This becomes evident when comparing the Latin roots of two verbs, *communicare* and *informare*, each of which means to share and to give form to; communication design focuses on exchanging the meaning between communicators for a better understanding of a particular message, whereas information design is concerned with providing a means to support human actions in order to fulfill a specific function.

As an example, consider a furniture assembly manual. When the content in the manual is readable and accessible, but a person remains unable to assemble the furniture for some reason, such as an important step is missing in the manual, we can say this manual still communicates the message but does not support one's action in a specific context. From the communication design perspective, the primary focus of design is to help the user *understand* the necessary steps and their sequence so as to assemble the furniture. From the information design perspective, the emphasis is on *supporting the user's action* of putting together different parts into a piece of furniture through understanding.

Conceptions of the relationship between emotion and information design

There are three reasons why a framework that encompasses emotion and information is useful to examine the current scholarship on information design. First, as information design has become increasingly complex due to the recent development of interactive communication and network technologies, the role of designers is not merely to create individual images or objects but to create an environment that mediates interpersonal and social interactions. For instance, examples of social media, such as Facebook or Twitter, move beyond the realm of designing symbols and objects to create environments that enable and support diverse activities. In another example – designing for an airport – designing airport signage in a clear and accessible manner is one of the most important concerns of information design. Yet, the way in which the entire signage system and other products enable a traveler's experience to be both comfortable and engaging points

to a different concern of information design beyond issues of usability and functionality.⁵

As these examples indicate, making the complex clear and accessible still remains one of the primary goals of information design; yet there are other goals of information design that make information desirable, engaging, and even persuasive so as to affect people's feelings, thoughts, and actions. Consider the following two road signs as examples. Figure 1.1 shows two different road signs in Montreal; the one on the left is found downtown where the office buildings, big shopping centers and museums are located, whereas the one on the right is placed in the Old Town where historical buildings, small boutique shops and restaurants are located.

At first glance, these two signs are distinguishable from each other in the form that each takes, from typefaces and colors to the icon and borderline on the edges. Considering that both signs are accessible and fulfill the intended purpose of typical signage, why are different forms of signage needed in Montreal? The answer is found when comparing the character of regions in which each form of signage is placed: the sign on the left represents the commercial and contemporary aspect of Montreal while the one on the right embodies its historical and cultural aspect. Each sign emotionally appeals to the person who lives in or visits the city in a different way.



Figure 1.1. Road signs in Montreal, Canada. Downtown (left), Old Town (right). Photo by Soojin Jun

There is a second reason why a unifying theory is needed at this time. As the primary focus of design has shifted from objects to people, this change calls for a different approach to information design that can allow designers to examine the

⁵ The following definitions of information design illustrate its emphasis on the *functional use* of communication: The art and science of preparing information so that it can be used by human beings with efficiency and effectiveness (Jacobson 1999); information design is concerned with making information accessible and usable to people (Sless 1992); information design is preparing communication products so that they achieve performance objectives established for them (Carliner 2000).

relationship between information artifacts to audiences in a particular context, in contrast to information artifacts themselves. In other words, whether an information artifact influences action, effectiveness over efficiency changes the attitudes and shapes the beliefs of the audience (Tyler 1992, 22).⁶

Consider these two ways of presenting information in two charity request letters, which illustrate the different effects that influence a reader's actions. According to a study that was conducted by Professors of Economics and Psychology Deborah Small and George Loewenstein, people are willing to donate more to an individual whose name and personal story are vividly described in detail (Figure 1.2, right) than to a list of statistical data about the hunger situation in Africa (Figure 1.2, left).⁷ These two examples, with their use of a “statistical victim,” versus an “identifiable victim,” demonstrate how different ways of presenting information can affect the way people think, feel, and act, particularly by appealing to the interests or the emotions of people who read the message.⁸

Appendix A. Statistical Victim	Appendix B. Identifiable Victim
<p>Food shortages in Malawi are affecting more than three million children.</p> <p>In Zambia, severe rainfall deficits have resulted in a 42 percent drop in maize production from 2000. As a result, an estimated three million Zambians face hunger.</p> <p>Four million Angolans — one third of the population — have been forced to flee their homes.</p> <p>More than 11 million people in Ethiopia need immediate food assistance.</p>	<p>Any money that you donate will go to Rokia, a 7-year-old girl from Mali, Africa. Rokia is desperately poor, and faces a threat of severe hunger or even starvation. Her life will be changed for the better as a result of your financial gift. With your support, and the support of other caring sponsors, Save the Children will work with Rokia's family and other members of the community to help feed her, provide her with education, as well as basic medical care and hygiene education.</p>

Figure 1.2. Text from two charity request letters that are used in the study applying “statistical victim” and “identifiable victim.”⁹ Recreated by Soojin Jun.

While this study specifically focuses on presenting verbal messages, the text used in the identifiable victim condition is accompanied by a picture of a little girl in

⁶ Tyler argues that the primary goal of design is “to induce action, to educate, to create an experience.” See Ann C. Tyler, “Shaping Belief: The Role of Audience in Visual Communication,” *Design Issues* 9:1 (1992): 21-29.

⁷ The results from their empirical studies demonstrated that these two ways of presenting information have affected the way people take actions by spending more money distinctly. See Deborah A. Small, George Loewenstein, and Paul Slovic, “Sympathy and Callousness: the Impact of Deliberative Thought on donations to Identifiable and Statistical Victims,” *Organizational Behavior and Human Decision Processes* 102 (2007): 143-153.

⁸ In their 1997 paper, Jenni and Loewenstein provide references to the “identifiable victim effect”: “Society is willing to spend far more money to save the lives of identifiable victims than to save statistical victims. This has been remarked upon in treatises on public policy (Gore 1992), in scholarly works (Schelling 1968; Calabresi and Bobbbit 1978; Viscusi, 1992; Whipple, 1992), the medical literature (Redelmeier and Tversky 1990) and the popular press (Toufexis 1993).” See Karen E. Jenni, and George Loewenstein, “Explaining the “Identifiable Victim Effect,”” *Journal of Risk and Uncertainty* 14 (1997): 235-236.

⁹ Texts come from Appendix in Deborah A. Small, George Loewenstein, and Paul Slovic, “Sympathy and Callousness: the Impact of Deliberative Thought on donations to Identifiable and Statistical Victims,” *Organizational Behavior and Human Decision Processes* 102 (2007): 152.

the letter; findings from this research may be applied to other cases where both verbal and visual messages are used. The Girl Effect website is an example where personal stories of individual girls are presented through a movie clip in order to emotionally connect the individual stories to the potential supporters who visit the website.¹⁰

There is a need for a theoretical framework that models the relationship of information and emotion because our understanding of emotion in design has not yet thoroughly been investigated. In fact, discussions of emotion have not been completely ignored in the context of graphic design in that conveying emotional meaning or evoking emotional response is central to the way that we communicate (Rand 1985; Greiman 1990; Neuenschwander 1993; Heller and Ilic 2004).¹¹

However, the emotional effect of a message can be understood in the most reductive sense by associating certain styles of letters with particular emotions that are evoked. For example, calligrapher and text artist Brody Neuenschwander discusses the emotional impact of letterforms by illustrating the fact that childlike handwritten letterforms evoke a feeling of friendliness and fun whereas cool and high-tech styles suggest an obvious reference to technology and modernity.¹² According to Steven Heller and Mirko Ilic, one of the handwritten letterforms, scrawl, can be deliberately used as an emotive and expressionistic component.¹³ There is no doubt that certain forms of information, ranging from typefaces and color to the composition, can convey emotional meanings, yet conceptualizing emotion merely by relating certain styles to particular emotional effects is to constrain our understanding of emotion as a separate component, either *emotional content* that is contained in the information artifact or *emotional expression* that is associated with a specific style (Figure 1.3).

In this study, I propose that there are other aspects of emotion to be

¹⁰ The Girl Effect is an online donation program that encourages people “to end poverty and help the developing world by investing time, energy, and funding into adolescent girls.” <http://www.girleffect.org> (accessed on April 14, 2011)

¹¹ Graphic designer, April Greiman states, “design must seduce, shape, and perhaps more importantly, evoke an emotional response.” See April Greiman, *Hybrid Imagery: The Fusion of Technology and Graphic Design* (New York: Watson-Guipill Publications, 1990), 45.

¹² Neuenschwander categorizes examples of lettering into eight groups, each of which represents a set of related emotions or associations: elegant and sophisticated, friendly and fun, hot and jazzy, crude and violent, nostalgic and historical, weird and wild, distressed and emotional, cool and modern. See Brody Neuenschwander, *Letterwork: Creative Letterforms in Graphic Design* (London: Phaidon Press, 1993), 31-65.

¹³ Steven Heller and Mirko Ilic, *Handwritten: Expressive Lettering in the Digital Age* (New York: Thames & Hudson Inc. 2004), 10-11.

considered beyond a fleeting emotional response; emotion should be understood as *the relationship* of the designer or the audience to the information (Figure 1.4).¹⁴ Conceptualizing emotion as the relationship will be further examined in Chapter 2 with discussions of information in the context of human action. Conceptualizing emotion as one's emotional connection to information helps us to better understand the scope and the potential of emotion that is central to communication.

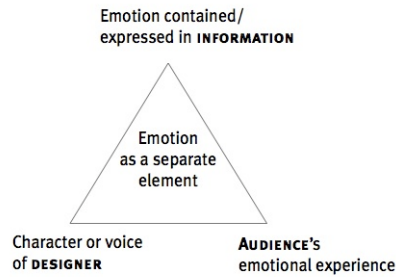


Figure 1.3. Emotion as a separate element

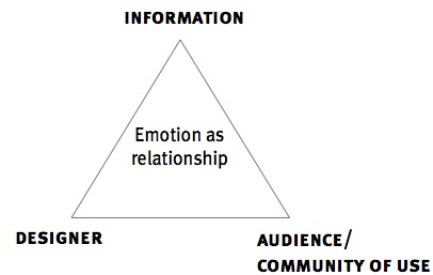


Figure 1.4. Emotion as a relationship¹⁵

In summary, there is room for a substantive theory that encompasses emotion and information design, as the role of emotion is crucial to creating effective communication in our daily lives. Although the role of emotion is central to human communication, there is no theoretical framework that would allow design researchers and educators to model the relationships among information artifacts, audiences, and designers in specific contexts. While this does not immediately threaten design practice, there is a great need to reconsider the current scholarship of information design, specifically as the primary focus of design has shifted from objects to people, from technical rationality to value-laden human communication, from efficiency to effectiveness. Since emotion in addition to information greatly affects our actions and experiences, this dissertation attempts to examine the relationship between emotion and information design.

¹⁴ In this study, I adopt John Dewey's concept of emotion because Dewey's definition of emotion is quite extensive compared with other approaches that focus on a certain aspect of emotion, such as emotion as an affect or emotion as a purposeful behavior. Understanding emotion as a connecting force, I argue that emotions are created by situations — a relationship formed by the combination of objects (information), people, and context. The concept of emotion will be further investigated in Chapter 2.

¹⁵ In this dissertation, I use the term *designer* as an author or creator who collaborates with clients rather than one who merely follows orders from clients.

Significance

Recognizing emotion in relation to action and experience as the central concern of information design, this research makes three central contributions. First, this study provides a theoretical framework that models the relationship among information artifacts, audiences, and designers in specific contexts. While the three components are not entirely new, the problem is the lack of a framework that models the complex relationship among the three. Therefore, I present two frameworks, Modes of Wonder and the Point of View framework, that are useful for design researchers and educators to describe the audience's emotional experience to the information artifacts and to analyze design strategies that enhance the audience's emotional experience in particular contexts.

Second, this study provides a metalanguage that allows design researchers and educators to articulate the complex relationship between information and emotion. Thematic variations of wonder and point of view can be used as a tool for analysis with which an information artifact or a particular communicative situation can be better understood not only to model the audience's emotional experience to the information artifacts, but also to uncover design strategies that are employed in specific contexts.

Third, this study offers an approach for modeling design strategies that are often implicitly used by designers to create information artifacts aimed at producing a particular emotional effect for an audience. The two frameworks that are presented in this dissertation can be employed by design researchers and educators in their analysis of the existing information artifacts; they can be also used by practicing designers in the planning process when solving a design problem, and by educators in the class as a tool for critique.

Overview of chapters

In **Chapter 2**, I examine the conceptualization of information through a review of existing literature on information science, knowledge management and information design. I demonstrate that having various ways of understanding the nature of information leads to different approaches to the practice of information design. After examining two ways of conceptualizing information – information as matter and information as interpretive process – that are commonly used in the literature, I propose that information can be better conceptualized as a medium in which designers have the ability to influence situated and value-laden human actions, as

well as a medium in which designers can be influenced by situated human actions. This conceptualization of information as a two-way mediation between designer and audience, allows us to reconsider information design as a meaningful social activity, of which designers are an integral part.

In **Chapter 3**, I examine two existing views of information design – analytical representation and persuasive communication – which provide useful modes of communicating information; yet, neither of these views explicitly addresses the role of emotion in their model. Through the examination of emotion as a mode of persuasion in rhetoric, I postulate that rhetoric—i.e., the art of invention and discovery beyond an art of expression—allows us to understand the relationship between an information artifact and the audience’s emotional experience, as well as the relationship with the designer.

Chapter 4 proposes the Modes of Wonder that allow designers to model an audience's emotional experience in relation to information artifacts. The examination of four thematic variations of wonder – wonder, astonishment, amazement, and sublimity – explores what is discovered by an audience in its experience of information artifacts: 1) the *existence* of information that differentiates it from others 2) the *construction* of information in a novel and unexpected way 3) the way information *connects* to an audience in the context of use 4) a *transcendent idea* that elevates a common experience into a spiritual one. I conclude by suggesting that each mode is a layer of experience that provides a metalanguage that models one's emotional experience in relation to information artifacts.

Chapter 5 presents a theoretical framework, called the Point of View framework, which allows us to describe design strategies used for creating information artifacts. I examine four thematic variations of Point of View, each of which attempts to answer the following questions: 1) From *whose* point of view is the information presented? (person) 2) *What* are the nature and the scope of the reality presented in information design? (perspective) 3) *How* is the information presented to the reader? (mode) 4) On *what* ground is the belief based? (principle). While Modes of Wonder in **Chapter 4** focuses on the relationship between information artifacts and audiences, the Point of View framework illustrates the relationship between information artifacts and the designer, who has created a specific response to a particular design problem.

In **Chapter 6**, I examine three cases of information artifacts – Titanic the Artifact Exhibition, David Macaulay’s books, and the *I Like Seoul Campaign* – that

respond to specific design problems through the use of the thematic variations of Point of View and Modes of Wonder as conceptual tools for analysis. The goal of this chapter is to demonstrate how these two frameworks can help us to uncover plausible design strategies in a particular context of information design. Through these demonstrations, I argue that my framework provides us with a unique approach for investigating the complex relationships between the information artifacts and the designers as well as the audiences, and encompasses rational and emotional aspects of communication.

I conclude my dissertation in **Chapter 7** by discussing the significance, contributions, and the implications of this study for design research, design practice and design education. The descriptions of the four Modes of Wonder provide a theoretically grounded characterization of the layers of experience that leads to the differing nature of discovery, which emphasizes a different mode of wonder engendered by the information artifacts and the issue that each communicative situation brings. The identification and explication of the layers of experience in wonder, and how these layers give rise to different forms and functions of information artifacts, provides a basis upon which to describe, analyze, and critique the varying forms of information artifacts, products, and services of the contemporary practice of design.

Chapter 2

Information

Introduction

In the previous chapter, the problem of communication in design was raised. Although the role of emotion is central to communication, there is a lack of substantive theories that encompass emotion and information design. This problem is relevant as the primary focus of information design is changing, which also requires a reconsideration of the current scholarship of information design.

The goal of Chapter 2 is to propose the central hypothesis of this dissertation; information can be better conceptualized as a medium in which designers have the ability to influence situated and value-laden human actions, as well as a medium in which designers can be influenced by situated human actions. The idea that the medium is situational and thus dependent on the form that is being created in a particular situation not only provides a framework that encompasses information and emotion, but also helps design researchers and educators better understand, articulate, and model the complex relationship between information and emotion. To support this claim, I demonstrate the fact that understanding the different natures of information leads to different approaches to the practice of information design through the examination of two existing views of information – information as matter and information as interpretive process – that are commonly found in the literature review on information science, knowledge management, and information design.

What is information?

Despite the increasing usage of the term *information*, the meaning of information remains ambiguous. For example, consider a newspaper. Each article provides us with abundant information through text and images. When we talk about information in a newspaper, to what do we refer? Does information refer to the content of only a news article? Or is information contained in headlines, captions, or images? If the presentation of information offers us some information as well, is information located in the way sentences or articles are structured in each spread? Or can we say that all of them are information? Some may argue that information resides neither in content nor in presentation; instead, information is what is created

inside a person through understanding. As seen from this example, what is meant by information is unclear in the sense that it refers to various concepts, ranging from communicative symbols, structures of sentences, and formal composition of elements to the knowledge of a person.

In the last three decades, information science researchers have offered an extensive framework in order to better understand the complex nature of information (McGarry 1981; Machlup and Mansfield 1983; Miller 1988; Buckland 1991; Capurro 1996). For example, information scientist Rafael Capurro argues that information scientists need to understand the concept of information as an interdisciplinary one by examining diverse views of information from the humanities, natural sciences, and social sciences.¹⁶ For Capurro, information is not only a tangible object but also a sign or a subjective meaning. He asserts this point by shedding light on the semantic and the pragmatic levels of information, which have not been the primary focus of the information scientists who adapted Shannon and Weaver's seminal information theory. To support this claim, Capurro refers to Fred Dretske's concept of semantic information, which describes information as informative for a given person depending on the interpretative needs and skills of the individual.¹⁷ This definition is useful to broaden our understanding of information, so that it does not merely exist as an external matter independent of its sender and receiver, but rather is closely related to the person who sends and receives it.

Similarly, information scientist Gordon Miller examines different meanings of information by presenting the etymological and historical background of the concept of information. Miller discusses the relation between two notions of information — information as “a static substance” and in-formation as “a dynamic formative process” — by investigating the shifting focus throughout information's history. For Miller, there is no sharp division between the static and interpretive; instead, they are closely related. However, the emphasis on the formative process of in-formation has greatly diminished since the 1950s; he notes that this is problematic because it has led us to regard information as “a relatively static structure or substance,” losing a sense of in-formation as “the activity of

¹⁶ Rafael Capurro, “The Concept of Information,” *Annual Review of Information Science and Technology*, vol. 37 (2003), 343-411.

¹⁷ Fred I. Dretske cited in Capurro, 2003, 369-370, 391-392.

establishing meaning or significance.”¹⁸ Therefore, he claims that reuniting the two notions can contribute to a more solid understanding of the nature of information. Indeed, Miller’s claim explains why information should be considered not only as matter but also as form or process. In other words, information is not merely a matter of communication that is transmitted between a sender and a receiver, but also a mediating agent that facilitates the process of communication.

Despite these attempts to investigate the complex nature of information in communication studies, the information sciences, natural sciences, and social sciences, the concept of information in design has not been explicitly discussed except by a few.¹⁹ For instance, Edward Tufte has written numerous books on information design, yet what he means by information remains ambiguous throughout all his work. Instead, his notion of information may be inferred from several of his remarks; information refers to a set of discrete visual elements that are organized into a formal composition as he states, “to envision information is to work as the intersection of image, word, number, art.”²⁰ More recently, he discusses evidence presentations as a mode to “assist the thinking of producer and consumer alike” with an emphasis on the analytical thinking and the cognitive aspect of information design.²¹ For Tufte, information is material, substance or content, which need to be structured and organized. This is manifested when he claims that “knowing the content” is the first step in designing information, which precedes “knowing the audience.”²² In other words, the relationship between information and the audience in *particular* contexts does not seem to be his major concern as he states, “the purpose of an evidence presentation is to assist thinking [...] principles of analytical design are derived from the *universal* principles of analytical thinking.”²³

In contrast to the focus on substance or content in the meaning of *information*, there are some design scholars and designers who articulate their views

¹⁸ Gordon L. Miller, “The Concept of Information: A Historical Perspective on Modern Theory and Technology,” in *Information and Behavior. Vol.2.* edited by Ruben Brent D. (New Brunswick, NJ: Transaction Publishers, 1988), 27-53.

¹⁹ Among much of the design literature on information design in the last three decades, only a few studies provide a definition of information that illustrates the author’s concept of information. See Pettersson (2002) for common definitions of information and other definitions of information design. Jamieson (2007) also illustrates the concept of information by emphasizing it in his book, *Visual Communication: More than Meets the Eye*. (City: Intellect Books, 2007), 45.

²⁰ Edward R. Tufte, introduction to *Envisioning Information* (Cheshire: Graphics Press, 1990).

²¹ Edward R. Tufte, introduction to *Beautiful Evidence* (Cheshire: Graphics Press, 2006)

²² Edward R. Tufte, “Presenting Data and Information” (One-day Course, Pittsburgh, PA, August 27 2009).

²³ Tufte, *Beautiful Evidence*, 137.

of information by providing a definition. For instance, information architect Richard Saul Wurman and information designer Nathan Shedroff (2001) define information as “data put into context with thought given to its organization and presentation.”²⁴ In regard to the primary goal of utilizing information design for understanding, their definition provides insight into examining the relationship between information and the person or the context where the meaning of information is created. This is also evident in design scholar Harry Jamieson’s remark (2007) that “information is not substance, it is a relationship not located in time or space, it is an idea of a connection of association, it is a figment of the mind.”²⁵ For him, information is what brings a change to the recipient’s mind or knowledge by illustrating the *difference* in meanings that acts upon an individual mind.

In what follows, I examine two different ideas on information – information as matter and information as interpretive process – that are commonly used in the literature. The goal of this inquiry is not merely to theoretically investigate the meaning of information; rather, different understandings of the nature of information leads to different approaches in the practice of information design.²⁶ After examining two existing views of information, I propose the hypothesis of this study that information as a medium supports human action in a particular situation.

Two views of information: information as matter & information as interpretive process

The first view considers information as *matter*. This view regards information as a substance in that information is material to be observed, processed or structured. Based on this notion, information may be equivalent to data, content, or facts, as what is being stressed here is that information is meaningless or the meaning of information is fixed regardless of the attributes of its recipient or the context. In other words, this idea of information as matter does not account for its relation to the person who informs or understands it.

²⁴ Richard Saul Wurman, *Information Anxiety 2* (Indianapolis: Que, 2001), 27-29, (original work published 1989). Nathan Shedroff, *Experience Design 1* (Indianapolis: New Riders Publishing, 2001), 42.

²⁵ G. Harry Jamieson, *Visual Communication: More Than Meets the Eye* (Bristol, UK: Intellect Books, 2007), 45.

²⁶ Richard Buchanan’s argument for the strategic and tactical purpose of definition is useful in the sense that “definitions are critical for advancing inquiry” because they “allow an investigator or a group of individuals to clarify the direction of their work and move ahead.” (Buchanan 2001, 8) See Richard Buchanan, “Design Research and the New Learning,” *Design Issues* 17:4 (2001): 3-23.

Information as matter is based on Claude Shannon and Warren Weaver's seminal work, *The Mathematical Theory of Communication*. Examining the nature of information from a statistical perspective, they define information as "a measure of one's freedom of choice in selecting a message."²⁷ For Shannon and Weaver, the study of information is fundamentally a problem of the technical level of communication because the selection of a message is determined by the capacity of the communication channel, not by the capacity of the person who sends or receives a message.²⁸ Their focus on the communication problem at a technical level becomes evident when they state, "information has nothing to do with meaning"; the semantic aspect of information is not their primary consideration in their communication model, in particular when examining how accurately the signals are transmitted through the phone cables.²⁹ Therefore, this model is not relevant to explain human communication systems in which the meaning of information depends on the attributes of the information sender and the receiver.

This view of information as matter is also manifested in the data, information, knowledge, wisdom (DIKW) hierarchy in information science and knowledge management, especially when data and information are distinguished from knowledge (Cleveland 1982; Zeleny 1987; Ackoff 1989). For example, professor of Management Systems Milan Zeleny creates a distinction among data, information, knowledge, and wisdom by assigning each a place within a hierarchy of understanding:³⁰

The distinction (data, information, knowledge) is crucial and knowledge is about human ability to make distinctions, choices, and decisions. We can *have* data or we can *have* information, but we do *not* have knowledge: we know or do not know. Data and information are parts and pieces of different levels of aggregation, but knowledge refers to the intended whole (which in itself can be a part of something.)³¹

His notion of data and information as matter is apparent when he relates knowledge to the act of knowing as more of a human attribute. This is also evident in Harlan

²⁷ Warren Weaver, "The Mathematics of Communication," in *Basic Readings in Communication Theory*, edited by C. David Mortensen, (San Francisco: Harper & Row, 1979), 30.

²⁸ Their use of the term "freedom" is noteworthy, yet what they mean by freedom is not equivalent to one's free will. Rather it refers to a probable choice that is externally constrained, and only the probability of selection of information counts regardless of the meaning of the message.

²⁹ *Ibid.*, 36.

³⁰ According to Zeleny's hierarchy of understanding, data, information, knowledge, wisdom means know-nothing, know-what, know-how, and know-why respectively. See Milan Zeleny, "Management Support Systems: Toward Integrated Knowledge Management," *Human Systems Management* 7:1 (1987): 59-70.

³¹ *Ibid.*, 61.

Cleveland's article, "Information as a Resource," where he addresses how information is "the sum total of all facts and ideas available to be known by somebody at a given moment in time while knowledge results from selecting and organizing facts and ideas into what will be useful to somebody."³² Claiming that information is a unique intangible resource distinguishable from other tangible resources, such as minerals, fuels, or goods, Cleveland stresses the significance and the implication of information in human life.

There is an alternative view that considers information as an *interpretive process*. In contrast to the first view of information as matter, the second view focuses on the relationship between information and its recipient in the process of communication.³³ While the view of information as matter conceives of communication as a transmission of signals, conceptualizing information as an interpretive process regards communication as a transaction of meanings that better describes human communication, in which the change of meaning or the effect of information becomes a concern in communication models (Berlo 1960; Emmert and Donaghy 1981).³⁴ Perhaps this notion can be best illustrated by Gregory Bateson, the British anthropologist and social scientist, who defines information as "a difference which makes a difference."³⁵ For Bateson, information refers to a limited amount of data that a person can select among an infinite amount because human perception is selective. While the existence of an objective fact is central to the view of information as matter, Bateson's view of information provides insight into the subjective interpretation of the individual by relating information to the person who perceives and understands it.

This notion of information as interpretive process is also commonly found in literature of information science and philosophy. Like Bateson, some information scientists are concerned that information is communicated in relation to the capacity of the information recipient by rejecting the view of information as matter. For example, information scientist Robert Fairthorne, information is "an attribute of the

³² Harlan Cleveland, "Information as a Resource," *The Futurist* December (1982): 34-39.

³³ The second view of information is closely related to Miller's notion of "in-formation" that refers to "a dynamic formative process." See Miller 1988, 27-28.

³⁴ Berlo's SMCR (source, message, channel, receiver) model of communication is essentially an adaptation of Shannon and Weaver's communication model, yet Berlo's model sees the meaning of message depends on various factors of source and receiver, such as their communication skills, attitudes, knowledge, social system, and culture. See David K. Berlo, *The Process of Communication* (New York: Holt, Rinehart, and Winston, 1960).

³⁵ Gregory Bateson, "Form, Substance and Difference," in *Steps to an Ecology of Mind*, 448-466. (New York: Chandler Publishing Co., 1972).

receiver's knowledge and interpretation of the signal, not of the sender's nor some omniscient observer's not of the signal itself."³⁶ Philosopher Fred Dretske's theory of semantic information also illustrates the fact that information is dependent on the knowledge of the receiver.³⁷

This concept is also reflected in Werner Kunz and Horst Rittel's conception of information systems.³⁸ For Kunz and Rittel, communication is an argumentative process where information is an issue that leads to decision-making; thus, they are concerned with the change or the effect that is brought about by information. The following passage is useful to clarify the distinction between the view of information as matter and that of information as process:

Those processes which lead to this change of somebody's knowledge are called INFORMATION. Information is an event resulting in the change of somebody's knowledge. It is not something "stored" in paper documents, or in RAM files, or the like - although ink blots on paper or holes in a punch card or phosphorescent patterns on a vacuum tube may - occasionally - trigger information.³⁹

As is addressed above, the idea of information as *interpretive process* implies that information is a selection that is made by the person who sends or receives information rather than by the limitation of external constraints, such as the communication channel itself. For this reason, the term *information* may be equivalent to a message that mediates a sender and a receiver. Here, the focus is on the formative procedural aspect of *in-forma-tion* rather than its materialistic or structural aspect, as information technology and management researchers, Thomas Davenport and Laurence Prusak note:⁴⁰

The word "information" originally meant "to give shape to" and information is meant to shape the person who gets it, to make some difference in his outlook or insight. Strictly speaking, then it follows that the receiver, not the sender, decides whether the message he gets is really information- that is, if it truly informs him. A memo full of unconnected ramblings may be considered "information" by the writer but judged to be noise by the recipient. The only message it may communicate successfully is an unintended one about the quality of the sender's intelligence or judgment.

³⁶ Robert A. Fairthorne, "The Theory of Communication," *Aslib Proceedings* 6:4 (1954): 254

³⁷ Fred I. Dretske cited in Rafael Capurro, 2003, 368-370, 391-392. For a detailed discussion of Dretske's semantic information, see Fred I. Dretske, *Knowledge and the Flow of Information*. (Cambridge, MA: MIT Press, 1981).

³⁸ Werner Kunz and Horst W.J. Rittel, "How to Know What Is Known: Designing Crutches for Communication," in *Representation and Exchange of Knowledge as a Basis of Information Processes*, edited by H. J. Dietschmann, 51-60. (North-Holland: Elsevier, 1984). (Original work published 1983)

³⁹ Ibid., 52.

⁴⁰ Thomas H. Davenport and Laurence Prusak, *Working Knowledge: How Organizations Manage What They Know* (Boston, MA: Harvard Business School Press, 1998), 3.

To summarize, information is what is relevant and meaningful to a person among the data that are available.⁴¹ The most important consideration of this view is the emphasis on human as active agent in information communication. In addition, this view of information explains that there exist different interpretations — subjective meanings — from the perspective of the individual who receives the message.

Information as a medium for human action

The two views of information discussed above — information as *matter* and information as *interpretive process* — have shown contrasting approaches toward the nature of information. Although each view allows us to better understand different aspects of information, both views alone are not adequate to further examine the relationship between emotion and information in that they do not account for the consideration of the form of information that is being created in a particular situation.

In this section, I propose the central hypothesis of this inquiry that information is a medium for human action in a particular situation. This notion of information as medium is significant to John Dewey, American philosopher and psychologist, in that he sees the situational quality as dependent on the form that is being created in a particular situation. According to Dewey, “the situation is not indifferent to man, because it forms man as a desiring, striving, thinking, feeling creature.”⁴² The following passage further explains the close relationship between an organism and its environment, which is key to his theory from education and experience to psychology:

In brief, the environment consists of those conditions that promote or hinder, stimulate or inhibit, the characteristic *activities* of a living thing. Water is the environment of a fish because it is necessary to the fish’s activities – to its life. The north pole is a significant element in the environment of an arctic explorer, whether he succeeds in reaching it or not, because it defines his activities, makes them what they distinctively are. Just because life signifies not bare passive existence (suppose there is such a thing), but a way of acting, environment or medium signifies what enters into his activity as a sustaining or frustrating condition.⁴³

⁴¹ Economist Peter Drucker defines information as “data endowed with relevance and purpose.” He distinguishes “data for control” from “data for information” emphasizing the human aspect of organization. Arguing against the control-and-command model of organization, he stresses the contribution of knowledge worked in information-based organization. See Peter F. Drucker, “The Coming of the New Organization,” *Harvard Business Review* (January - February 1988), 3-11.

⁴² John Dewey, *Experience and Nature* (New York: Dover Publications, 1958), 76.

⁴³ John Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (New York: The Macmillan Company, 1916), 16.

For Dewey, an organism constantly interacts with its environment through its *actions*; one does not experience objects and events in isolation, but “only in connection with a contextual whole.”⁴⁴ Experience is central to explain one’s relationship to the environment in that we have an experience through our interactions with an environment, and we are changed in turn by our interactions with it.

This emphasis on *action* that brings an organism and its environment together in a situation is key to the hypothesis of this study, information as a medium for human actions, in that it connects a person to his or her environment depending on that person’s interest, intent, and action in the situation. Suppose that a person is conducting an online search to prepare for a trip to Peru. When he googles Peru, he can find a huge amount of data with only a few clicks. However, it is not the case that all these data are relevant to his purpose. There are many factors that determine the relevance and the priority of data, depending on whether the purpose of the trip is a honeymoon or a family vacation. Also, there are other factors that affect the type of data considered to be relevant or important, such as the number of days of the stay or the type of activities that he would like to do. As this example indicates, information is not considered simply to be given, but is rather taken by a person who enters a situation with a particular intent. His or her interactions with this information then create new meanings by exploring different kinds of connections among information. Information is what is relevant and meaningful to a person in a *particular* context; information is always functional in the sense that it supports a specific purpose that needs to be achieved. Otherwise, information remains meaningless or merely factual because it is not useful or appropriate to the purpose of action in specific contexts.

This idea of relating information to action is also closely related to the discussion of *affordance* and *schema* in psychology. Psychologist James J. Gibson proposes the concept of affordance as the actionable properties that mediate the relationship between an actor (a person or an animal) and the world.⁴⁵ For Gibson, affordance is neither the objective property of a thing in the world nor the subjective value dependent on an observer; rather, he emphasizes the complementary relationship of a person and his environment through constant

⁴⁴ Dewey gives an explanation of the word ‘situation’ by stating, “situation is not a single object or event or set of objects or events.” See John Dewey, *Logic: The Theory of Inquiry* (New York: Henry Holt & Company, 1938), 66.

⁴⁵ James J. Gibson, “The Theory of Affordances.” in *Perceiving, Acting, and Knowing*, edited by R. E. Shaw and J. Bransford, 67-82 (Hillsdale, NJ: Lawrence Erlbaum Associates, 1977).

interaction, particularly in the process of perception, in that the environment *affords* the person or the organism by providing the function of good or bad. While Gibson coins the term “affordance” as a functional relationship between a living animal, its environment, and their ever-changing interaction, it is Donald Norman who introduces the concept of affordance in design to illustrate the relationship between the form of products and the user’s action. For example, Norman demonstrates how various forms of door knobs can suggest different possibilities of action to the user.⁴⁶ For Norman, the appearance of any object can invite one to take certain actions even though it does not specifically instruct you what to do or how to do it.⁴⁷

Similarly, the concept of schema explains the relationship between a person and his or her social world. Schema refers to “a mental structure that contains general expectations and knowledge of the world.”⁴⁸ Schema theory originally comes from work in cognitive science, yet it has been applied to people’s perception and processing of information in the social world. For example, when people process the new information, schemas as existing mental structures help them process, interpret, and interact with complex information in the social world, such as person schemas, social schemas, or event schemas. In summary, affordance and schemas provide some sense of prediction and control of information so that people can better understand and interact with the environment in which they live.

This hypothesis can be better understood through the idea that the same subject matter is often represented via a number of different forms depending on the function that supports a particular action. Forms are dependent neither on data taken from the external reality that the information represents nor on the subjective interpretation of the designer who created the form. Rather, the situation, where information is in use and experienced, is carefully observed by designers and the most appropriate form to the function is selected. Consider, for example, New York tourist map and New York subway map. Although both maps represent the same

⁴⁶ Donald A. Norman, *The Psychology of Everyday Things* (New York: Basic Books, 1988).

⁴⁷ In his 1999 article, Norman recognizes that his use of affordance refers to *perceived affordance*, which is not at all the same as real affordance by Gibson; “real affordances do not always have to have a visible presence.” Witnessing that some designers say, “I put an affordance to the system” by adding an icon, cursor, or other symbols on screen, he attempts to clarify the distinction among perceived affordances, real affordances, constraints, feedbacks, and conventions. See Donald A. Norman, “Affordance, Conventions, and Design,” *Interactions* (May+June 1999): 38-42.

⁴⁸ Augoustinos and Walker give an excellent overview of schemas and social schemas. See Martha Augoustinos and Iain Walker, “Social Schemas,” in *Social Cognition: An Integrated Introduction*, 32-59 (London: SAGE Publications Ltd, 1995), 32.

city as their external reality, the form of each map is distinct because the intent and function of each map differs. The New York tourist map illustrates geographical information along with historic landmarks and tourist attractions as a form of scenery for a person to explore, whereas a subway map visualizes how each station and various subway lines are connected in an abstract and simplified form.

Conception of emotion in relation to human action

When information is conceived as a medium for human action, the form of information is central to the mode of communication in that the form of information is situational, dependent on the function that supports actions in a particular situation. The idea that the form is situational also leads us to encompass emotion in this view of information because we make decisions based on not only our reason but also our value – whether it matches our beliefs and experiences in a specific situation. The idea that humans are reasoning-valuing animals is the basis of Walter Fisher’s narrative paradigm.⁴⁹ For Fisher, humans are essentially storytellers and all communication is a form of storytelling from which we choose and constantly re-create our lives on the basis of “good reasons.”⁵⁰ In other words, Fisher’s narrative rationality is useful to highlight the close relationship between the story and the people who create and interpret it, in which their emotions and values are central to communication.

In order to investigate the relationship of emotion and information, I adopt John Dewey’s concept of emotion, which consists of three parts: 1) affect or feel, 2) a mode of conduct, and 3) its ‘object.’⁵¹ In contrast to other theories of emotion that focus on a single aspect, such as emotion as an affect or emotion as a behavior that expresses one’s feeling, Dewey’s view focuses on the relationship among a mode of conduct, affect, and its object or idea.⁵² For example, Dewey argues that a mode of behavior is purposeful because emotion is always aimed toward or at some objects.⁵³

⁴⁹ Walter R. Fisher, *Human Communication as Narration: Toward a Philosophy of Reason, Value, and Action* (Columbia, University of South Carolina Press, 1987).

⁵⁰ Ibid.

⁵¹ Dewey cited in Robert C. Solomon, *What is an Emotion? Classic and Contemporary Readings* (New York: Oxford University Press, 2003), 84.

⁵² According to Cunningham’s reading on Dewey, there are “three elements in emotion states like being afraid – namely, the behavioral, the cognitive, and the feeling dimensions – puts him in broad agreement with many other philosophic accounts of such emotions.” See Suzanne Cunningham, “Dewey on Emotions: Recent Experimental Evidence,” *Transactions of the Charles S. Pierce Society* 31:4 (1995): 868.

⁵³ Dewey takes the survival value on emotional behavior from Charles Darwin’s discussions of emotion because the real function of behaviors is not the expression of emotions but “their usefulness

Also, he discusses one's awareness of feeling that follows the physiological change in the body, which is not the major concern of theories of emotion with an emphasis on the cognitive and behavioral aspect of emotion. According to Dewey, we feel sad because we cry; our feeling of sadness comes after our action of crying, which relates a mode of conduct of crying to affect.⁵⁴ Put simply, a mode of conduct is central to his view of emotion that is directed towards an object and followed by a feeling.

Dewey's view of emotion helps to understand why one's emotional experience cannot be the same when encountering the same object or event in one situation and in another, because emotion leads to the adjustment of habit and the coordination of action.⁵⁵ Following Dewey, when we feel frightened, the emotion of fear comes neither from the object nor from us; it is the entire situation that makes us feel frightened. For example, seeing a bear in a zoo may not make one scared, but it can make another individual feel terrified if he or she experienced an encounter with a bear in the woods. Even the same people can have different emotions depending on the situation, because what they bring to each situation can vary greatly. As this example suggests, Dewey's theory of emotion is useful to articulate the particularity of human situations in that emotions are created by situations – a relationship is formed between the combination of objects (information), people, and context. These relationships, combined with other factors such as our past experiences or energy, produce specific emotions.

Another key concept in Dewey's view of emotion is experience. For Dewey, emotion is not a disparate component of one's experience; rather, it is "the moving and cementing force" that unifies various parts of our experiences, as he describes the relationship of emotion with experience as the following:⁵⁶

The intimate nature of emotion is manifested in the experience of one watching a play on the stage or reading a novel. It attends the development of a plot; and a plot requires a stage, a space, wherein to develop and time in which to unfold. Experience is emotional but there are no separate things

in the struggle to survive." Dewey and Darwin cited in Cunningham, "Dewey on Emotions: Recent Experimental Evidence," 866.

⁵⁴ This is Dewey's extension of James Williams' theory of emotion as a physiological disturbance in the body: "connecting the emotional seizure with the other phases of the concrete emotion-experience," Dewey explains why or how the 'feel' of sadness is related to the bodily change. For a detailed account of Dewey's analysis of James Williams' theory of emotion, see John Dewey, "The Theory of Emotion. (2) The Significance of Emotions," *Psychological Review* 2 (1895): 16.

⁵⁵ Dewey, "The Theory of Emotion. (2) The Significance of Emotions," 13-32.

⁵⁶ John Dewey, *Art as Experience* (London: Penguin Books Ltd, 1934), 42.

called emotions in it.⁵⁷

As he compares the nature of emotion to the seamless flow in a river, he sees emotions not as a discrete set of feelings but as *layers* of a developing underlying quality. Experiences may be distinguished from one another based on whether their interests and purposes are aesthetic, intellectual, or practical, yet there is no such thing that we can name as one particular emotion or another.⁵⁸

The following passage from Kenneth Burke also provides insight into the way the audience's emotional experience is created through a piece of art:

If, in a work of art, the poet says something, let us say, about a meeting, write in such a way that we desire to observe that meeting, and then, if he places that meeting before us - that is form. While obviously, that is also the psychology of the audience, since it involves desires and their appeasements.⁵⁹

For Burke, form is the key concept that symbolizes the feeling of the audience. As he states, "form is the creation of an appetite in the mind of the auditor, and the adequate satisfying of that appetite."⁶⁰ Similar to Dewey's, Burke's discussion of form illustrates the close relationship of the form and its emotional effect on the audience.⁶¹ Form of information is created as a medium, an inquiry into a situation, yet what becomes meaningful information is dependent on what is discovered and experienced by the audience in the situation.

In summary, information and emotion are embedded in situations of experience, which manifest in diverse forms, such as the form of writing, artwork, or plays. People initiate and experience these components through their interactions with situations. The types or numbers of forms may vary depending on individual designer's ability to identify a problem in a particular situation. As a designer chooses a form as a different hypothesis for exploration, each form provides a pathway to inquire into a situation, and an audience's emotional experience is also shaped by the form that is chosen. In other words, the relationship between information and emotion can be explained by the idea that forms arise from, and in

⁵⁷ Ibid.

⁵⁸ Dewey does not name different categories while other emotion scholars argue for a categorization of emotions, or primary and secondary emotions.

⁵⁹ Kenneth Burke, "Psychology and Form," in *Counter-Statement* (Berkeley: University of California Press, 1968), 31.

⁶⁰ Ibid.

⁶¹ Burke (1968) distinguishes between psychology of form and psychology of information; however, by "information" I mean in this study is "a medium that serves the context of human action" in contrast to "matter," which is Burke's view of information in a normative sense. Information as a medium emphasizes the form of information, just as the form of play or music, which is central to the discussion of the relationship of information to emotion.

response to, the situation based on the issue, intent, and function of a particular situation. The form of information is neither given by the content nor created by the designer; the form becomes complete when it is reconstructed by the audience as they experience it through their interaction with a particular situation.

Summary

The hypothesis that information is a medium for human action is central to encompassing emotion and information into a single theory. This concept enables us to better understand how information organizes human actions to support function in a particular context and how it is manifest in the diverse forms of information artifacts. Also, conceptualizing information as a medium is useful to examine the concept of emotion, particularly in modeling the relationship among information artifacts, designers, and audiences. Adopting Dewey's view of emotion with an emphasis on emotional connection and emotional experience, the form of information is closely related to the emotional effect that is being created in a particular situation.

Chapter 3

Information Design

Introduction

This dissertation sets out to explore the lack of substantive theory encompassing emotion and information design. In order to examine the relationship between information and emotion, I propose information as a medium for human actions to be the central hypothesis of this inquiry. This hypothesis that the medium is situational, dependent on the form that is being created in a particular situation, enables design researchers and educators to better understand, articulate, and model the complex relationship between information and emotion.

The goal of Chapter 3 is to present my method of inquiry for this study: information design as an art of invention and discovery in the context of rhetorical inquiry. In shifting the focus from an art of composition or that of expression to an art of invention and discovery, conceptualizing information design as rhetorical inquiry would allow design researchers and educators to account for the relationship of information artifacts to the audience and the designer in specific contexts rather than to focus on information artifacts or designers separately. To support this claim, I argue that existing views of information design cannot provide an explicit framework to model the relationship between information and emotion in a single theory. Through the examination of two distinct approaches to information design – analytical representation and persuasive communication – which are commonly found in the literature review of information design and related fields, I explain the implications of their ignorance of emotion for information design.

Information design as analytical representation

In the first approach, information design is regarded as analytical representation. This view is built on the premise that information design is concerned with transferring data from the sender to the recipient in a clear and prompt manner. Since this view focuses on the functional aspect of information, whether it performs an intended task or not, emphasis on accessibility, efficiency, and usability are central in this view.

From the functional and analytic perspective to communication, the origin of information design can be traced back to several different points of time in history. Besides its close connection to the modern design tradition of the 1920s, another

point of origin for information design can be found in the works of early modern inventors in statistics of late eighteenth and nineteenth century designers and engineers, such as William Playfair, Charles Joseph Minard, Joseph Priestley.^{62 63} Due to the complexity of statistical data, transforming large sets of numbers into readily accessible figurative representations was one of the major concerns for these pioneers, especially at a time of great increase in the collection of statistical data. For example, political economist William Playfair invented and improved many numerical charts by claiming, “the amount of mercantile transactions in money, and of profit or loss, are capable of being as easily represented in drawing.... though, till now, it has not been attempted.”⁶⁴ In addition to his development of numerous graphical representations similar to those in use today, his major contribution to chart-making was to provide a way for seeing the data in a relationship. Figure 3.1 represents two kinds of data over time, the weekly wage of a mechanic in the red line and the price of the quarter of wheat in black bars, which helps viewers to better understand the dynamic change of the wheat price in contrast to the steady increase in the wage.

⁶² In *The Visual Display of Quantitative Information*, Edward Tufte introduces the works of early inventors of modern statistical graphics, including the famous example, Charles Minard’s 1869 chart, *Napoleon’s March to Moscow*, by calling it “possibly the best statistical graphic ever drawn.” For a detailed account and more examples, see Edward R. Tufte, *The Visual Display of Quantitative Information* (Cheshire: Graphics Press, 1983). Also, Mijksenaar and Horn provide a brief historical overview of these pioneers in their books. See Paul Mijksenaar, *Visual Function: An Introduction to Information Design* (Rotterdam: 010 Publishers, 1997), 28-30; Robert E. Horn, *Visual Language: Global Communication for the 21st Century* (Washington, WA: MacroVU, Inc., 1999), 33-42.

⁶³ Although Tufte’s books, including *The Visual Display of Quantitative Information*, point to numerous pioneers who contributed to establishing the modern form of statistical graphics, there are some missing but important figures in this development. James W. Reidhaar’s book review on Tufte’s 1983 book adds quite extensive references to the initial list that Tufte offers. For example, Arthur Lockwood in his 1969 book, *Diagrams: A Visual Survey of Graphs, Maps, Charts and Diagrams for the Graphic Designer*, provides a means of categorizing different kinds of statistical and explanatory diagrams. See James W. Reidhaar, “Book Review: The Visual Display of Quantitative Information by Edward R. Tufte”, *Design Issues* 3:1 (1986): 89-92.

⁶⁴ Playfair cited in Robert E. Horn, *Visual Language: Global Communication for the 21st Century* (Washington, WA: MacroVU, Inc., 1999), 33.

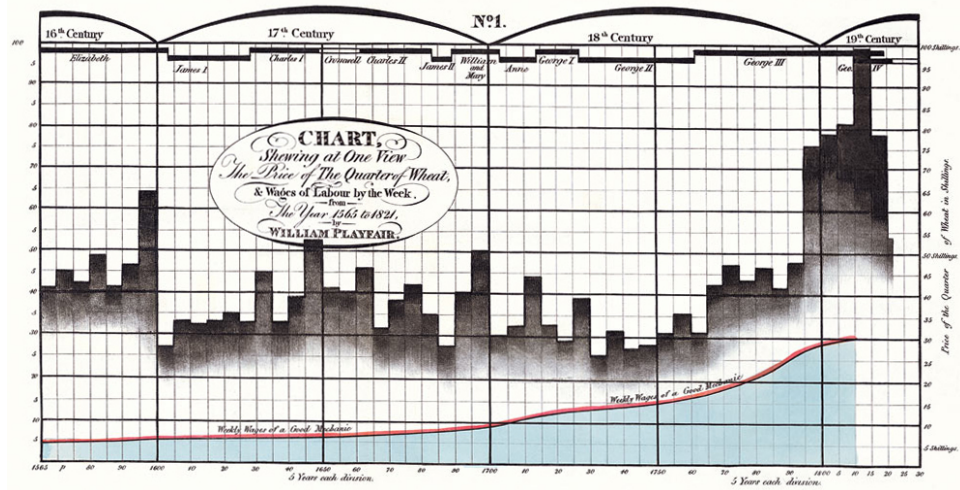


Figure 3.1. Chart showing at one view the price of the quarter of wheat and wages of labour by the week from 1565 to 1821 (William Playfair, 1821)

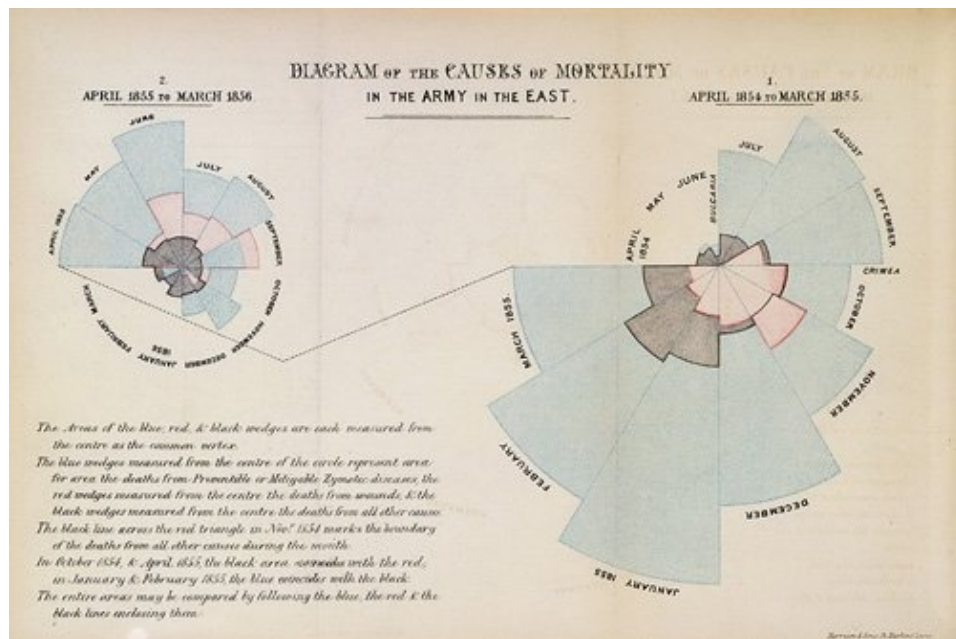


Figure 3.2. Diagram of the causes of mortality in the army in the east. Florence Nightingale, 1858

Another important pioneer is Florence Nightingale, who invented the Polar area Diagram (Figure 3.2) and presented statistical data to illustrate the problem that more soldiers died from the infection in the poor sanitary conditions in British military hospitals than from the injuries during the war.⁶⁵ Although she invented the Polar area diagram, her greater contribution to this area is found in her use of

⁶⁵ This diagram originally appeared in Florence Nightingale's 1858 report, "Notes on Matters Affecting the Health, Efficiency, and Hospital Administration of the British Army," in *Florence Nightingale: Measuring Hospital Care Outcomes*, edited by Duncan Neuhauser et al (Oakbrook, Illinois: Joint Commission, 1999), 158. One of recent articles in the *Economist* offers a brief overview. See "Worth A Thousand Words," *The Economist* (December 22, 2007): 74-75.

diagrams as a means to effectively visualize complex statistical data, in particular pointing to a problem that was not apparent as numbers presented in a table.⁶⁶ These two examples demonstrate that the graphic representation of statistical data contributes not only to making the complex clear and accessible, but also to enabling the audience to see different relationships among data, which leads to a discovery of an issue or a problem that may not be apparent when points of data are not visualized in relation to each other.

Another origin of information design can be found in the emergence of information science as an independent research discipline after the Second World War. As the amount of information has drastically increased with the advancement of information technology, efficiency has become one of the principles in information design, which stems from a guiding principle of engineering design. A greater emphasis on the principle of efficiency has also brought about some changes in the contemporary discussions of design. Consider the following definitions of graphic design: “the organization of information that is semantically correct, syntactically consistent and pragmatically understandable. (I like it) to be visually powerful, intellectually elegant, and above all timeless,”⁶⁷ or as “the medium or vehicle by means of which something is transported from one place to another.”⁶⁸ These definitions suggest that both graphic design and information design, as modes of communication, are not distinguishable from each other. This is evident when Malcolm Barnard discusses graphic design as a “neutral” and “transparent” medium:

This conception of communication is what lies at the root of the common understanding of graphic design as an innocent, transparent medium, or a neutral transporter of messages. This understanding emphasizes the idea that graphics is transparent in the sense that it adds nothing and taking nothing away from the message; ...a transparent medium is one that distorts nothing that passes through it and graphics is often presented as such a medium. The idea of the neutral vehicle is also popular.⁶⁹

⁶⁶ As Robert Horn writes, “the revolutionary notion that social phenomena could be objectively measured and subjected to mathematical analyses,” was... Nightingale cited in Robert E. Horn, *Visual Language: Global Communication for the 21st Century* (Washington, WA: MacroVU, Inc., 1999), 38.

⁶⁷ This quote has its origin from two references: Massimo Vignelli and Lella Vignelli, *Design is One* (Victoria: Images Publishing Group, 2004), 5. Massimo Vignelli, *Vignelli from A to Z* (Victoria: Images Publishing Group, 2007), 18.

⁶⁸ Kalman cited in Malcolm Barnard, *Graphic Design as Communication* (New York: Routledge, 2005), 18. Also, see Tibor Kalman, J. Abbott Miller, and Karrie Jacobs. “Good History/Bad History,” in *Looking Closer*, edited by Michael Bierut, William Drenttel, Steven Heller, and DK Holland, 25-33. (New York: Allworth Press, 1994). (Original work published in *Print Magazine*, March/April 1991).

⁶⁹ Ibid., 19

In addition to the principle of efficiency, this view of communication as a neutral and transparent medium is central to the view of information design as analytical representation, as it is based on the assumption that communication is “conveying a message from sender to receiver.”⁷⁰ This idea of conveying a message in an efficient and transparent manner had already appeared in modern typographer Beatrice Warde’s 1956 essay, “The Crystal Goblet.” Using two distinct metaphors, a crystal goblet and a solid gold goblet, she argues that the form of typography should be “invisible” in conveying the content just as the wine in a crystal goblet clearly reveals what it contains.⁷¹ This idea of “invisibility” continued to appear in later statements by graphic designer Paul Rand and information design scholar Edward Tufte, who claim that information should be designed in a way that does not obscure the audience’s reading.^{72 73}

Information design as persuasive communication

While information design as analytical representation is based on the assumption that communication is a neutral or transparent mode, information design as persuasive communication promotes the idea that communication cannot be purely neutral or value-free. Since human communication consists of the sender, the message, and the receiver, what is communicated from one person to another is not a signal that is meaningless or has a fixed meaning; rather, the meaning can change

⁷⁰ Referring to the definitions of graphic design by design practitioners and theorists, such as Tibor Kalman, Richard Hollis, Jobling and Crowley, Barnard presents this view of graphic design as “the medium or vehicle by means of which something is transported from one place to another (Barnard 2005, 18).” Later in this book, his hypothesis turns against this view by claiming, “there can be no neutral, objective of conveying of a message” because it always accompanied by the rhetorical elements by referring to Robin Kinross (Barnard 2005, 19). His view of two distinct approaches to graphic design is quite similar with two approaches to information design; yet his hypothesis is distinguishable from the hypothesis of this study in that his view of graphic design as communication is built on the accounts of semiology, from the grammatical point of view, that “meaning is socially and culturally constructed and negotiated, that is, like a language (Barnard 2005, 29),” whereas my hypothesis is based on the rhetoric to investigate how different kinds of discovery arise in the way the audience emotionally experiences with information design presentation.

⁷¹ Beatrice Warde, “The Crystal Goblet or Printing Should Be Invisible,” in *The Crystal Goblet: Sixteen Essays on Typography* (Cleveland: Cleveland and New York World Publishing Co, 1956)

⁷² Tufte’s use of the term *Chartjunk* throughout his books articulates his emphasis on the content of information (data) rather than data-container. Referring to modern architect Robert Venturi, Tufte argues that mere cosmetic decoration cannot help to disguise lack of content. For example, a data-chin chart frequently distorts data, and therefore requires ornaments to enliven it. See Tufte, *The Visual Display of Quantitative Information*, 1983.

⁷³ Paul Rand writes, “Readers of a report should be unaware of its ‘design,’ rather, they should be enticed into reading it by interesting content, logical arrangement and simple presentation. The printed page should appear natural and authoritative, avoiding gimmicks which might get in the way of its documentary character.” Paul Rand cited in Edward Tufte, *Envisioning Information*, 34. Original work published in Paul Rand, “Design” in *Speaking Out on Annual Reports* (New York, 1983).

based on the sender's intent or the recipient's communication skills, attitudes, or social and cultural context in which the communication occurs.⁷⁴ The following passage from design scholar Gui Bonsiepe supports this claim as he notes:

Informative assertions are interlarded with rhetoric to a greater or lesser degree. Information without rhetoric is a pipe-dream which ends up in the break-down of communication and total silence. 'Pure' information exists for the concrete shape, to bring it within the range of experience, the process of rhetorical infiltration begins.⁷⁵

For Bonsiepe, information design is fundamentally a rhetorical means of visual and verbal communication because information is always selected, organized, and presented by the person who intends to communicate to a particular audience. This was a radical perspective to information design in the 1960s, when information design as analytical representation was still a central concern with its great emphasis on functional and cognitive aspects of communication.

Twenty years later, in "The Rhetoric of Neutrality," Robin Kinross adopts Bonsiepe's argument that information design is fundamentally persuasive communication; yet Kinross refuted Bonsiepe's exclusion of "the train timetable or a table of logarithms" from the examples of information design by offering a keen insight into rhetoric.⁷⁶ For Kinross, train timetables are different kinds of rhetoric, "the art of directed communication – directed, that is, both internally to organize the material communication and externally to persuade an audience."⁷⁷ Perhaps, because most advertisements attempt to attract and persuade consumers with their "language characterized by artificial or ostentatious expression," the way train timetables persuade people is quite subtle and hardly visible most of the time, which Kinross describes as demonstrating "eloquence."⁷⁸ Kinross's notion of *eloquence* may not directly appear in the form of the seductive voice of advertisements, but eloquence can work effectively and persuasively in the way of communicating information, just as train timetables provide train riders with the train numbers, the time of departure and arrival, and the station number. In this respect, both train

⁷⁴ Professor at Communication Arts John Fiske believes that there are two schools in communication studies. First is the *process school*, built on Shannon and Weaver's communication model with an emphasis on transferring a signal from one to the other. Second is to see communication as "the production and exchange of meanings." Communication is a *transaction of meanings* that are socially and culturally constructed. See John Fiske, *Introduction to Communication Studies* (New York: Routledge, 1990)

⁷⁵ Gui Bonsiepe, "Visual/Verbal Rhetoric," *Ulm 14/15/16* (1965): 30.

⁷⁶ Although Bonsiepe claims, "information design without rhetoric cannot exist in the real world," he considers some information, such as the train timetable and a table of logarithm, innocent of rhetoric by claiming that they are extreme cases. See Bonsiepe, "Visual/Verbal Rhetoric," 23-38.

⁷⁷ Robin Kinross, "The Rhetoric of Neutrality," *Design Issues* 2:2 (1985): 21.

⁷⁸ Kinross, "The Rhetoric of Neutrality," 19-20.

timetables and advertisements are persuasive communication because they persuade people directly or indirectly.

Graphic designer Katherine McCoy also argues that the conventional distinction between information and persuasion has been a problem in that this distinction is dependent upon the type of content or the sender's intention. Searching for an alternative to this dichotomy, she states, "perhaps information and persuasion are not an either/or opposition. More likely, they are modes of communication that overlap and interact."⁷⁹ In short, information and persuasion are not the opposite modes of communication, one purely neutral and the other value-laden; both employ slightly different rhetorical means in the way that "they organize and articulate and give visual presence to information" based on the audience's motivation, the purpose of communication, and the situation where the communication takes place.⁸⁰

Limitations of existing approaches to information design

Up until now, two different approaches to information design have been presented. The first view, information design as analytical representation, places information design and persuasive communication as opposite modes of communication. The second view, on the other hand, argues against this separation of information by claiming that information design is also a mode of persuasive communication based on the accounts of rhetoric.

Although these approaches have attempted to investigate the relationship of information to emotion, particularly by focusing on the relation between information and persuasion, they are not adequate to thoroughly examine the relationship between information and emotion in communication. The problem in the first view is to understand emotion in the most reductive sense: the relation of one's emotional response to a stimulus. This way of conceptualizing emotion states that emotion can be contained or expressed as a part of information, whether the content or its expression evokes particular emotional responses to the audience. Since the first view emphasizes information design as a neutral and transparent medium, emotion is treated as noise or an unnecessary distortion of meaning. Therefore, emotion should not be involved when information should be designed in a way that it is easy to read, understand, navigate and use. As a result, many people,

⁷⁹ Katherine McCoy, "Information and Persuasion: Rivals or Partners?" *Design Issues* 16:3 (2000): 80.

⁸⁰ Kinross, "The Rhetoric of Neutrality," 19.

including information designers themselves, find most information design presentations boring and dry because their primary focus is on the issues of efficiency or usability. This also leads many to assume that the best way to communicate information is in the simplest way possible – that is, a neutral and transparent form that does not distort the meaning of information.

In contrast, the second view, based on the rhetorical accounts of communication, has expanded the understanding of information design toward a means of persuasive communication. Regarding communication as an exchange of meanings between one person to another, this view allows us to discuss the emotional aspect in communication because rhetoric is an art of persuasion that influences the way the audience thinks, feels, and acts by appealing to them logically and emotionally. However, the rhetorical approach to information design taken by Bonsiepe, Kinross, and Ehse (1984) is limited in that their focus is on the analysis of the visual signs and the description of the signs and the meanings in graphic design by applying rhetorical figures to their discussions.⁸¹ In other words, their approaches are mostly focused on the interaction between visual and verbal signs or on the relationship of the signs to meaning, rather than examining the relationship among signs (information), the designer, and the audience. This can be attributed to their perspective based on the grammatical viewpoint of rhetoric, from which they are interested in discussing types of signs in advertising, the interaction between visual and verbal signs, and the implied meaning or what is represented through signs. Although Bonsiepe indicates that his focus is on the interaction between signs and meaning using the terminology of semiotics, conceiving rhetoric as a way of describing and analyzing the relationship of signs and meanings is not adequate to investigate the relationship between information design and audience, particularly in understanding the designer's intent to persuade and the way it affects the audience when the designer creates posters or advertisements.⁸²

For Kinross, the choice of formal presentation of information, ranging from typeface and image to the composition of elements, reflects “the ideas and

⁸¹ This is reflected in Bonsiepe's remark that he is concerned with “the syntactic and semantic relationships between visual and verbal signs but not with these meanings in their social context.” Bonsiepe was interested in the aesthetic dimension of rhetorical figures. Bonsiepe, “Visual/Verbal Rhetoric,” 38.

⁸² Bonsiepe writes, “The terminology of semiotics makes it easier to sort out these figures with greater precision. Starting from the fact that there are two aspects to every sign, namely its shape and its meaning, we arrive at to basic types of rhetorical figures.” Bonsiepe, “Visual/Verbal Rhetoric,” 25.

beliefs that inform the process of design.”⁸³ Individual components of form not only create meaning in relation to one another, but also are created based on the social and cultural reference. This expands Bonsiepe’s focus on the relationship of signs to their meanings by taking into account the designer’s interpretation of the social and cultural context of information; yet, Kinross’s view that the form and the meaning of information is socially and culturally constructed is limited in its consideration of the communicative situation. For example, Kinross asserts that simplified forms in modernism are the reflections of social and cultural needs “to save labor, time, and money, and to improve communication,”⁸⁴ but he does not articulate how they accommodate the needs of a particular audience in different kinds of situations. In order to create a meaningful and engaging experience, it is necessary to investigate the relationship of the form of information and the underlying principles appropriate to the respective situation, which is not found in this view of information design as persuasive communication.

Information design and rhetoric: an art of invention and discovery

This study assumes the premise that both information design and rhetoric are arts of creating persuasive and effective communication that are appropriate to the problem, issue, and purpose in a particular situation. Persuasion as a goal of communication is addressed by numerous scholars in rhetoric⁸⁵; yet the more important concern in rhetoric is found in its role as an intellectual art, as is seen in Aristotle’s definition of rhetoric as “the faculty of discovering in any particular case all of the available means of persuasion.”⁸⁶ Understanding rhetoric as an art of discovery has also expanded its focus from *a static art* that is confined to a special domain, such as speech making and persuasive writing, to *a dynamic method* that can be applied to the entire range of artistic expression, including the argumentative media, such as fiction, film, painting, or products.⁸⁷

The expansion of rhetoric to a wide range of communication in the twentieth

⁸³ Kinross, "The Rhetoric of Neutrality," 22.

⁸⁴ Ibid., 25.

⁸⁵ Other definitions of rhetoric that include persuasion are: Whenever there is persuasion, there is rhetoric. And wherever there is “meaning,” there is “persuasion” (Burke 1969). Rhetoric is generally defined as the art of persuasion, of the probable argument, of prose style and composition, or of literary criticism (Kristeller 1983).

⁸⁶ Aristotle, *The Art of Rhetoric*.

⁸⁷ McKeon cited in Mark Beckman, “Introduction: Richard McKeon and the Renaissance of Rhetoric,” in *Rhetoric: Essays in Invention and Discovery* (Woodbridge, CT: OX Bow press, 1987), xiv.

century makes it imperative to connect rhetoric to information design as a mode of communication. However, rhetoric as a mode of communication does not refer to the power of persuasive communication in its expression. Rather it is found in the capacity of rhetoric to not only enable an audience member to discover facts, but that also leads to changes in the way he or she thinks, feels, and acts. In other words, it is *an art of invention* in the sense of creating the possibility of these changes from the perspective of the speaker or the writer; it is also *an art of discovery* that leads the audience to reconstruct and experience this possibility as the audience reads or listens to the speech. Within numerous rhetorical discourses in the twentieth century, this perspective is articulated by Richard McKeon who claims that rhetoric is “not a *heuristic* method or radical *interpretation* but *an art of topic* or *a selection of elements* which opens the way to the recognition of new facts and to the perception of unnoticed structures and sequences.”⁸⁸ For McKeon, rhetoric is “more than an art of expression” because rhetoric has “its end in *action*, not knowledge.”⁸⁹ Invention is not confined to creating new expression of the message; it includes taking into account the situation where the communication takes place, which enables the speaker, the writer, or the designer to choose an issue or any elements in exploring any possibilities of communication. In other words, true invention occurs when an old term or an idea is *transformed* into a new problem rather than the simple application of new technology to the existing problem.⁹⁰ This is a subtle but significant distinction that McKeon makes in his view of rhetoric between the radical interpretation and the true invention in the sense that rhetoric is *an art of invention and discovery* that mediates communication between the creator and the audience by discovering any materials, meanings, relations, and values in the communicative situation. There is another reason why it is significant to shift the focus of rhetoric, as well as information design, from an art of expression to an art of invention and discovery. While information design as an art of expression emphasizes the role of the designer who creates a message (Figure 3.3), information design as an art of invention and discovery shifts the focus from the information or

⁸⁸ Richard McKeon, “Philosophy of Communications and the Arts,” in *Rhetoric: Essays in Invention and Discovery* (Woodbridge, CT: OX Bow press, 1987), 110.

⁸⁹ McKeon, *Rhetoric: Essays in Invention and Discovery*.

⁹⁰ Mark Beckman’s reading of McKeon states, “Innovation, in any discipline, arises by means of rhetoric, when old terms and ideas are transformed by new problems and uses. Invention, first linked to the creation of arguments, now stands for creativity in every realm of human thought and action.” See Beckman, “Introduction: Richard McKeon and the Renaissance of Rhetoric,” in *Rhetoric: Essays in Invention and Discovery* (Woodbridge, CT: OX Bow press, 1987).

the designer to the situation in which the role of the audience, the purpose of communication, and the action and the experience of the audience become significant (Figure 3.4). Therefore, rhetoric and information design are not conceived as simply a descriptive and interpretive art; rather, they are a productive art because both are concerned in the effect of the communication and the action that is produced.

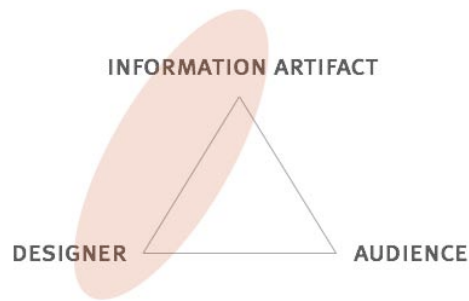


Figure 3.3. Information design as an art of expression

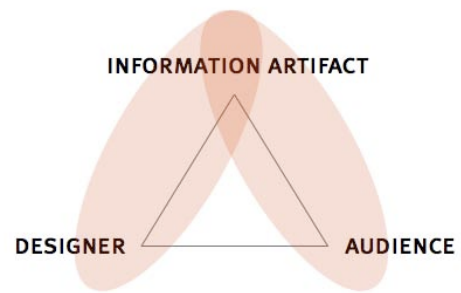


Figure 3.4. Information design as an art of invention & discovery

The following example, the Domestic Mail Manual (DMM) Transformation Project, can illustrate this idea of information design as an art of invention and discovery in examining information design, and can be a powerful tool not only to increase the usability of information and to best support the action in a particular context but to also change the vision in the organization based on a human-centered design approach. The goal of this project is to restructure the DMM, a manual of more than 1,000 pages that contains all the mailing standards in the United States, serving as the operational core of the federal agency that employs 800,000 postal workers and also supports an industry of more than nine million people. Because of its complexity, difficulty of use, and inaccessible structure, this manual failed to provide employees and customers with the tools to understand mailing options and/or any guidance for making informed decisions.⁹¹

⁹¹ The DMM Transformation Project (2001-2005) was a research project in the Carnegie Mellon School of Design that was funded by the US Postal Service from 2001 to 2005 (Richard Buchanan, project director; Angela Meyer, project manager). For a detailed discussion of the project with system diagram examples, see Soojin Jun, Miso Kim, and Joohwan Lee, "The System Diagrams: Shifting Perspectives." *Design Issues* 27:2 (2001): 79-80.

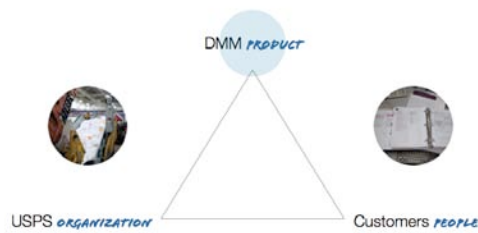


Figure 3.5. Focus on the product and the organization separately

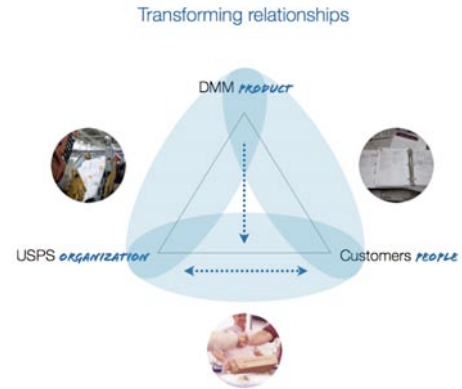


Figure 3.6. Focus on the relationships

The research team at the Carnegie Mellon School of Design proposed a new information structure based on findings from an initial user study, which observed the way the manual was actually used in various contexts of mailing. This design process shifted the focus of design from designing the DMM as a product that is separated from the identity of the USPS or from the customer's needs (Figure 3.5) to transforming the relationship among the DMM, the USPS, and the customer (Figure 3.6). Put simply, the DMM was designed as a two-way mediation between the USPS and the customer. This was done to create a new structure that reorganizes mailing standards and regulations based on the sequences of actions users take in the mailing process, such as identifying the shape of mail, selecting a service, and preparing for the package (Figure 3.7). In doing so, information in the DMM has become more accessible and easily navigable to users, in that the organization of this information now supports users' actions in consideration of an appropriate context, while the old structure failed to connect the information to the users' actions.



Figure 3.7. Spreads from the first series of documents in the Domestic Mail Manual Transformation project. Copyright © School of Design, Carnegie Mellon.

Summary

This chapter presents the method of investigation for this dissertation: a rhetorical inquiry of information design. I argue that conceiving information design as an art of invention and discovery allows us not only to investigate the relationships among information artifacts, audiences, and designers in specific contexts but also to discuss the relationship of information and emotion by considering the communicative situation as a whole, in which the information, the audience, and the designer are closely related to one another. In contrast to the two other views of information design, information design as analytical representation or persuasive communication, neither of which discusses emotional connection in their view of communication, conceptualizing information design as an art of invention and discovery provides a possibility for bringing the discussion of emotion into the study and the practice of information design. Also, it allows us to model the

relationship among information artifacts, designers, and audience in a particular context.

Chapter 4

Modes of Wonder as Layers of Discovery

Theme of study: wonder and layers of discovery

In the preceding chapters, the problem of information design was identified as a lack of substantive theory that encompasses emotion and information design. Through the examination of different conceptualizations of information and existing views of information design through literature review, I proposed the central hypothesis of this study that information is a medium for human actions, which mediates the designer and the audience through building their emotional connections to a situation. Based on this hypothesis, the goals of the next two chapters are to provide two theoretical frameworks that are core parts of this dissertation: Modes of Wonder in Chapter 3 would allow designers to model an audience's emotional experience in relation to information artifacts, whereas the Point of View framework in Chapter 4 helps us to describe design strategies used for creating information artifacts. Put simply, Modes of Wonder focuses on the relationship between information artifacts and audiences, while the Point of View framework illustrates the relationship between information artifacts and the designer who has created a specific response to a particular design problem (Figure 4.1).

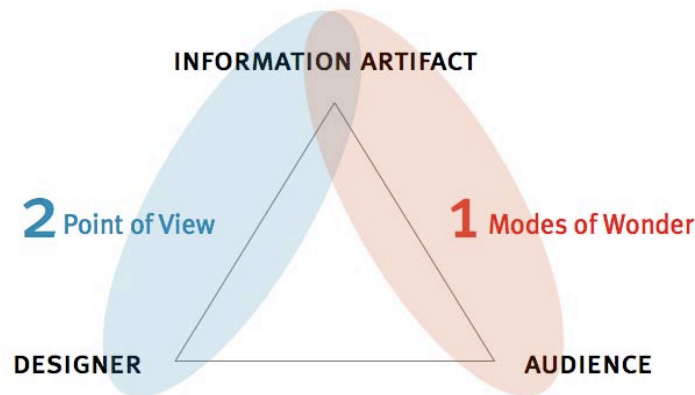


Figure 4.1. Framework of the experience of wonder

Chapter 4 focuses on Modes of Wonder. I begin this chapter by presenting *wonder* as the theme of study, and wonder as a place of discovery that helps us to describe a different way of experiencing information artifacts in diverse communicative situations. In order to better understand the notion of a place of discovery, the discussion of rhetorical questions and stasis theory is useful for the

introduction of wonder as a principle of communication that is closely connected to the audience's discovery experience.⁹² Next, after examining different thematic variations of wonder through a literature review in philosophy and psychology, I propose Modes of Wonder as a descriptive framework that allows designers to model an audience's emotional experience in relation to information artifacts. Last, I conclude by suggesting that each mode can be seen as a layer of experience that provides a metalanguage that models one's emotional experience in relation to information artifacts.

Issues as places for discovery in communicative situations

Communicative situations are described in various ways. Each situation can be identified by the subject matter being discussed. Situations can be differentiated from one another by those who are participating in them, or by the purpose of the communication taking place in each situation. In classic rhetoric, communicative situations are primarily characterized by specific issues that arise when arguments occur. For ancient Greeks and Romans, issues are rhetorical questions that are used to identify different kinds of conflicts so that they can create an effective argument within a particular situation, such as a court or a political assembly. According to Roman rhetorician Cicero, "there will always be one of four issues applicable to every kind of case,"⁹³ before illustrating each issue involved in different kinds of dispute. The four issues include the following definitions: 1) a conjectural issue is a question about a fact 2) a definitional issue is a question about a name 3) a qualitative issue is about the nature of an act 4) a translativ issue is about legal processes. For example, when controversy about the existence of a fact arises, the question "did it really occur?" should be raised; the question "what happened?" should be asked in response to the conflict of a definition. Determining the issue of fact or existence is different from agreeing on the issue of name or definition, as each issue helps to identify different kinds of problems in communication. These four issues are also called Stasis theory, which "helps one discover both the nature of the argument and the tipping point of a case, suggesting where to push."⁹⁴ Stasis

⁹² Principle has many meanings. In this article, I use principle as ideas that "initiate and guide any planned activity," as Joseph Schwab states. See Joseph J. Schwab, "What Do Scientists Do?" *Behavioral Science* 5:1 (1960): 2.

⁹³ Cicero, *De Inventione*.

⁹⁴ The origin of Stasis theory goes back to Hermagoras of Temnos around 150 BCE, and Cicero and the *Rhetorica ad Herennium* author spread its use in their books. "Stasis" in Greek means both "strife"

refers to the point at which conflicting points of view meet, and stasis occurs during the invention stage of rhetoric. Put simply, issues are places where arguments arise.

The use of the four issues is not limited to resolving controversy in a legal or a political dispute. In “Design and the New Rhetoric,” design theorist and researcher Richard Buchanan states, “these four *quaestio* or rhetorical questions...identify the master issues in the development of any argument, idea, art, or other subject.”⁹⁵ By illustrating each issue in the exploration of the origin, definition, methods, and evaluation of design, Buchanan demonstrates how the four issues can be useful to not only propose an outline of rhetorical inquiry of design but also identify any rhetorical themes in design discourse. Also, professors of professional writing and English Jeanne Fahnestock and Marie Secor explore the usefulness of identifying the stasis of an argument, whether it concerns as an issue of fact, definition, cause, value, or action, in order to examine scientific and literary argument.⁹⁶

The use of stasis questions would also be useful in design practice to allow designers to focus on one particular issue over others based on the purpose and the problem of communication. The emphasis on an issue that is relevant to the goal of communication can help to create clear and effective communication rather than conflating different kinds of issues altogether. Consider designing an advertisement for a new mobile phone. There may be a number of ways to create an advertisement depending on the primary focus of communication. First, if an advertisement is concerned with introducing a new mobile phone to the market, the primary focus is to let the potential customers first become familiar with its existence (conjectural). To that end, emphasizing the name of a mobile and its novelty in a simple, elegant and visually exciting way can be more effective than offering all of the details about the mobile phone itself. Once the potential customers recognize its existence, the next step is to describe what the product is and how it works (definitional). Describing functions and features is useful for users to better understand and use this product. Third, if there are similar types of products on the market, the next concern can be built around making a distinction between this particular product

and “immobility.” Steven Lynn, *Rhetoric and Composition: an Introduction*. (Cambridge: Cambridge University Press, 2010), 71-72.

⁹⁵ Richard Buchanan, “Design and the New Rhetoric: Productive Arts in the Philosophy of Culture,” *Philosophy and Rhetoric* 24:3 (2001): 187.

⁹⁶ Jeanne Fahnestock and Marie Secor, “The Stases in Scientific and Literary Argument,” *Written Communication* 5 (1988): 427-43. Note that there are five stasis questions instead of four. The fourth (value) and the fifth (action) question can be subsumed together under *translative* issue.

and others (qualitative). In this case, comparing or contrasting this mobile phone with a rival brand can be an effective strategy, especially when these products are competing in the market.⁹⁷ Last, while products in different brands appeal to the same audience, the same product needs to appeal to a range of audiences, from college students to middle-aged housewives. This calls for a need to create a series of advertisements that appeal to different segments of users so that they become aware of the relevance and values of the product to themselves (translative).⁹⁸

Despite the relevance and the significance of issues in creating clear and effective communication in design, the discussions of issues have not appeared in design discourse in contrast to rhetoric and other communication-related studies. This does not immediately threaten design practice because finding an appropriate issue in the communicative situation has been already considered significant by many experienced designers intuitively when they create effective communication. However, I argue that there is a need for a theoretical framework that would allow design researchers, educators, and practitioners to better understand the problem and the issue, to articulate their design process, and to critique the final product. Furthermore, issues are not just places where arguments arise, but also *places for discovery*. Identifying different kinds of issues, whether of existence or definition, leads to different ways of communicating in the situation; it also affects the way the audience emotionally experiences the communicative situation, as what is discovered in each situation is based on the issue as a primary communication focus. Put simply, issues provide different ways of examining the same subject matter or phenomenon, and lead to different discoveries.

There are two reasons why I selected wonder as the theme of this dissertation among many emotions. My claim is that wonder, not merely as a discrete emotion but rather as an emotional experience that unfolds over time, can describe different layers of experience in relation to what is discovered in each layer. This notion of different layers is also closely related to the issues or stasis questions that were discussed at the beginning of this chapter in that they provide a means to describe the focus of communicative situations in consideration of its effect on the

⁹⁷ One of the common strategies in advertisement is to compare one product to another rival brand in the market, such as Pepsi and Coca-Cola advertisements in print and video, or the recent Dove TV advertisement, which promotes the quality of the product in comparison to other anonymous body cleansing products.

⁹⁸ In a Wii TV advertisement, the focus is to expand Wii users from the younger generation to the older generation along with female users, who were not considered to be target users for video console games, by emphasizing the value of Wii as family leisure time rather than personal entertainment.

audience. Communication does not simply end when a set of facts are transferred to the recipient; the process of communication may end at some point, yet it is not complete until the audience transforms it into something meaningful and valuable. In this respect, information artifacts should be designed in such a way that the audience not only understands what is apparent and present, but also discovers and is able to realize beyond what is readily perceivable by exploring its various relationships to other information, people, actions, and values.

There is another important reason why wonder has been chosen as a theme of this study. Wonder unites one's intellectual and emotional experiences. We desire to know, and what we think we know already may become useless. Wonder as emotion that connects ignorance and knowledge is clearly described by Emily Dickinson's poem as the following:

Wonder – is not precisely Knowing
And not precisely Knowing not –
A beautiful but bleak condition
He has not lived who has not felt.⁹⁹

What we mean by knowing cannot be separated from the way we feel. Wonder, as the beginning of one's act of knowing, continuously questions whether, what, how, and why we know. Although we already have some knowledge about a particular thing, it can change when we experience a sense of wonder, and then acquire new information about it. In this respect, wonder is a principle of communication in any situation, which inspires one to constantly move from the state of unknown to that of known. Thus, designing information is creating inquiry into a situation, which leads the audience to different layers of experience based on what is discovered in a particular situation.

What is wonder?

According to the Oxford English dictionary, the first definition of wonder is the “a cause of astonishment or surprise: something that excites wonder.”¹⁰⁰ Though this interpretation of wonder is quite common, associating wonder simply with a feeling of surprise or astonishment is not adequate to investigate its full potential, especially in pursuit of the experience of discovery. Similarly, wonder is neither one of the primary emotions nor the most frequently mentioned emotion in studies from the

⁹⁹ Emily Dickinson, “Wonder – is not precisely Knowing,” in *Dickinson: Selected Poems and Commentaries* (Cambridge: Harvard University Press, 2010), 455. (Original work published 1331)

¹⁰⁰ Oxford English Dictionary

perspectives of scientists or constructivists.¹⁰¹ In *Wonder: from the Emotion to Spirituality*, Robert Fuller offers a reasonable explanation for this by stating, “wonder has been little discussed as a topic of scientific study because biologists and psychologists tend to emphasize emotions that lead to the performance of adaptive behaviors or immediate survival value.”¹⁰² Following Fuller, conceptualizing emotion as a feeling of physical agitation or a socially constructed behavior does not lead to further exploration of different natures of wonder beyond a physiological level.

In contrast to the scientific standpoint, wonder has been described as one of the primary emotions in the context of the philosophical study of emotion, where the role of emotions is central to ethics in making the right judgment. For Plato and Aristotle, wonder leads people to begin to philosophize.¹⁰³ According to Lorraine Daston and Katharine Park’s reading in their book, *Wonder and the Order Nature*, Aristotle’s view of wonder as the origin of philosophy puts wonder as the first and foremost sense that leads to a philosophic inquiry seeking universal truths. This sense of wonder as intellectual curiosity contrasts with that of wonder as surprise; while the former is elicited by the ordinary, the latter is evoked by the particular and extraordinary.¹⁰⁴ By conceiving wonder as “the affection of a philosopher,” wonder has become one of the primary emotions. In other words, wonder as a desire for learning is distinguishable from other kinds of emotions, such as anger, sadness, or happiness, because the former leads one to an inquiry by providing a beginning point whereas the latter regards an emotional response as an ending point.

In the seventeenth century, Rene Descartes and Benedict De Spinoza also discussed wonder in the context of passions and ethics.¹⁰⁵ Descartes’s view has many parallels with that of Aristotle in that both see wonder as the beginning of one’s creation of meaning; yet Spinoza’s discussion of *astonishment* points to another

¹⁰¹ Robert C. Fuller, *Wonder: From Emotion to Spirituality* (Chapel Hill, NC: The University of North Carolina Press, 2006)

¹⁰² Ibid.

¹⁰³ “I see, my dear Theætetus, that Theodorus had a true insight into your nature when he said that you were a philosopher, for wonder is the feeling of a philosopher, and philosophy begins in wonder. He was not a bad genealogist who said that Iris (the messenger of heaven) is the child of Thaumas (wonder).” See Plato, *Theætetus* (The Dialogues of Plato) Est. 400 B.C.

¹⁰⁴ See Lorraine Daston and Katharine Park, *Wonders and the Order of Nature, 1150-1750*. (Cambridge: Zone Books, 2001), 311. “Aristotle had made wonder the origin of philosophy, but it was a wonder engaged first and foremost by the ordinary, and a philosophy that aimed at universals (as opposed to the wonder in the medieval sense, as particular and extraordinary.)

¹⁰⁵ Descartes, “The Passions of the Soul” in *The Philosophical Works of Descartes*, trans. By Elizabeth S. Haldane and G. R. T. Ross (Cambridge: Cambridge University Press, 1972), 358.

aspect of wonder, which is the mind's connection to an object that leads to a feeling of wonder or astonishment.¹⁰⁶ Their discussions of wonder and astonishment are useful not only to reveal different aspects of wonder but also to understand wonder as a primary human emotion that connects a person to the world. For this reason Descartes chose wonder as the primary human passion because it provides a beginning to one's reaction to the world.

In addition to these earlier attempts to understand the nature of wonder from diverse perspectives, some recent psychological studies have revealed that wonder is closely related to the evolutionary-adaptive functions of other emotions.¹⁰⁷ These studies follow Darwinian tradition, yet each study focuses on the emotion's different aspects. For example, psychologist Jonathan Haidt discusses *awe* and *elevation* in relation to wonder by stating that they make people open up, seek contact, and create positive feelings in contrast to other moral emotions, such as disgust, which "makes people close off and avoid contact."¹⁰⁸ Psychologists Silvan Tomkins and Carroll Izard's discussions of *interest* also provide valuable insight into another aspect of wonder: *interest* motivates sustained involvement with one's environment where the person can explore, engage, and learn.¹⁰⁹ Tomkins and Izard did not include *wonder* in their nine innate major affects, yet their discussion of *interest* is relevant to indicate its relation to "long-term constructive and creative interaction with the environment."¹¹⁰ Another point worth noting in their discussions of emotion is the distinction between *interest* and *surprise*. As Haidt compares *awe* to *surprise*, Tomkins points out that *interest* is an affect that increases an individual's attention level; while one stares fixedly or tracks an object with interest,

¹⁰⁶ Spinoza defines astonishment as "the imagination of an object in which the mind remains fixed because this particular imagination has no connection with others." See Benedict De Spinoza, *Ethics*, James Gutmann, ed (New York: Harfner Publishing Company, 1968), 175.

¹⁰⁷ Izard cited in Fuller. For an original discussion, Carroll E. Izard, "Organizational and Motivational Functions of Discrete Emotions," in *Handbook of Emotions*, edited by Michael Lewis and Jeannette M. Haviland, 631-41. (New York: Guilford Press, 1993).

¹⁰⁸ Haidt states, "awe seems to make people stop, admire, and open their hearts and mind." (Haidt 2003, 863). His view of awe followed psychologist Nico Frijda's description of wonder as "a passive, receptive mode of attention in the presence of something unexpected" just as surprise or amazement; yet, Haidt further expands Frijda's view from a reflexive emotional response to the novel to an active and moral attitude, particularly by introducing the idea of *elevation* as another related emotional experience. For a detailed account of awe and elevation, see Jonathan Haidt, "The Moral Emotions," in *Handbook of Affective Sciences*, ed. Richard J. Davidson, Klaus Scherer, and H. Hill Goldsmith (New York: Oxford University Press, 2003), 863-864.

¹⁰⁹ Tomkins and Izard cited in Fuller, *Wonder: From Emotion to Spirituality*, 37.

¹¹⁰ Ibid.

surprise is a reflexive response to an external condition.¹¹¹ Izard in *Human Emotions* takes this notion a step further by arguing that *interest* is a fundamental motivator that can not only sustain daily work but can also develop skills, intelligence and creativity.¹¹² For Tomkins and Izard, *interest* can lead to revealing other aspects of wonder beyond wonder merely as a passive surprise reaction to an external condition.

Until now, we have seen that wonder is more than simply a reflexive emotional response to an unexpected and novel stimulus that is accompanied by surprise; there are other aspects of wonder that should be further investigated in order to better understand its nature. As is briefly discussed above, regarding wonder as a motivator that opens our senses and minds or as an emotional experience that sustains interaction with one's environment will provide some clue to the existence of other ideas of wonder.

In the next section, I will investigate different ideas of wonder as a framework to articulate layers of experience in relation to discovery. Each mode will be further discussed based on a different philosophic notion with a brief analysis of works of information design, which will illustrate what it means to present information to create a sense of wonder in each mode.

Four modes of wonder

In this section, I will draw out four different ideas of wonder as *Modes of Wonder: wonder, astonishment, amazement, and the sublime*. Examining *Modes of Wonder* in relation to different means of making discoveries also enables us to locate different ways that we experience the world around us. Modes of wonder are *layers of discovery* in the sense that each mode is related to what it is that we discover in a situation: 1) wonder arises when one perceives *the existence* of information that is differentiated from others 2) astonishment arises when one understands the *construction* of information in a novel and unexpected way 3) amazement arises when one discovers the way information is *connected* to an audience in the situation of use 4) the sublime arises when one realizes *a transcendent idea* that elevates a common experience into a spiritual one (Figure 4.2).

¹¹¹ Silvan S. Tomkins and Carroll E. Izard. *Affect, Cognition, and Personality: Empirical Studies* (New York: Springer, 1965)

¹¹² See Carroll Ellis Izard, *Human Emotions: Emotions, Personality, and Psychotherapy* (New York: Plenum Press, 1977).

Each mode will be further discussed through examining a different philosophic notion with a brief analysis of information artifacts, which will illustrate how to present information to create a sense of wonder in each mode. These four ideas of wonder will provide a descriptive framework that can allow us to discuss the effects of communicating information in different types of situations, where different ideas of wonder figure into inquiry.

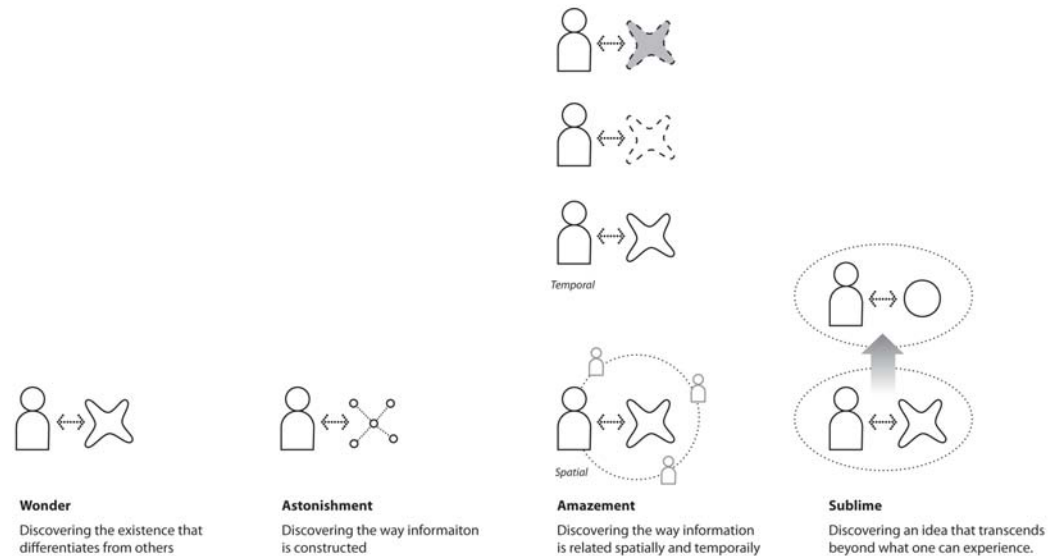


Figure 4.2. Modes of Wonder as layers of discovery

Wonder

The first idea of wonder is encompassed in the following quote, “wonder opens us to an unseen world beyond ourselves.”¹¹³ This is a sense of wonder that we often describe in our own childhood experiences, which are full of wonder and the desire to know. We are curious about everything that surrounds us in our youth; however, we become disinterested or stop questioning as we grow, and soon are no longer fascinated by everything. When we lose this sense of wonder that enables us to open our senses and minds to the world, our connection to the world may not be as strong as when it used to be so that we may feel what happens around us inattentive or meaningless.

This idea of connecting a person to the world is the key to the first mode of wonder, in the sense that wonder is elicited only when one attends to an object or

¹¹³ Fuller, *Wonder: From Emotion to Spirituality*.

an event. Some objects may be striking in themselves yet they may not be of interest unless attention is directed toward the object. In this respect, wonder is regarded as a state of desire that leads to creating meaning through further interaction or engagement. This desire arises through the initial discrimination among the objects that exist, especially in perceiving *the existence* of an object or an event that differentiates it from others; yet what is significant about this mode of wonder is that it is a beginning that enables one to pay attention to or to act further.¹¹⁴

In summary, the first notion of wonder should be understood as a state of desire that leads to creating meanings through further interaction or engagement. This desire in the human soul arises through connection with objects, yet the more significant notion of wonder lies in the existence of humans' will, which enables them to direct their attention or act. As Descartes discusses the utility of wonder "in making us learn and hold in memory things we have previously been ignorant of,"¹¹⁵ the first mode of wonder provides a beginning to one's desires to move from ignorance to knowledge.

Perhaps this concept is best illustrated in Rene Descartes's discussion of wonder in *Passions of the Soul*. For Descartes, wonder is the primary human emotion because it is the first passion that makes one attend to the objects around us.

When our first encounter with some object surprises us and we find it novel, or very different from what we formerly knew or from what we supposed it ought to be, this causes us to wonder and to be astonished at it. Since all this may happen before we know whether or not the object is beneficial to us, I regard wonder as the first of all the passions. It has no opposite, for, if the object before us had no characteristics that surprise us, we are not moved by it at all and we consider it without passion.¹¹⁶

For Descartes, wonder is not a distinct emotion, such as happiness, sadness or hatred. Rather, wonder is the initial differentiation that something exists in the world. Wonder provides a beginning before one creates individual meanings and makes judgments about it.

In *Psychology*, John Dewey also discusses wonder as an intellectual feeling in relation to knowledge. For Dewey, wonder is "the simple recognition that objects

¹¹⁴ For an excellent discussion about wonder and astonishment in the context of art and design education, see Richard Buchanan, "Anxiety, Wonder, and Astonishment: the Communion of Art and Design," *Design Issues* 23:4 (2007): 44.

¹¹⁵ Descartes cited in Lorraine Daston, "Preternatural Philosophy," in *Biographies of Scientific Objects*, edited by Lorraine Daston (Chicago: University of Chicago Press, 2000), 31. Original reference to Descartes, *Les Passions de l'ame* [1649], ed. Genevieve Rodis-Lewis (Paris: Librairie Vrin, 1955), art.75, 119.

¹¹⁶ Rene Descartes, *The Philosophical Writings of Descartes, Volume 1*, tran. by John Cottingham, Robert Stoothoff, Dugald Murdoch (Cambridge: Cambridge University Press, 1985), 373.

have significance for us beyond the mere fact of their existence.”¹¹⁷ Like Descartes, wonder is the initial recognition that something that exists in the world before one even knows what it is. In this respect, Dewey sees wonder as “an attitude” that provides a beginning before it springs into intellectual action in acquiring the meaning of objects. Furthermore, Dewey’s discussions of wonder have parallels with Plato and Aristotle, who regarded wonder as the source of scientific or philosophic inquiry.¹¹⁸ Therefore, wonder is not only “the cause” of an inquiry but also “the continuer” that enables one to discover what exists and why it exists in his or her active relation to the world.¹¹⁹ In this way, Dewey regards wonder as the spring of intellectual activity, from which we discover the significance of the objects to which our attention is given.

The following two examples illustrate this aspect of wonder as initial differentiation. These are two covers of the *New Yorker*: one was designed by Saul Steinberg in 1976¹²⁰ and the other by Maria Kalman and Rick Meyerowitz in 2001.¹²¹ Both covers use New York as their subject matter, yet the way each presents the same place is distinguishable from one another based on the issue that was attended at that time and how it is visually expressed. There is something different in this way of viewing New York, which evokes a sense of wonder; this simple recognition of difference is what drives one to wonder (Figure 4.3). However, what makes these issues effectively communicated not only depends upon the choice of issue but also comes from the way each issue is visually presented.

First, both effectively used different perspectives in articulating the social issue present during each time period. Whereas Steinberg takes a three dimensional perspective that emphasizes the view from 9th avenue to the world, Kalman and Meyerowitz choose a bird’s eye view to show New York City’s neighborhoods in equal status. Their choices of perspectives were engaging and meaningful because each vividly described the social situation faced at that time. When Steinberg finished this illustration in 1975, a year before this appeared on a 1976 cover of the

¹¹⁷ John Dewey, *Psychology* (New York: Harper & Brothers, 1886), 305.

¹¹⁸ Plato at Theætetus 155 d (trans. Benjamin Jowett): “I see, my dear Theætetus, that Theodorous had a true insight into your nature when he said that you were a philosopher, for wonder is the feeling of a philosopher, and philosophy begins in wonder.” Aristotle echoes the Theætetus passage at 982b12 of his *Metaphysics*: “It was their wonder, astonishment, that first led men to philosophize and still leads them.”

¹¹⁹ Dewey, *Psychology*, 304.

¹²⁰ Saul Steinberg, *The New Yorker* (Mar 29, 1976), cover.

¹²¹ Maria Kalman and Rick Meyerowitz, *The New Yorker* (December 10, 2001), cover.

New Yorker, New York City faced a fiscal crisis. In order to overcome the economic crisis at that time, Steinberg deliberately depicted the world with New York City as its center, whereas other parts of world, even some parts of the United States, are not major concerns for New Yorkers. In this respect, his choice of a three-dimensional perspective with some further exaggeration of detail was quite effective to evoke a feeling of pride and hope from the reader.

Second, both illustrators' hand-drawn expressions were appropriate to communicate these issues in an engaging and humorous manner. The 2001 *New Yorker* cover demonstrates the use of humor as a means of visual and verbal communication. Naming the city's neighborhood like Middle Eastern countries came from the idea that New York consists of different cultural tribes just as does Afghanistan; yet this idea was not easy to implement considering the time, just a few months after the attacks of September 11. Therefore, Kalman and Meyerowitz chose a hand-drawn style using pen and watercolor that is more personal and light in manner, and even inserted a little cartoon figure of a camel on the left-hand corner of the map. In addition, their choice of a flat world-view was effective to depict cultural tribes of the city without emphasizing one's power over the other. This was appropriate to emphasize that we are all New Yorkers regardless of our diverse nationalities or original cultures. This was the core message that needed to be communicated in order to make New Yorkers emotionally and spiritually united so that they could overcome the difficulties post-September 11.¹²²

¹²² For more information about 2001 *New Yorker* cover by Kalman and Meyerowitz, see Sarah Boxer, "A Funny New Yorker Map is Again the Best Defense," *Nytimes.com*, December 8, 2001, Critic's Notebook.

WONDER: DISCOVERY OF AN INITIAL DIFFERENCE

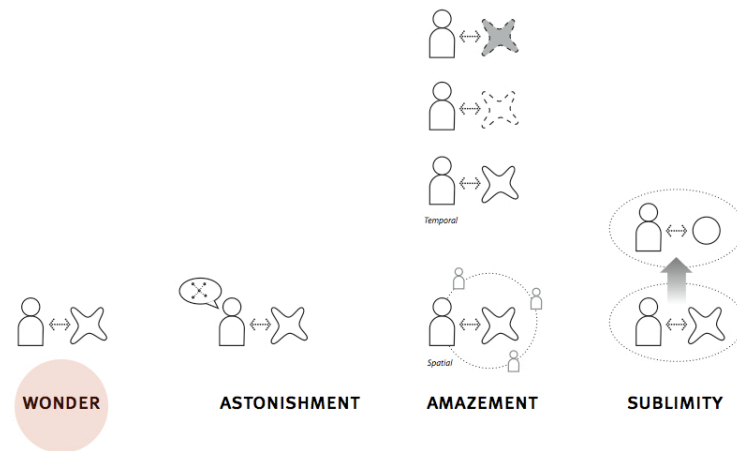


Figure 4.3. Wonder as discovery of an initial difference

Astonishment

The next notion/phase of wonder is associated with surprise. A feeling of surprise is evoked when we encounter an object or an event that is novel, rare or extraordinary, just as we feel wonder at its presence. However, wonder is distinguished from astonishment. Wonder provides a beginning that marks one's initial differentiation in perception; yet the mode of *astonishment* goes further by relating one's inner thoughts to an actual experience.¹²³ In other words, astonishment comes when our internal conception of an object does not correspond to our actual experience of it. This is reflected in Spinoza's view of astonishment when he defines it as "the imagination of an object in which the mind remains fixed because this particular imagination has no connection with others."¹²⁴ Astonishment comes from the incongruity between our expectations and our actual experience: when there is a bigger gap, the level of surprise may increase.

Among the four modes of wonder, this conceptualization has been most recognized and explored as a design strategy. Creating a surprise reaction in

¹²³ Dewey argues that wonder is distinguished from surprise in this way: "Surprise is the emotion experienced when the mind finds itself confronted with an order contravening its established association. Wonder is the emotion experienced before all objective orders whatever." For a complete account of this distinction, see Dewey, *Psychology*, 303-304.

¹²⁴ Benedict De Spinoza, *Ethics*, ed. James Gutmann (New York: Hafner Publishing Company, 1968), 175.

products or marketing is beneficial to both designers and users because it makes the product more appealing in such a way that the recall and the recognition of the product can be increased. For this reason, we often find in our daily lives many design products that use surprise as their design strategy, such as a lamp made up of broken porcelain pieces or a perfume bottle shaped like a hand grenade.¹²⁵ The form of these products is unusual, which makes it easier to grab people's attention and differentiate certain products from their counterparts. For another example, consider the Bonaldo Poly Chair designed by Karim Rashid. The form of the chair is nothing new, yet this chair surprises people by forcing them to question their common expectations of this kind of chair. When they sit on it, they are surprised because it provides comfort, which is not expected from the chair's material, glass poly carbonate. People bring their own expectations of what this plastic chair feels like, yet they feel surprised when their actual experience of this chair does not match these preconceptions.

Whereas this example shows the way designers can apply visual-tactual incongruities¹²⁶ by making use of new materials or creating a new form of products in order to create a sense of surprise, a feeling of astonishment comes when one recognizes the way designers combine the materials, the manner, and the form in a manner that has not quite been realized before. One common example that illustrates users' emotional reactions to products is Apple's i-product series, such as the iPad or iPhone. Some may just *wonder* at discovering the existence of the iPad when they first encounter it, whereas others may be *astonished* at the way designers at Apple were able to combine the materials, technology, or even components from other existing Apple products in a novel way. When information or a product is constructed, designed, or used in a way that questions existing assumptions, it achieves a new meaning that has not yet been conceived before. Astonishment comes after the discovery of existence, when one recognizes that there is something that differentiates the way a particular piece of information or product is constructed, designed, or used. The second mode *astonishment* is when one is astonished at a new meaning that has not quite been realized before. Astonishment is about interpretation, a discovery of new meaning.

¹²⁵ For more examples of products that employ surprise as a design strategy, see Geke D.S. Ludden, Hendrik N.J. Schifferstein, and Paul Hekkert. "Surprise as a design strategy," *Design Issues* 24:2 (2008): 28-38.

¹²⁶ *Ibid.*, 29-30.

Ben Fry's Valence project (Figure 4.4 – Figure 4.5) is another example that is drawn from this mode of astonishment. Valence is a data visualization project that creates representations from very large sets of information from dynamic sources.¹²⁷ Fry developed this method by focusing on employing properties and behaviors of organic systems, and applied them to visualizing data in various contexts, ranging from user traffic on a web site and book contents for an art installation (2001), to biological data for Genome Valence (2002).

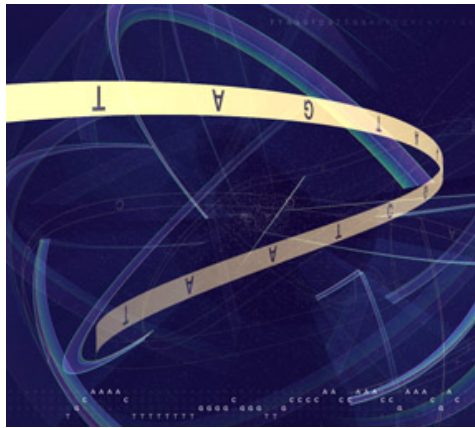


Figure 4.4. Genome Valence.
Copyright © Ben Fry



Figure 4.5. Valence installation in Ars 2001.
Copyright © Ben Fry

Fry's Valence project elicits a sense of astonishment, which leads the audience to discover new meanings in the way data is constructed (Figure 4.6). Indeed, this novel information system enables the audience to be able to see patterns that were not evident before. One of the most effective ways of presenting large sets of data that are constantly changing is to show any patterns that frequently occur. These patterns are not easy to recognize, such as in the linear presentation of book contents where sentences flow. The fact that the Valence system constructs the typical material in an unusual way makes it distinguishable and relevant in discussing how the construction of data can astonish an audience. By transforming a temporal sequence to a spatial structure, Figure 4.5 demonstrates a way in which the audience can explore different kinds of relationships within the same content of a book. For instance, what are the words that Mark Twain used the most in *The Innocents Abroad*? Figure 4.5 shows this pattern by placing more frequently used words outside while pushing less commonly used words to the center, or by attracting two words that

¹²⁷ For more information about Valence project, see <http://benfry.com/valence> (accessed in July 23, 2010) and Ben Fry, *Organic Information Design*, Masters Thesis, MIT, 2000.

are found adjacent in the text as the text is fed into the system. The audience is astonished when they discover any patterns or any meaning that were not realized before. To that end, the Valence project shows that reinterpreting the same data from different points of views provides new meaning for the audience, which is central to the mode of astonishment.

ASTONISHMENT: DISCOVERY OF THE NEW MEANING

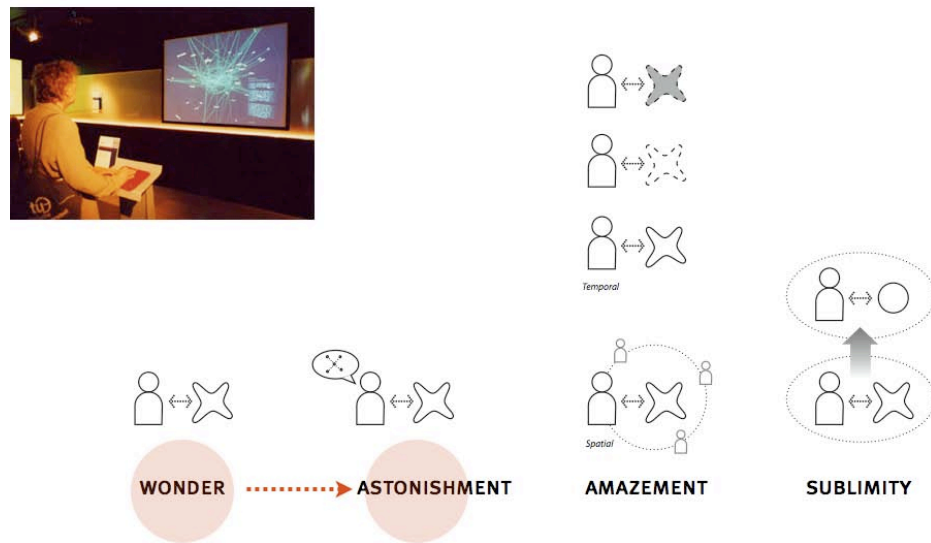


Figure 4.6. Astonishment as discovery of the new meaning

The visualization of a complex information space is not limited to the use of digital media. The arc diagram above developed by Martin Wattenberg demonstrates how musical form can be visually constructed by employing the form of translucent arches in print.¹²⁸ By creating each arch when there are two identical, repeated passages of a musical composition, each diagram visualizes complex patterns that are not obvious when listening to a song. Wattenberg's arc diagram is similar to the Valence project in the way visualization reinterprets a temporal sequence to a spatial structure; yet the Arc diagram moves further by changing the way the same information, rhythms of a song, can be experienced differently. What astonishes the audience most is the moment when they are able to see the rhythm in a poster that they once experienced while listening to a song. Constructing information in this way illustrates a means to not only change a point of view, but also affect the way information can be experienced, more specifically, by

¹²⁸ For more information about the project, go to <http://www.bewitched.com/song.html>; see Martin Wattenberg, "Arc Diagrams: Visualizing Structure in Strings," in *Proceedings of the IEEE Symposium on Information Visualization* (2002), 110.

unexpectedly appealing to different senses and shifting from one's ears to one's eyes.

Amazement

The third idea of wonder focuses on the quality of the experience that unfolds. The concept of *quality* is central to conceive the third mode of wonder as *amazement*, which is distinguishable from the other modes of wonder, as it is found in the definition of wonder as “the quality of exciting amazed admiration.”¹²⁹ Amazement becomes the quality that arises in an experience of an object, an event or an information artifact, whereas two modes of wonder – wonder and astonishment – are drawn from the idea that regards wonder as a state of human desire or an affection of the mind.

In *Art as Experience*, John Dewey provides valuable insight into this notion of quality as it connects a person to an environment. For Dewey, a living organism and its environment are inseparable in the sense that both are constantly modified through their mutual interaction. Quality exists in an environment; yet it becomes a quality to us only when some objects or events affect our experience through our meaningful and engaging interactions with the environment. This is the way Dewey illustrates “having an experience,” because experiences remain inchoate when they do not offer any meaning, value, or quality to us.¹³⁰

Understanding wonder in relation to one's experience is reflected in Fuller's discussion of wonder in this way:

Wonder is first and foremost an experience; wonder as an emotional experience (an activity whereby an organism responds to its environment) rather than as simply an emotion.¹³¹

Fuller sees wonder as an emotional experience in the religious context, yet this experiential aspect of wonder can be also found in other contexts, such as reading a novel, watching a movie, or going to an exhibition. This way of conceptualizing wonder as amazement with an emphasis on the quality acquired throughout an experience can illustrate the way individual parts are unified into a coherent experience when a story unfolds. This is also reflected in Aristotle's view of amazement, which reinforces emotional responses in *Poetics* according to professor of Greek language and literature, Malcolm Heath's reading. Heath illustrates that the

¹²⁹ Merriam-Webster's Collegiate Dictionary, 11th edition.

¹³⁰ John Dewey, *Art as Experience* (New York: Perigee Books, 1980). (Original work published 1934)

¹³¹ Fuller, *Wonder: From Emotion to Spirituality*, 33.

emotional effect of a tragedy can be strengthened by the connectedness of individual parts of a story; these parts should be connected by necessity and probability, not by any chance.¹³² This is why Aristotle emphasizes the significance of plot in enhancing the emotional effect of a tragedy, as plot places readers into a flow of emotion rather than a mere sequence of events. Plot, the way parts of a story are connected to one another, evokes a sense of amazement when one explores his or her own pathway through a story.

The way individual parts are structured into a seamless relation, whether it is temporal, spatial, or conceptual, is central to elicit a feeling of amazement, because it is the audience or the reader who discovers the relationship by navigating from one part to the other. In short, amazement is concerned with discovering the *relationship* that is possible: we are amazed at the way information can be related in a certain way. This can be a relationship between a person and a situation, or a relationship between people (Figure 4.8). In this respect, information is not simply an instrument of expression of one's inner thoughts or feelings; instead, it becomes a means of communication that facilitates different kinds of relationships that arise around it.

An information artifact that exemplifies this mode of amazement may be found in Maya Lin's Vietnam Veterans Memorial (Figure 4.7). This memorial demonstrates a design that not only structures data into form but also changes the way visitors experience the memorial. This means of presenting information transforms the way information can be related to an audience in a distinctive way, in particular by telling a story that appeals to the visitors' emotions. What makes Lin's memorial design different from others began with Lin's consideration of viewers' experience in the design. Visiting war memorials can be a boring or meaningless experience to one who does not have any personal connection to the dead or the event itself. Therefore, at the initial conception of the design, the most significant concern for Lin was to create a way of presenting a story that could affect the visitors' emotional responses to the memorial and make them aware of war as an issue. Instead of erecting a large monumental sculpture that symbolizes the war scene, she chose a simple but powerful way of presenting this story. By arranging the names of soldiers in chronological order by date of death, this memorial provides a different experience to visitors, especially to a returning veteran who

¹³² Malcolm Heath, "The Universality of Poetry in Aristotle's Poetics," *The Classical Quarterly* 41:2 (1991): 402.

finds his or her own time frame on the wall and other names with whom he fought (Figure 4.7). This design concept is quite effective, even for the visitors who did not lose anyone in the war or do not have any memory of war. It elicits a sense of amazement that allows individuals to look at the increasing numbers of deaths as the war continued over years, and ultimately question the meaning and the value of a war that sacrificed so many lives (Figure 4.7).



Figure 4.7. Vietnam Veterans Memorial in Washington D.C. Photo by Soojin Jun

AMAZEMENT: DISCOVERY OF THE CONNECTION



Figure 4.8. Amazement as discovery of the connection

The sublime

The last mode of wonder, *the sublime*, is based on the premise that there is an idea that unifies every part into a harmonized one. This idea can be spiritual, ethical, aesthetic, or cultural, depending on the context and purpose of communication. It is “an ideal of beauty, truth, or justice” that offers individuals meaning and values by

serving as a vision that motivates them to participate in the idea.¹³³ Since this idea transcends one's sensorial and emotional experiences, it is often hard to grasp this unifying concept. Therefore, a feeling of *the sublime* is elicited when one *discovers* this idea of the connected whole, especially realizing the way we are all connected to one another. The sublime is about discovering one's consciousness of something and of the consequences of what we are doing because the relationship of one to the whole is significant when everything is connected in a certain way.

In *Critique of Judgment*, Emmanuel Kant defines the sublime as, "The sublime is what even to be able to think proves that the mind has power surpassing any standard of sense."¹³⁴ For Kant, the sublime is not found in any sensible form of an object or a phenomena, but concerns only ideas of reason. This idea, being indeterminate and unbounded, leads us to discover a universal idea just as we try to understand any underlying principle behind nature's chaos. For example, the absolutely great force of nature or the excellent beauty of a work of art are common objects that discuss the sublime experiences.¹³⁵ However, the sublime is not simply an experience of these external causes; it emerges from our consciousness when experiencing the relationship between ourselves and those greater causes in the world, when we realize the connection between ourselves and the world. In this respect, the sublime is distinguished from wonder, astonishment, and amazement in that this fourth mode works on intellectual and spiritual levels rather than sensorial, interpretative, and experiential levels. This is how Kant claims that beauty and the sublime are a judgment of aesthetic reflection, not a judgment of sense. For Kant, only the mind is sublime, because what is sublime is the mind's "attunement" in judging the sublime.¹³⁶

¹³³ Richard Buchanan, "Children of the Moving Present: The Ecology of Culture and the Search for Causes in Design," *Design Issues* 17:1 (2001): 82.

¹³⁴ Emmanuel Kant, *Critique of Judgment*. Translated, with an introduction by Werner S. Pluhar, (Indianapolis, Cambridge: Hackett Publishing Company, 1987), 106. (Original work published 1790)

¹³⁵ According to Kant, there are two kinds of sublime: mathematical sublime and dynamical sublime. Mathematical sublime is triggered by the quantitative magnitude whereas dynamic sublime is elicited by the enormous power beyond one's imagination. These two kinds can be distinguishable by their external causes, yet what is more important is one's realization of the limitation of capacity. Kant writes, "the feeling of the Sublime is therefore a feeling of pain arising from the want of accordance between the aesthetical estimation of magnitude formed by the imagination and the estimation of the same formed by Reason." For a detailed account of two kinds, see Kant, *Critique of Judgment*, 97-125.

¹³⁶ Kant was not the first philosopher who discussed the beauty and the sublime. In his book, *A Philosophical Inquiry into the Origin of Our Ideas of the Sublime and Beautiful*, English philosopher Edmund Burke developed his treatise for beauty and sublime. Kant and Burke are distinguished from each other because Burke's concept of emotion focuses on one's physiological effect whereas Kant's sense of sublime is based on an idea of reason that transcends one's physical senses.

There are other philosophers and psychologists who discuss the sublime by identifying the common characteristics of the sublime upon which most researchers agree across disciplines. According to psychologists Dacher Keltner and Jonathan Haidt, *power* is one of two properties that produce the sublime experience.¹³⁷ They claim that the feeling of the sublime involves being in the presence of a superior power that is accompanied by one's feeling of submissiveness by referring to Edmund Burke's treatise on the sublime and William McDougall's focus on admiration.¹³⁸ For example, we can feel the sublime when seeing a mountain peak for the first time or when having a spiritual realization when entering a temple. Something greater than ourselves in its magnitude or force overwhelms us so that it may lead to evoking a negative feeling such as fear or even horror. In this sense, power is the first characteristic of the sublime.

The next characteristic of the sublime is also related to the presence of a superior power, yet it is distinguishable from power in the sense that the sublime *elevates* us or *overpowers* us. This notion of *elevation* is articulated by Longinus in his discussion of the sublime in inquiring how and what makes good writing. For Longinus, the sublime lies in "a consummate excellence and distinction of language" because a great idea may not evoke sublimity from an audience if it is not properly expressed in some elevated form of language.¹³⁹ However, what is more significant in this characterization of the sublime as elevation is not only the excellence in expression but also the effect of dignity and elevation from the audience. In this sense, the effect of the sublime is not merely to persuade the audience, but "to transport them out of themselves," which is key to Longinus's discussion of elevation.¹⁴⁰ Put simply, the sublime lifts the audience to realize that there is something beyond what humans can experience in their mundane and ordinary lives.

The third characteristic of the sublime is found in realizing an idea that transcends one's sensorial, interpretive and emotional experiences by participating in a greater whole. The significance of "forming a whole" is claimed by Longinus and

¹³⁷ Dacher Keltner and Jonathan Haidt, "Approaching Awe, a Moral, Spiritual, and Aesthetic emotion," *Cognition and emotion* 17: 2 (2003): 297-314.

¹³⁸ Burke (1757) and McDougall (1910) cited in Haidt, "Approaching Awe, a Moral, Spiritual, and Aesthetic emotion," 300-302. See Edmund Burke, *A Philosophical Inquiry into the Origin of Our Ideas of the Sublime and Beautiful* (Oxford, UK: Oxford University Press, 1990). (Original work published 1757). William McDougall, *An Introduction to Social Psychology* (3rd ed.). (Boston, MA: John W. Luce, 1910).

¹³⁹ Longinus, "Longinus, On the Sublime," trans. by W. Hamilton Fyfe, revised by Donald Russell (Ann Arbor, Michigan: Edwards Brothers, 1995), 163.

¹⁴⁰ Ibid.

Kant based on their assumptions that there is neither a determinate nor a universal concept that we can locate in discussing the sublime. We do not call a piece of writing or a speech the sublime when it is filled with adorned expressions or ornate language. Rather, the sublime arises at a certain moment as a bolt of lightening, when we realize an idea that gradually emerges as parts are developed into an organic whole in the composition. This idea can be an underlying principle, value, moral virtue or spiritual belief, which combines disparate parts into an organic whole.

How can these three characteristics of the sublime be applied to experiences with information artifacts? Perhaps, two posters by Milton Glaser (Figure 4.9, Figure 4.12) illustrate a way in which public awareness of social and political issues is raised in relation to a mode of the sublime. Figure 4.9 is “We are African” poster that was designed by Glaser and distributed around New York for a campaign when the UN World Summit on Poverty was held in October 2005. Juxtaposing several hand images of different races to a single hand, Figure 4.9 emphasizes the concept of oneness irrespective of different skin colors. The visual expression of Glaser’s poster is subtle but contrasts to other posters, such as a human right poster designed by Chaz Maviyane-Davies (Figure 4.10) that visually juxtaposes human and steel chains and evokes a sense of astonishment. Advocating design for social change, Glaser claims, “what is even more significant is a change of human consciousness, we can participate in this change.”¹⁴¹ A feeling of the sublime is elicited when we participate in the idea or the issue that was not recognized before. Taking action in response to the circumstances at hand, we realize that we are not individuals but *citizens* who are responsible for the changes and the consequences of what we are consciously or unconsciously doing in the way we live (Figure 4.9).

¹⁴¹ Milton Glaser, “We are all connected,” *Design Issues* 22:1 (2006), back cover.

WE ARE ALL AFRICAN



TO HELP
VISIT
ONE.ORG

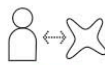


Figure 4.9. We are All African Poster. ©Milton Glaser

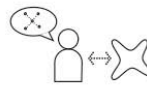


Figure 4.10. Human Rights Poster. ©Chaz Maviyane-Davies

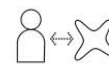
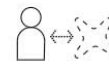
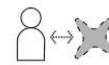
THE SUBLIME: DISCOVERY OF A BIG IDEA



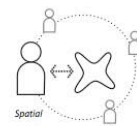
WONDER



ASTONISHMENT

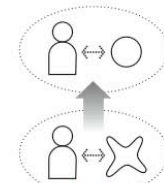


Temporal



Spatial

AMAZEMENT



SUBLIMITY

Figure 4.11. The sublime as discovery of a big idea

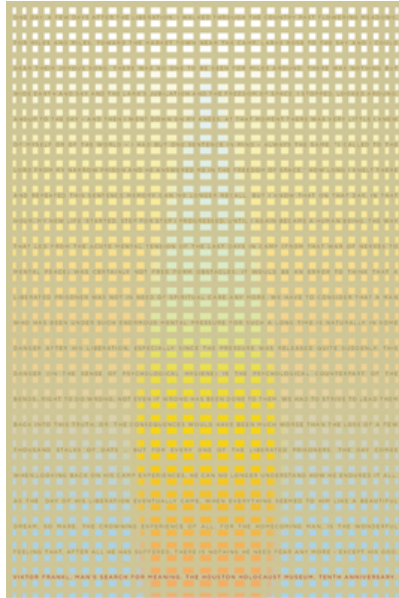


Figure 4.12. Poster for the Holocaust Museum, Houston. ©Milton Glaser

Milton Glaser's poster for the Holocaust Museum in Houston (Figure 4.12) is another example that illustrates the mode of the sublime. Instead of choosing a realistic representation that describes a historic event or people in the event, Glaser selected an abstract representation that consists of small rectangles with a color gradation from light blue to white.¹⁴² On the one hand, a feeling of the sublime is closely related to the visual expression of the poster, in particular by employing the simplified and beautiful form along with an elevated expression of color. This is also reflected in Glaser's statement as an underlying principle of this poster as "its intent is to elevate and enlarge consciousness in the way a work of art does through the use of light and form."¹⁴³

However, what creates a truly sublime experience from the audience is not just found in the use of visually stunning form and color. A greater sense of the sublime is evoked when the audience reads twenty-three lines of small texts that are printed on the poster, which were taken from a book by Victor Frankl, a Holocaust survivor and a psychotherapist who survived Auschwitz.¹⁴⁴ The experience of

¹⁴² When Glaser was asked to design a poster celebrating the tenth anniversary of the museum, the clients asked him not to make a poster too dark to frighten the children who come to visit. This led his final design to be distinguished from other posters that deal with an event like the Holocaust.

¹⁴³ Milton Glaser, "Since then," AIGA National Design Conference, Boston 2005.

¹⁴⁴ This quote presents Viktor Frankl's experiences from the day he left the camp until he found the true meaning of life for the human being, as he writes, "one day, a few days after the liberation, I walked through the country past flowering meadows, for miles and miles, toward the Martet town near the camp. Larks rose to the sky and I could hear their joyous song. There was no one to be seen for miles around; there was nothing but the wide earth and sky and the lark's jubilation and the freedom of space. I stopped, looked around, and up to the sky – and I went down on my knees. At that moment

reading this text enables the viewers to go through the emotional experience of Frankl; readers react to his condition by imagining extreme circumstances that they have never encountered. This may be a visual expression of Longinus's discussion of elevation that transcends the reader from his or her own reality to become conscious of the meaning of life. This subtle but significant point was one that Glaser himself realized through his design process, a feeling of which he also wanted the audience to become aware: *This is perhaps the only meaning of the Holocaust, and it enabled me to design something that was not a reflection of despair but a tribute to the human spirit.*¹⁴⁵ By transforming the horrific emotional experience of the Holocaust into another opportunity to appreciate the meaning and the value of life, this poster effectively appeals to the fourth mode of wonder as experienced through the sublime.

Summary

This chapter presented Modes of Wonder that can allow designers to model an audience's emotional experience in relation to information artifacts. Four thematic variations of wonder – wonder, astonishment, amazement, and sublimity – were examined in relation to examples of information artifacts to demonstrate how each mode can lead to what is discovered by an audience in their experience of information artifacts. Each mode as a layer of experience provides a metalanguage that models one's emotional experience in relation to information artifacts. Modes of Wonder may be used by designers in the planning process as a tool of production when solving a design problem and by educators in classes as a tool for critique.

there was very little I knew of myself or of the world – I had but one sentence in mind – always the same: 'I called to the Lord from my narrow prison and He answered me in the freedom of space.'" In *Man's Search for Meaning* (Boston: Beacon Press, 2000), 96-97, (Original German version published 1946, English translation in 1959).

¹⁴⁵ Ibid.

Chapter 5

Point of View as Mediacy of Information Design

Introduction

In the previous chapter, Modes of Wonder was presented as a descriptive framework that examines an audience's emotional experience in relation to information artifacts. Each mode is closely related to the way an audience makes a discovery and to the way this discovery shapes our act of knowing.¹⁴⁶ For example, recognizing the existence of an object or understanding its meaning is not the same kind of knowing as discovering a new relationship among facts or becoming aware of the big picture. Understanding the various form of knowing associated with various senses of wonder changes the way information is presented. In other words, the way we know is greatly affected by the way information is presented, and the sense of wonder elicited becomes is impacted by this as well. In this regard, wonder is an emotion that connects the state of not knowing to the state of knowing, both by initiating one's desire to know, and also by constantly shifting between what we know and what we don't know.

In this chapter, I shift the focus from the relationship between information artifacts and audience to the relationship between information artifacts and the designer who created a specific response to a particular design problem. The goal of Chapter 5 is to present a Point of View framework that allows us to describe design strategies used for creating information artifacts in response to specific design problems. Through examination of the four thematic variations of Point of View – person, perspective, mode, and principle – I demonstrate the use of this framework in the analyses of several examples of information visualizations that are created for a similar communicative situation. The next section further examines Point of View framework in detail and presents why it is relevant in information design.

Point of view as mediacy of information design

In literary criticism and linguistics, point of view has been conceived as a framework for the “speaking voice” in the analysis of narrative texts. In a story, events may merely be presented in chronological order from a seemingly objective point of view;

¹⁴⁶ According to the Oxford American dictionary, the word “discover” has several meanings and each one is closely related to the thematic variations of wonder presented in Chapter 4. For example, discover as “be the first to recognize the potential” is related to wonder whereas discover as “become aware of (a fact or situation)” is connected to the sublime.

or they may be described subjectively from a specific character's point of view. The readers' experience of the story may vary greatly depending on which viewpoint the story is told from or whether the point of view is singular or multiple.¹⁴⁷ ¹⁴⁸ Perhaps one of the most common uses of point of view can be found in its focus on the narrative person: the narrator who speaks of himself or herself in the story (the first-person narrator), the narrator who "never speaks of himself/herself but rather of characters designated by third-person pronouns" (the third-person narrator), or the story that is told from the viewpoint of a character in the story or without the viewpoint of a character, who knows everything that happens in the story (the omniscient narrator).¹⁴⁹ Each type of narrative person offers a different way of telling a story, which ultimately affects the reader's experience of the story as well.

Although the emphasis on narrative person is still prevalent in the study of point of view, there have been some shifts from the focus on narrative person to other notions, such as *distance* or *mediacy* as there are some problems or limitations that come from treating point of view as narrative person.¹⁵⁰ According to Wayne Booth, professor of rhetoric and literary criticism, regarding point of view simply as narrative person is not adequate for discussing any subtle distinctions in point of

¹⁴⁷ According to Kuno and Kaburaki (1977), certain linguistic form in a sentence can affect its interpretation in terms of point of view. For example, the interpretations of the following three sentences differ due to the differing point of view, like 'camera angles': John hit Mary, John hit his wife, and Mary's husband hit her. In his later work, Kuno (1987) develops the notion of 'camera angle' into the term 'empathy' that is defined as 'the speaker's identification, which may vary in degree, with a person/thing that participates in the event or state that he describes in a sentence.' For an overview of research on the linguistic form as related to point of view, see Susan Ehrlich, *Point of View: A Linguistic Analysis of Literary Style* (London: Routledge, 1990), 4-6.

¹⁴⁸ Susan Ehrlich gives an example of the multiplicity of perspectives by referring to Auerbach's comments on Virginia Woolf's novels as the following:

The essential characteristic of the technique represented by Virginia Woolf is that we are given not merely one person whose consciousness (that is, the impressions it receives) is rendered, but many persons, with frequent shifts from one to another.... The design of a close approach to objective reality by means of numerous subjective impressions received by various individuals (and at various times) is important in the modern technique which we are examining. It basically differentiates it from the unipersonal subjectivism which allows only a single and generally a very unusual person to make himself heard and admits only that one person's way of looking at reality.

Ibid., 2; For an original reference to Auerbach's analysis, see Erich Auerbach, *Mimesis* (Princeton, NJ: Princeton University Press, 1973), 536.

¹⁴⁹ Ehrlich, *Point of View: A Linguistic Analysis of Literary Style*, 6.

¹⁵⁰ This issue has been addressed by numerous scholars since the emergence of modern writing in the twentieth century. For example, Ehrlich (1990) notes, "the terms 'third-person narrative' and 'first-person narrative' are misnomers" by referring to Tamir (1976) who suggests replacing the terms by *personal* and *impersonal* discourse, respectively. Franz Stanzel also states, "The terms which have led narrative criticism to the problem of mediacy again and again since the end of the nineteenth century are 'point of view' and 'narrator' or 'personalized narrator.'" For an extensive overview of earlier works on point of view, see Franz Karl Stanzel, *A Theory of Narrative* (Cambridge: Cambridge University Press, 1986), 9-10.

view or any actual literary effect to the readers.¹⁵¹ For Booth, the discussion of point of view can be further enriched by including “differing degrees of presence and of proximity to the fictional world of the characters.” He offers a critical analysis of point of view conceived as the *degree* of distance between the narrator and the implied author, distance between the narrator and the character in the story, distance between the narrator and the reader, or the *kind* of distance, such as moral, psychological or intellectual.¹⁵²

Literary theorist Franz Stanzel also points out the inconsistent use of point of view in narrative criticism, specifically when its general meaning (‘viewpoint,’ ‘attitude toward a question’) is not distinguished from its special meaning (‘standpoint from which a story is narrated or from which an event is perceived by a character in the narrative’).¹⁵³ For Stanzel, the distinction between these two meanings is significant for examining different *functions* of point of view (deep structure) beyond the narrative form in the story (a surface feature). In this regard, he argues that “mediacy as the generic characteristic of narration” consists of three constitutive elements: *person*, *perspective*, *mode*.¹⁵⁴ Figure 5.1 is Stanzel’s *The Typological Circle* in which each constitutive element, *person*, *perspective*, and *mode*, is presented by the oppositions in order to articulate differences in mediacy.¹⁵⁵

¹⁵¹ At the beginning of his article, Booth points out that it is absurd to count the number of times “I” appears in the text because it does not reveal anything about any actual literary effects that the reader may have. Therefore, he argues for the need for new terms that will improve the literary criticism. See Wayne Booth, “The Distance and Point-of-View: An Essay in Classification,” in *Essentials of the Theory of Fiction*, 2nd edition, edited by Michael J. Hoffman, Patrick D. Murphy, 116-133 (Durham, North Carolina: Duke University Press, 1996). Original work was published in *Essays in Criticism* 11.1 (1961): 60-79.

¹⁵² In his seminal book *The Rhetoric of Fiction*, Booth thoroughly discusses and analyzes the use of point of view in fiction according to the kind of *distance* between the narrator and the implied authors, the reader, or other characters in the story, as well as the distance between the implied authors and the reader. His distinction between *reliable* and *unreliable* narrators or *dramatized* and *undramatized* narrators enables discussion of how point of view is related to literary effects by observing “the moral and intellectual qualities of the narrator,” rather than the “privileged or limited” the narrator’s point of view is. Booth also talks about the distance in terms of several different dimensions, which are not only physical or temporal but also moral, intellectual, emotional. For a more detailed account of “variations of distance,” see Wayne Booth, “The Distance and Point-of-View: An Essay in Classification,” *Essays in Criticism* 11.1 (1961): 60-79. Wayne Booth, *The Rhetoric of Fiction*. 2nd edition. (Chicago: The University of Chicago Press, 1983), 155-159.

¹⁵³ Stanzel, *A Theory of Narrative*, 9.

¹⁵⁴ Ibid., 47. Stanzel states, “Mediacy as the generic characteristic of narration is a complex and multi-layered phenomenon. In order to use this generic characteristic as the basis for a typology of the forms of narration, it is necessary to break down this complex into its most important constitutive elements.”

¹⁵⁵ Ibid., 56.

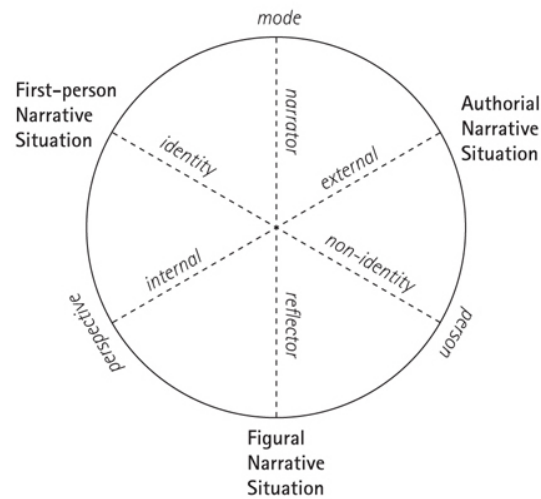


Figure 5.1. *The Typological Circle* by Stanzel¹⁵⁶

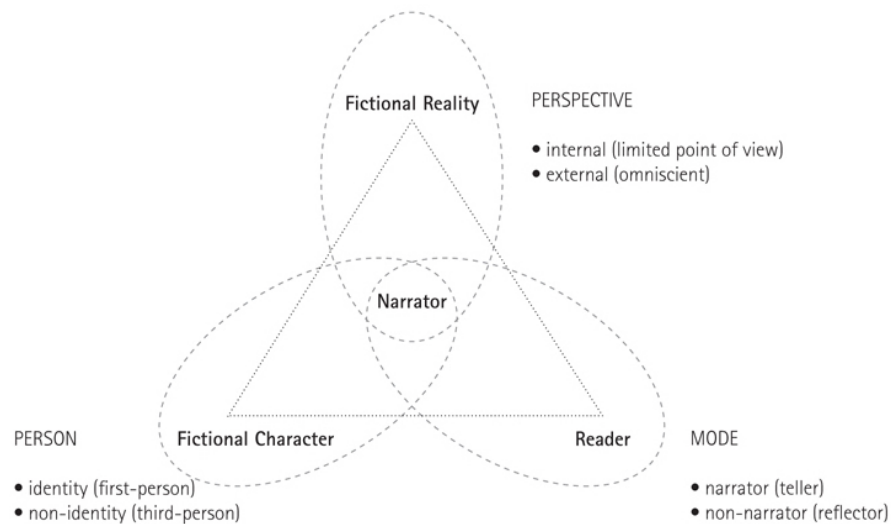


Figure 5.2. Modification of Stanzel's *Typological Circle* by Jun

For example, *mode* with two oppositions refers to the way in which the narrator either “directly conveys information to the reader (teller-character)” or “filters it through the consciousness of one or several of the characters (reflector-character).”¹⁵⁷ Depending on the characteristic of *person*, as identity or non-identity, in terms of the narrator’s relation to the world, whether he or she belongs to the world of the story” or “abides in another postulated realm of existence”; *perspective* is

¹⁵⁶ Ibid.

¹⁵⁷ Ibid., 141.

based on the way in which the narrator perceives the narrated events in the story from an *internal* or an *external* perspective.¹⁵⁸

While Stanzel's *Typological Circle* (Figure 5.1) is a triadic system in which three kinds of narrative situations are characterized by the dominance of one constitutive element over the others, my reconstruction of his framework in Figure 5.2 attempts to emphasize the following two aspects. First, Figure 5.2 centers on *the relations* between the narrator and three elements: the fictional characters (person), the fictional reality (perspective), and the reader (mode). In Figure 5.1, each element is also based on the various relations, yet its binary opposition and its relationship to different kinds narrative situations are prominent. Shifting the focus from *narrative situations* to *relations*, I attempt to deconstruct the binary opposition of perspective, mode, and person in order to explore additional possibilities under each element. Second, Figure 5.2 offers three elements as places for discovery in order to examine the mediacy of information design. Stanzel's Typological circle also comes from the examination of differences in mediacy of a proposed narrative, and his model highlights the relationship of three elements that center on three kinds of narrative situations. In contrast, the purpose of my modification in Figure 5.2 is to provide a framework that would allow us to describe and analyze the diverse use of point of view in the context of information design in which the narration can take the form of either verbal, written or visual narrative.

There are, however, some missing aspects in Figure 5.2 in terms of *perspective*, in the way the narrator or the reader perceives fictional reality. For Stanzel, a distinction between *internal perspective* and *external perspective* lies in whether "the point of view from which the narrated world is perceived or represented is located *in the main character* or *in the centre of events*" or whether it is located "*outside the main character* or *at the periphery of events*."¹⁵⁹ While his opposition perspective as it relates to demonstrating an *internal* or *external* view is one way to explore *perspective*, there is a limitation to conceptualizing *perspective* merely as a physical position or as the narrator's perception of fictional reality, particularly when the narrator's ideological view is *discordant* with that represented in reality. At this level, it is no

¹⁵⁸ Ibid., 111.

¹⁵⁹ Ibid., 111-112. According to Stanzel, examples for internal perspective can be found in "the quasi-autobiographical form or first-person narration, in the epistolary novel, in autonomous interior monologue and where the figural narrative situation predominates in a narrative" in contrast to those for external perspective, which can be found in "narrative texts with an authorial narrative situation and those with a peripheral first-person narrator."

longer a difference in perception that dictates whether the narrator's belief is in accord or in discord with that of the implied author or the fictional character in the story; instead it is related to a difference in ideation (the norm of the work).

Take Unilever's Dove campaign of Real Beauty as an example.¹⁶⁰ In this worldwide marketing campaign launched in 2004, Dove challenges the stereotypical imagery of other beauty products, often symbolized by slim and attractive women, by showing "how our perception of beauty is distorted" by extensive media exposure. Taking an oppositional stance to the objectification of women in other beauty products campaigns, the Dove campaign attempts to argue that real beauty comes from the inside resulting from self-esteem or confidence in oneself.¹⁶¹ This ideational attitude needs to be distinguished from *perspective*, which should instead be named the *principle*.

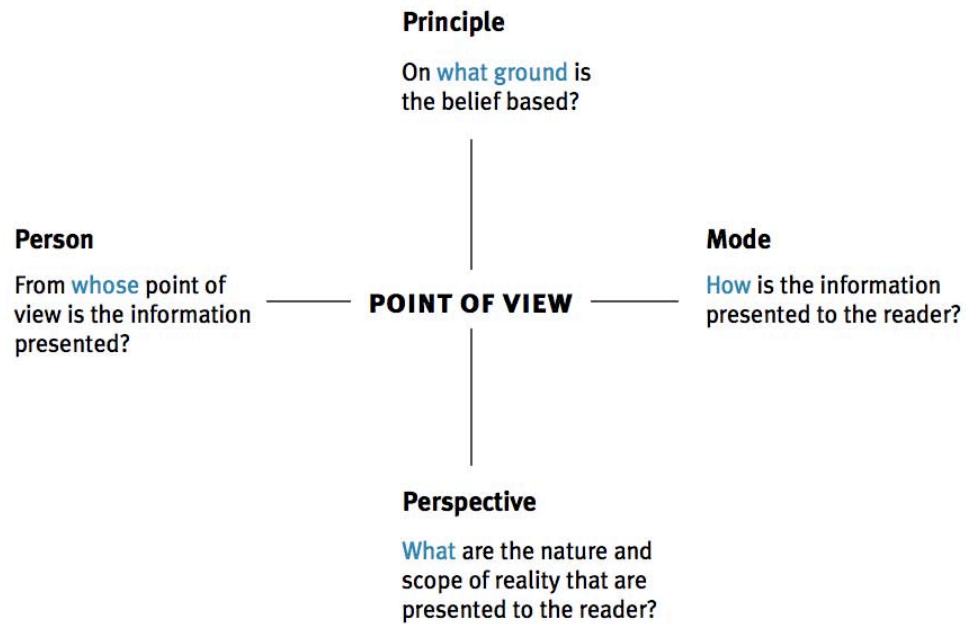


Figure 5.3. Thematic variations of point of view as mediacy of information design

Figure 5.3 illustrates the theoretical framework for this dissertation, which presents four thematic variations of point of view as mediacy of information design: *perspective*, *person*, *mode*, *principle*. This framework will help to broaden one's understanding of point of view in relation to its functional aspects that move

¹⁶⁰ The Dove Campaign for Real Beauty is a worldwide marketing campaign launched in 2004. For Dove's TV campaign for Real Beauty, "Onslaught," go to <http://www.youtube.com/watch?v=Ei6JvK0W60I>.

¹⁶¹ This is reflected on Dove's billboard and magazine advertisement for the Real Beauty campaign. www.campaignforrealbeauty.co.uk.

beyond its focus on narrative person; it also will contribute to providing a framework that can develop design strategies through an inquiry into the following questions: 1) *What* are the nature and the scope of reality presented in information design? (perspective) 2) From *whose* point of view is the information presented? (person) 3) *How* is the information presented to the reader? (mode) 4) On *what* ground is the belief based? (principle). These questions do not represent mutually exclusive categories for the purpose of analysis. Instead, they should be regarded as “places” or topics that provide “tools of inquiry” in analysis, exploration, and generation of various forms of mediacy for information design.¹⁶² For example, some people can consider point of view as the *perspective* from which individual elements are structured and visualized while others can focus on the aspect of the *person* from whom information is perceived and interpreted. Others might regard perspective as the *mode* by which information is reconstructed and experienced through the process of action in contrast to the *principle* in which one’s belief or idea is grounded.

The purpose of the above framework is twofold. First, it offers terminology and a theoretical framework which are relevant in examining diverse uses of *point of view* as the mediacy of information design. In fact, point of view is not a new concept, in that its application and related terminology have appeared in visual studies and social semiotics in the analysis of levels of meaning in images (Kress and van Leeuwen 1996; Unsworth 2001; Rose 2007). For example, in their 1996 book *Reading Images*, Kress and Van Leeuwen use the terms, *direction of gaze*, *distance*, and *angle*, in the context of understanding “a particular social relation between the producer, the viewer and the object represented,” specifically by discussing the level of attention and involvement between the viewer and the participants in the image.¹⁶³ While these terms are still useful for analyzing the physical, social and emotional relationships between the viewer and the represented participants in the image (interpersonal), the use of point of view could be improved by the discussions

¹⁶² According to Buchanan, “places” or master topics are “intellectual tools with a long formal tradition in Western culture and a long informal tradition in Eastern cultures.” These places are significant for generating creative thought in design or any other field, because their real power “lies in what we can do with them inquiry.” For a detailed account of “places” or *topics*, see Richard Buchanan, “Children of the Moving Present: The Ecology of Culture and the Search for Causes in Design,” *Design Issues* 17.1 (2001): 75.

¹⁶³ In their 1996 book *Reading Images*, Kress and van Leeuwen present three ways of decoding meaning in images. These include *ideational*, *interpersonal*, and *textual*. For further discussion of this idea and more examples, see Gunther Kress and Theo van Leeuwen, *Reading Images: The Grammar of Visual Design*. (New York: Routledge, 1996), 41-43, 94-98.

of other kinds of relationships between an image and reality (ideational) or the relationships among the information components (textual).

Second, this framework is useful to explore a set of design strategies that will be effective in particular communicative situations through analysis of information design projects. Figure 5.4 presents a few exemplary sets, which designers can further apply to create various kinds of emotional effects in the audience experience of a design. For instance, Stanzel's constituent *person* presents the opposition of *identity* and *non-identity* to whether the realms of existence of the narrator are *identified* with those of the fictional characters, yet a given list of sets in this category can still be further expanded depending on its focus within the character. While *identity* and *non-identity* illustrate emotional distance between the narrator and the fictional character, the terms *single* and *multiple* focus on the diversity of voices within a story, particularly on whether information is presented from the viewpoint of a single person or multiple persons. Therefore, the notions of *identity–non-identity* or *single–multiple* are able to provide different kinds of strategies for examining the nature of a character.

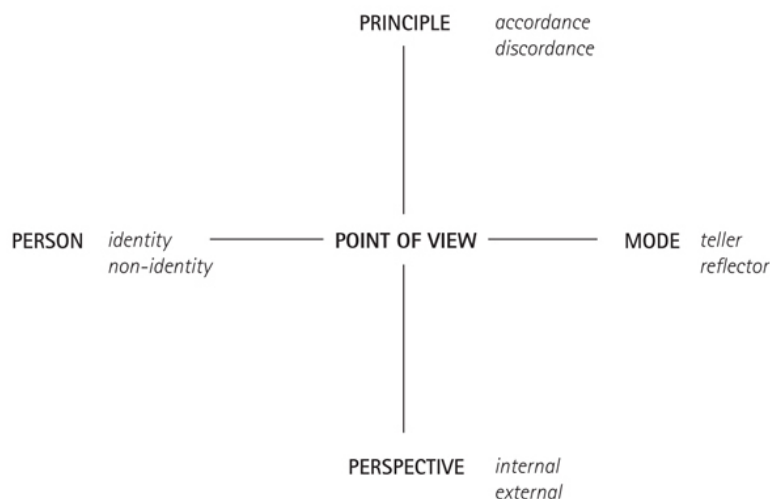


Figure 5.4. Exemplary set of design strategies

In what follows, I will examine ways in which the Point of View framework can be used to describe design strategies using examples of information design, from charts to interactive information visualization.

Point of view as mediacy of information visualization: perspective and person

Information visualization as an academic research discipline began with its focus on “displaying structural relationships and context that would be more difficult to detect by individual retrieval requests.”¹⁶⁴ Traditional information visualization systems are designed to perform analytical tasks for expert use; yet their use has now been extended to visualize data in everyday lives, for functions ranging from social connections to artistic purposes.¹⁶⁵

Perhaps one of the most common applications of point of view in information visualization can be found in the use of perspective. Simply put, perspective refers to the viewer’s physical location in relation to the reality that is represented. When presenting some data sets that are selected from reality, the use of perspective can be associated with looking at the same data in different ways, specifically through different types of representation or through different structural representations. The choice of particular structures and forms of representation is based on the choice of the various properties from reality that are reflected in the corresponding information visualization, as well as the purpose and the emphasis of different types of representation. For example, a person’s monthly expense data can be represented by a pie chart, a bar graph, or a line graph. Choosing a pie chart rather than a bar graph should not be regarded as a selection of a different type of representation; rather, each selection provides a different perspective of the same data, emphasizing in one case the comparison among different expense categories (pie chart) and in the other case the changes in expenses over time (line graph).

The use of perspective to illuminate differing aspects of data can be also found in interactive visualization methods, such as focus + context techniques or dynamic queries.¹⁶⁶ While static charts provide a single perspective on data, interactive visualization methods, such as focus + context techniques or dynamic queries, allow users to shift the perspectives of the data, employing real-time manipulation or interactive graphics over time, depending on their focus in maintaining the context of the whole. For example, the hyperbolic browser visualization, one of the focus + context techniques, demonstrates one way of

¹⁶⁴ George G. Robertson, Stuart K. Card, and Jock D. Mackinlay, “Information Visualization Using 3D Interactive Animation.” *Communications of the ACM* 36.4 (1993): 65.

¹⁶⁵ Stuart K. Card, Jock D. Mackinlay and Ben Shneiderman, *Readings in Information Visualization: Using Vision to Think* (San Francisco: Morgan Kaufmann, 1999)

¹⁶⁶ "Focus + context" refers to one of the visual principles where readers are shown the most important data in detail, while at the same time presenting its relationship to the overall context.

presenting a detailed view, by maintaining the overall structure in the context of visualizing large hierarchies, such as organizational charts.¹⁶⁷

There is another use of perspective in interactive visualization methods, specifically *organizing* data according to different variables.¹⁶⁸ For instance, the Film Finder enables users to reduce the number of movies in the display by adjusting each slider or button used for movies. This is the *dynamic query* method, in that it provides continuous real-time feedback to users during their query process in their exploration of large databases.¹⁶⁹ By providing multiple points of views to the same data sets, the viewers are able to customize their access to data based on their needs and on the tasks performed.

The two ways of exploring the relationships among the data points, as shown above, demonstrate the use of point of view as perspective. In addition to this, there is another way of exploring a different kind of relationship between information and users, by adjusting the distance or the relevance of information to users. While the previous two means of representation illustrate use of perspective, this example demonstrates the use of *person* as point of view.

The next three figures showing visualizations of the H1N1 swine flu (Figure 5.5, Figure 5.6, Figure 5.7, Figure 5.8) further illustrate this idea of difference between perspective and person. In the first figure, the Flu Tracker (Figure 5.5) presents data about H1N1 incidents by showing the geographical distribution of the flu on a map along with its temporal progress on a bar chart.¹⁷⁰ On the map level, the aggregate data for each country are represented as circles in various sizes and colors according to the number and types of cases, such as probable, confirmed, or fatal. Users can also examine individual cases when they zoom in to specific parts of the map and read individual incident reports (Figure 5.6). Providing both macro and micro views of H1N1 incidents, Flu Tracker allows users to access an overview as well as detailed accounts of individual cases.

¹⁶⁷ John Lamping and Ramana Rao, "The Hyperbolic Browser: A Focus + Context Technique for Visualizing Large Hierarchies," *Journal of Visual Languages and Computing* 7 (1996): 33-55.

¹⁶⁸ Richard Saul Wurman's 5 hatracks (Location, alphabetical order, time, category, and hierarchy) also demonstrate the application of point of view to demonstrate different ways of organizing data.

¹⁶⁹ Christopher Ahlberg and Ben Shneiderman, "Visual Information Seeking: Tight Coupling of Dynamic Query Filters with Starfield Displays," CHI 94, Boston, Massachusetts, USA, April 24-28, 1994. 313-317, 479-480.

¹⁷⁰ Flu tracker is a visualization software developed by a biomedical researcher, Dr. Henry Niman using technology provided by Rhiza labs and Google. See <http://rhiza.com>



Figure 5.5. Flu Tracker in a macro-view. Copyright © 2009 Rhiza Labs, LLC

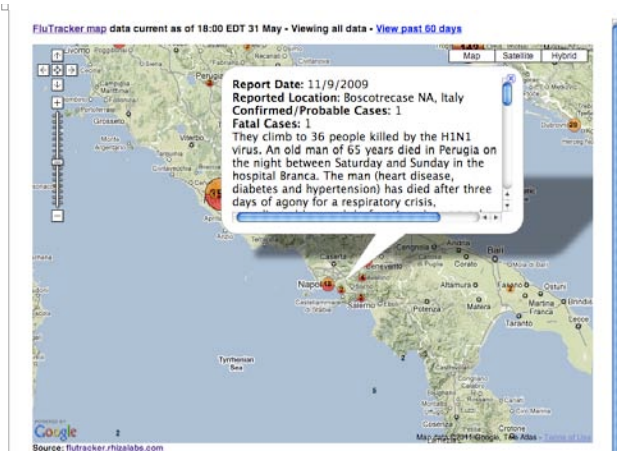


Figure 5.6. Flu Tracker in a zoomed-in view. Copyright © 2009 Rhiza Labs, LLC

Similar to Flu Tracker (Figure 5.5, Figure 5.6), the H1N1 flu map at flu.gov (Figure 5.7) visually presents H1N1 and influenza activity across the states; yet it focuses on comparing the activity among the states rather than its overall temporal progress. This focus reflects the difference in purpose of the visualization at flu.gov versus that of Flu Tracker (Figure 5.5), in that it offers the user a detailed view about the flu and the current status of a particular location.¹⁷¹ Through visualization of the monthly progression of flu per location by categorizing influenza activity from “no activity” to “widespread” per state, this flu visualization (Figure 5.7) can provide users with data that are more relevant to their needs, particularly by illustrating H1N1’s activity in their place of residence.

In contrast to the data that are presented as numbers in tables or charts, the two examples of information visualization above point to different usages of *perspective* in order to monitor the activity of H1N1 at a macro level, as well as to examine individual cases on a micro level which is relevant to particular needs. However, it is not clear that considering perspective as different types of representation or at a macro/micro level is sufficient. At this point, the question arises: what is the difference between data presented on a table versus data on a map? Is it a matter of choosing a formal presentation that is either abstract or representational? Are there any differences in the way each type of representation connects information to its viewer, particularly in the sense of changing the way one looks at the situation that is represented through data? Take a look at the following examples in Figure 5.7, where the state level H1N1 virus Lab test data are

¹⁷¹ <http://www.healthmap.org/flu.gov> (accessed April 4, 2011)

represented, on the week of June 9th, 2009 (left) and the week of September 19th, 2009 (right). This example shows that data can be customized to respond to users' queries at different scales; instead of seeing the overall spread of the flu across several states, users can view information about specific H1N1 incidents that occurred in their region or during a particular week. Furthermore, it is possible for users to find various patterns or relationships while they are exploring data in various ways. For instance, from the week of June 9th to that of September 19th, there is an exponential increase by more than 40% of individuals testing positive for H1N1 flu in Western states, such as Oregon, Washington, and California, whereas the rate decreased from 40% to 10-20% in most Southern and Eastern states. What happened during these three months? What does this indicate to the residents in these regions about prevention from catching the flu? Exploring various relations among data with the use of visualization – comparing data on the scale of time and region – may lead to a discovery of patterns that may not have been noticed before.

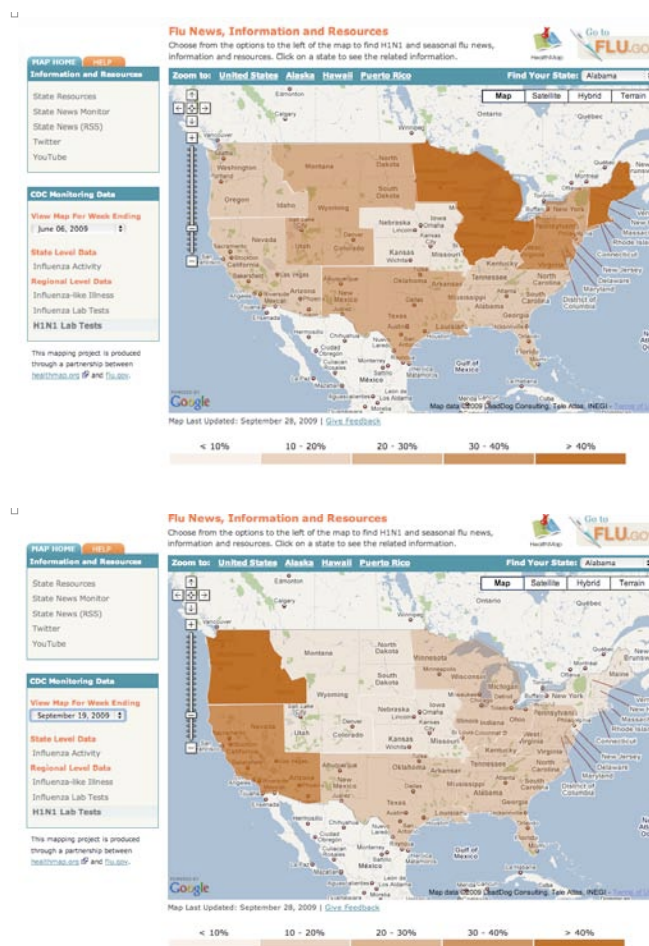


Figure 5.7. H1N1 map from flu.gov website, state level comparison between the week of June 9th, 2009 (top) and the week of September 19th, 2009 (bottom) Copyright © Flu.gov

Status of Death Toll from Domestic Swine Flu Infection						
date of death	Death #1 August 15	Death #2 August 16	Death #3 August 27	Death #4 September 2	Death #5 September 12	Death #9 September 22
age, sex	56, male	63, female	67, male	47, female	73, female	40, female
region	Kyungnam	Seoul	Seoul	metropolitan area	metropolitan area	metropolitan area
health condition	unidentified	high blood pressure	asthma, smoke for 20 years	high blood pressure, diabetes	above 65 years old, high blood pressure	healthy, does not belong to high risk group
infection route	after Thailand trip	local	local	local	USA visit	local
hospitality	7 days	18 days	3 days	8 days	21 days	brain death after 5 days death after 27 days
symptom/COD	fever, dyspnea, blood poisoning	cough, fever, sore throat, muscle ache	cough, expectoration, dyspnea	fever, low blood pressure	fever, cough, dyspnea	fever, chill (encephalitis due to swine flu)
antiviral drugs	5 days later	18 days later	unidentified	10 days	1 day	2 days
dosage point first visit to hospital	1 day	6 days	unidentified	7 days	1 day	1 day

Figure 5.8. Domestic Swine Flu Death Chart, recreated and translated by Jun¹⁷²

Another example (Figure 5.8) points to a different use of point of view, which brings the relationship of information closer to users by offering more detailed information that is relevant to users' needs. This table in a Korean newspaper article presents data about the nine fatalities from the H1N1 flu in South Korea from the beginning of May until the end of September in 2009. At first sight, presenting information with a small size of data samples in a table does not seem to have any advantage over large sets of data on a map (Figure 5.5, Figure 5.6, Figure 5.7) in terms of the amount of data and type of visualization in context. However, this manner of presenting information reveals another important feature that has not yet been discussed: how to connect users and information not only through visual representation but also in the selection and the frame of data that are more relevant to the users' needs in a particular context.

In Korea, H1N1 flu incidents began to occur in the spring of 2009; yet the number of confirmed cases exponentially increased from mid-July 2009, with nine death reported between August and September. Although this number was minimal in comparison to the number of confirmed cases and deaths in North and South America, the prompt increase in deaths over a month-long period put most Korean in a state of fear. The purpose of the table in Figure 5.8 is to present patterns among these nine deaths by offering diverse variables, such as the ages, health conditions, symptoms, and the number of days of hospitalizations for these victims. Figure 5.8 shows some commonalities, namely that 7 out of 9 were above their fifties and had other health problems, except for the ninth victim. In summary, it is significant to note that presenting the H1N1 death cases in this way may express a message about the risks associated with the disease among particular groups within the population. This example suggests another way of selecting, organizing and presenting data in

¹⁷² "Domestic Swine Flu Death," *Yonhap News* (Seoul, Korea), Sep. 22, 2009.

ways that are appropriate to the various information users want to extract from various H1N1 flu visualizations, in particular depending on the type of audience or the context in which the information is presented. While seeking the disease's causes and possible solutions by understanding its progression, etc. is one of the primary concerns of researchers and doctors, providing more a detailed profile of a small number of cases is a more effective means of communication for the general audience who is more interested in flu prevention.

In summary, point of view in information visualization should not be limited to different kinds of representation or different methods of organization. Instead, conceptualizing point of view may have a greater impact as a way of exploring different kinds of connections not only among the individual data within the visualization but also between data and users, so as to discover relationships that are not apparent. Other examples of such applications can be found in the Gapminder Project or Human Disease Map Project (Figure 5.9).¹⁷³ These information visualization projects suggest a different way of inquiring into a situation, specifically by changing the way we look at the world, which also leads viewers to identify a problem and a potential solution in different ways. For instance, Hans Rosling at one of his Gapminder project presentations at TED demonstrates a different way of looking at the current status of HIV by presenting its temporal progress and geographical distribution for 100 years, using animated and interactive statistical visualization. Rosling's presentation helps the audience not only recognize that the distribution of the HIV is not Africa's problem alone, as the rate in other continents is rapidly increasing, but also helps them discover that its geographical distribution among several countries within Africa vary greatly. Identification of the existing problem from a new point of view may suggest a new direction from which to seek a solution.

Mapping the Human Diseasesome (Figure 5.9) also demonstrates a different way of exploring the connections between human diseases and the genes associated with them. Like the Gapminder project, it is useful not only to redefine the classification of diseases by improving the "understanding of the causes of disease

¹⁷³ *Gapminder* is a non-profit venture founded in Stockholm by Ola Rosling, Anna Rosling Ronnlund and Hans Rosling in 2005. The mission of the organization is "to promote sustainable global development and achievement of the United Nations Millennium Development Goals by increased use and understanding of statistics and other information about social, economic and environmental development at local, national global levels." In order to accomplish this mission, they developed the Trendalyzer software, which creates a statistical time series by converting numbers into animated and interactive graphics. For more information on Gapminder and their projects, go to <http://www.gapminder.org>.

and of the functions of particular genes,” but also to search for alternative treatment to the disease.¹⁷⁴ In other words, these two projects point to the power of visualization as a means of not only discovering a problem but also seeking a potential solution to a problem, identified by exploring various kinds of connections.

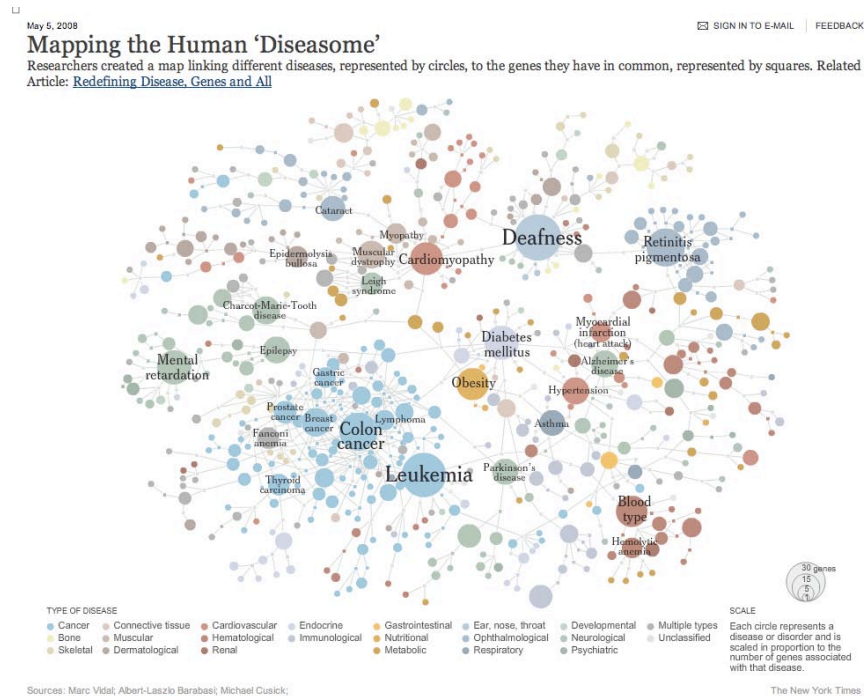


Figure 5.9. Mapping the Human Diseasome, Copyright © 2008 The New York Times

Summary

This chapter presents a Point of View framework, which allows us to describe design strategies used for development of information artifacts. In order to demonstrate the usage of this framework, I analyzed diverse examples by comparing their emphasis on a different mode, such as perspective or person. Many examples, particularly in information visualization, primarily focus on employing *perspective*, in that their emphasis is to visualize the kind of nature and the scope of the reality presented in charts, graphs, or dynamic information visualization. However, we showed that applying other modes, such as *person* or *mode*, would allow us not only to explore different forms of representation but also to produce some emotional effect on the audience, especially by making information more relevant and meaningful to them.

¹⁷⁴ Andrew Pollack, “Redefining Disease, Genes and All.” *The New York Times* (May 6, 2008). Go to <http://www.nytimes.com/2008/05/06/health/research/06disc.html>

Chapter 6

Modes of Wonder and Point of View: Uncovering Design Strategy

Introduction

The goal of this chapter is to demonstrate how two frameworks – Point of View in Chapter 5 and Modes of Wonder in Chapter 4 – can help us uncover plausible design strategies in a particular context of information design. To that end, I examine three cases of information artifacts – The Titanic Exhibit, books by David Macaulay, and the I Like Seoul Campaign – all of which respond to specific design problems through the use of the thematic variations of Point of View and Modes of Wonder as conceptual tools for analysis. Each analysis consists of an overview of the information artifact, two or three design strategies uncovered based on the Point of View framework, and the analysis of the audience’s emotional experience which is mapped out based on Modes of Wonder. Through these demonstrations, I argue that my framework provides us with a unique approach for investigating the complex relationships among the information artifacts, the designers and the audiences, which encompasses rational and emotional aspects of communication.

Example analysis 1: Titanic, The Artifact Exhibition

Titanic, The Artifact Exhibition showcases actual artifacts that were recovered from a debris field 2.5 miles beneath the surface of the North Atlantic after the ship’s wreck during its maiden voyage on April 15, 1912.¹⁷⁵ The story of the Titanic has been retold in numerous books and movies; perhaps one of the reasons the story of the Titanic still attracts so many people nearly a hundred years after its occurrence is the dramatic element of human stories of those who were onboard this legendary ship. Thus the exhibition is not only a portrait of a famous unsinkable ship from its birth to death; it is also a compilation of stories of people who survived or passed away with the fate of the ship.

While books and movies focus on the story of characters involved in the event, the goal of the Titanic exhibit is to display real objects collected from the ocean floor surrounding the wreck site, thereby telling a story of the ship and the 2,228 souls who

¹⁷⁵ Since the first exhibition in 1991, the Titanic Exhibition have been viewed by over 16 million visitors in 18 countries, including Japan, France, Canada, Brazil, and Australia. One was held in Pittsburgh, PA, USA in the Carnegie Science Center from May 24 through September 1, which is where I was able to visit.

journeyed with her into history. While it is easy for books and movies to sustain an audience's attention as a story unfolds over time, designing an exhibit offers a different challenge to designers in that the experience of the exhibit is temporal and spatial. In other words, the exhibit allows visitors to navigate through the artifacts in the exhibit from their own point of view whereas the books or movies present a story that is told from one of the main character's point of view. Depending on the visitor's motivation or their personal interest in the story, their emotional experiences with the exhibit may vary. For example, when visitors do not have any personal interest in the event or are not familiar with the story, the exhibit may not evoke any emotional response from them, just as a person browsing old artifacts in an antique store. Although visitors recognize the fact that the artifacts they are seeing in the exhibit are real artifacts used in the Titanic nearly a century ago and that they are recovered from an ocean floor 3820 meters deep, these facts may not greatly affect the visitors' perception or experience of the exhibit.

Therefore, building some connection between the artifacts and the visitors is key to designing the exhibit.¹⁷⁶ When creating a situation for the artifacts in which each object tells a story of people onboard or illustrates their experiences in the Titanic, the artifacts become meaningful to the visitors when each piece is seen in context, just as evidence in a crime scene reveals a whole story when all the pieces of evidence are in place.

In what follows, I discuss three design strategies used in the Titanic exhibit, based on the Point of View framework presented in Chapter 5. The diagram below (Figure 6.1) shows how each strategy is related to the thematic variations. For example, person and mode function as mediacy for the Titanic exhibit, particularly in examining the artifacts or the design of the exhibit as it was created to enhance the audience's emotional experience in the exhibit. Also, the examination of each strategy further describes specific Modes of Wonder: wonder, amazement, awe (Figure 6.2).

¹⁷⁶ From the interview with John Williams, principal designer for Titanic exhibition, he states his goals in designing an exhibition is "we recognize part of our role is to re-tell Titanic's story and preserve her legacy. We emphasize the Exhibition as a memorial and as an amazing platform to educate visitors on each part of her unfortunate tragedy." The interview script is available at <http://titanic-shipofdreams.tumblr.com/post/4671237676/interview-with-john-williams-principal-designer-for>. (accessed June 1, 2011).

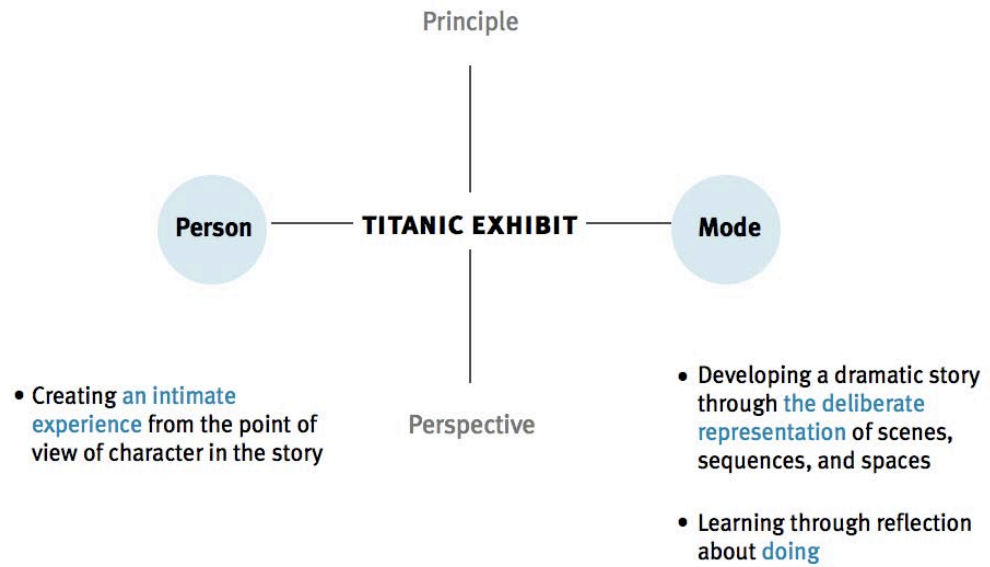


Figure 6.1. Design strategies in the Titanic exhibition

MODES OF WONDER: TITANIC EXHIBIT

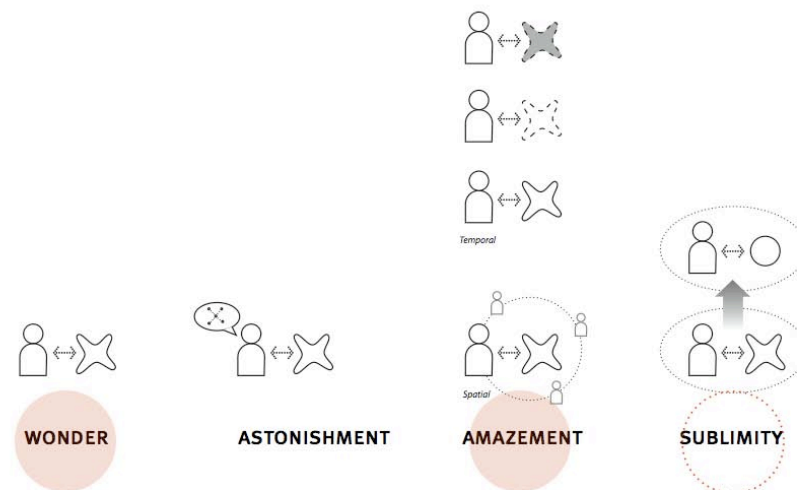


Figure 6.2. Modes of Wonder found in the Titanic exhibition

I. Creating an intimate experience from the point of view of a character in the story

Perhaps what distinguishes the visitors' experiences in the Titanic exhibit from others is first found in the boarding pass given to the individual upon entering (Figure 6.3). Each ticket is a replica of a boarding pass for the ship and has a detailed description of an

actual passenger on the back. These descriptions offer information about each passenger, from name, ticket class, number of people accompanied to the reason that he or she was onboard, along with additional passenger facts. For example, 38 year-old Miss Annie Clemmer Funk was returning to her family home in Bally, Pennsylvania from Janjgir, India on a second class ticket after receiving a telegram that her mother was very ill. Another example shows a story of a 48 year-old woman, Mrs. John Morgan Davies who was traveling with her two sons and two friends to Hancock, Michigan to live with her eldest son after being widowed twice.¹⁷⁷



Figure 6.3. Boarding Pass from the Titanic Exhibition. Copyright © Titanic: the Artifact Exhibition

¹⁷⁷ Each boarding pass has its own ticket number on the back at the top right corner.

Instead of moving through the exhibition from a stranger's point of view, this information in this postcard-size carry-on is useful for visitors to track their passenger's experience on their boarding passes from his or her point of view. Consider the following quote from one of the visitors to the exhibit in the Denver Museum of Nature and Science:

Those boarding passes got all of us emotionally invested before we stepped foot into the exhibit. As we talked through, it was each to *imagine and wonder* if 'we' had been the owners of the artifacts displayed did we wear those glasses? Drink from those cups? And most of all, did we get into any of the lifeboats?¹⁷⁸

The boarding pass creates an impression that this is not just a story of a legendary ship but also the stories of the 2,238 people who journeyed in the ship. In this respect, each object becomes a piece of information that is meaningful and engaging when it portrays the experience of a particular passenger onboard or describes what the experience would be like in the Titanic. Simply put, the Titanic artifacts are not just physical pieces of evidence that demonstrate the veracity of the historical event; they are storied objects that elicit emotional experiences of the people onboard the Titanic.

In addition to the boarding pass which first builds the visitor's connection to the actual passenger, another element that elevates this emotional experience is found in the Memorial Gallery, the exhibit's final display. Upon entering, there are three wall panels that list all the names of the passengers who were saved or lost based on their ticket class (Figure 6.4). At first glance, looking at the huge number of people who were lost overwhelms visitors, particularly in noticing the big difference between third class and first class passengers who didn't survive. Then, a feeling of astonishment turns into a sense of awe or deep sorrow as the visitors locate his or her passenger on the wall. This sentiment is illustrated in the following comments:

Powerful and awe inspiring, this exhibit allows the visitor to see, hear, and feel a small portion of what life and death must have been for the passengers and crew of the Titanic.¹⁷⁹

This was my second time and I still am in *awe* and have a feeling of *sadness* for all of those families broken up and all of the sorrow. This is amazing.¹⁸⁰

¹⁷⁸ <http://childplay.wordpress.com/2007/09/29/titanic-exhibit/> (accessed September 6, 2010) (Emphasis added)

¹⁷⁹ Comments from K.H.Tulsa, OK. <http://www.rmstitanic.net/index.php4?page=234> (accessed September 12, 2010) (Emphasis added)

¹⁸⁰ Comments from anonymous, Salt Lake City, Utah. <http://www.rmstitanic.net/index.php4?page=234> (accessed September 12, 2010) (Emphasis added)

It is not only the connection between the individual visitor and his or her passenger that is built in this exhibit; the emotional connection is also strengthened by bringing the visitors together and allowing them to share in their experiences and the story in the exhibit. For example, a visitor recalls, “by the end of the exhibit, we all really felt like we were the people on our paper.”¹⁸¹ He further describes:

The Golfer. Oh, The Golfer (a third class passenger). I found his wife on the survivor list, but without his name accompanying it. He was so nervous as I searched and searched. I finally found it, along with his brother’s name, on the “Lost” list. I told him that he had most likely placed his wife on a lifeboat, and then stayed behind so more women and children could be saved. And then I started tearing up. I had no idea it would be so emotional by the end!¹⁸²

After he checked the fate of his passenger, he also walked over to ask another visitor with whom he talked in the exhibit if his passenger survived or not. Sharing real stories about their passengers turn strangers into friends; it also creates a sense of leaving the exhibit with some stories to tell or feelings about the journey.



Figure 6.4. The Memorial Gallery in the Titanic Exhibition. Copyright © Titanic: the Artifact Exhibition

II. Developing a dramatic story through the deliberate representation of scenes, sequences, and spaces

What distinguishes one’s experience in the exhibition from the experience of reading a book or watching a movie lies in the difference between spatial and temporal experience. Walking in an exhibit develops the visitor’s navigation through the artifacts on display by controlling their pace and movement, yet it may not create an experience as immersive or vivid as events occurring within a moment in a movie.

In order to develop a compelling story through the visitors’ spatial navigation, the Titanic exhibit presents its story based on the chronological order of the event. The exhibit consists of four parts from its construction and departure to the memory of people, in which the life of the Titanic is told in a way that creates a deliberately

¹⁸¹ <http://childplay.wordpress.com/2007/09/29/titanic-exhibit/> (accessed September 6, 2010)

¹⁸² Ibid.

organized pathway for the visitors. For instance, the construction and departure gallery in the first part, as well as the gallery describing the Titanic's crash into a block of ice in the third part, are organized according to the temporal progression of events. The second part of the exhibit showcases various recreations of rooms with furniture, clothing, dinnerware and silverware, menus, and personal belongings that were used in each space (Figure 6.5, Figure 6.6, Figure 6.7). Displaying artifacts and furniture in context vividly describes the passenger experience along with the use of other kinds of informative pieces. For example, the Veranda café, one of the restaurants for the first class passengers, includes an actual recreation of the space with a display of china, glassware and silverware and demonstrates a contrast with the third class dining saloon displayed in pictures with their simple mugs and plates (Figure 6.7). Comparing the dinnerware between the first and third class provides a glimpse of the dining experience between different classes; the dinner menu hanging on the wall also offers detailed information about types of food served for each class. For example, Filet Mignon and Beef Sirloin are served to the first class diners whereas boiled chicken and bacon are the main dishes in the third class dining area. Representing the dining experience in diverse ways illustrates what it was like having a meal per each class in Titanic.



Figure 6.5. Room recreations: first class cabin (left), third class cabin and hallway (right).
Copyright © Titanic: the Artifact Exhibition



Figure 6.6. Artifacts. Copyright © Titanic: the Artifact Exhibition



Figure 6.7. Second class china (left), Third class plate and mug (right). Copyright © Titanic: the Artifact Exhibition

III. Learning through reflection about doing

One of the goals of the Titanic exhibit is to provide education. According to Joanna Haas, the director of Carnegie Science Center, the Titanic exhibit “isn’t just about the historical aspects of the sinking of the Titanic. It also deals with the science behind what was hailed as a tremendous engineering feat that ended in disaster. Ninety years after the sinking of the Titanic, science played a role in developing ways to salvage artifacts from the wreckage area surrounding the ship.”¹⁸³ In this respect, science as inquiry becomes the primary focus of the Discovery Gallery in which the process of artifact recovery and conservation is presented. In addition to a variety of hands-on activities, various documents are also available to download online from the link upon

¹⁸³ “Titanic: The Artifact Exhibition,” *Carnegie Science Center*, <http://www.carnegiesciencecenter.org/default.aspx?pageId=378>. (accessed August 21, 2008).

request, such as the Teacher's guide or Educator's information packet, which list of a variety of field trip activities and classroom lessons for different grades.¹⁸⁴

The educational impact of the Titanic exhibit is further enhanced through the presentation of scientific information within the stories of real people and real artifacts. Reconstructing the historical event from diverse perspectives, the Titanic exhibit becomes "a great catalyst for lessons in history, geography, English and Math" beyond science and technology.¹⁸⁵ This is why the exhibit has drawn a wide range of visitors, from children to adults, and now continues to be held across numerous countries. Because of the richness and detail of the reconstruction of the event in its time, the exhibit provides something, from emotional experience to scientific knowledge, that the visitors can take away from it. This is expressed in one of the visitors' comments, "This is an *amazing* exhibit. I knew part of the stuff about the Titanic, but I never knew all of it. There are all these fiction/fact movies and stories about the Titanic, but you never get the *full* story, like you do here."¹⁸⁶ Scientific facts, historical records, and social and cultural contexts can provide a fuller experience when they are woven together as a coherent story.



Figure 6.8. The wall of ice in the Titanic exhibition. Copyright © Titanic: the Artifact Exhibition

Another example of the design of the learning experience is found in the third section of the exhibit. In order to create a distinct experience from other sections, the emphasis in the third part is a description of the day of the ship's sinking. This part is

¹⁸⁴ Teacher's Guide, Classroom Lesson Plans and Field Trip Activities, available at <http://www.prxi.com/tguides/titanictg-bc.pdf> (accessed August 21, 2008) To request *Free Teacher Guides and Lesson Plans* on Las Vegas Exhibition website, go to <http://education.prxi.tgrequest/>

¹⁸⁵ Ibid.

¹⁸⁶ Comments from JC Richland, WA, Age 14. <http://www.rmstitanic.net/index.php4?page=234> (accessed September 12, 2010) (Emphasis added)

meant to enhance the visitors' sensory experiences in diverse ways: through dim lighting, low temperature, and numerous sounds effects such as a low humming sound that mimics the ship's engines. The highlight of this part is a large block of ice that stands in the middle of the room, which visitors can touch, feeling the coldness of the water that the ship's passengers felt on that night (Figure 6.8). The following comments from two visitors describe their experiences with the iceberg wall:

The kids tried to see who could keep their hands on it the longest-no one managed longer than 8 seconds. Then we read that the freezing sea water was even colder than the fresh iceberg, and that most of the deaths occurred from hypothermia than drowning. We all sat in silence, imagining how cold it must have felt being totally submerged in the cold ice water, not just putting our hands on it.¹⁸⁷

Touching the ice gave you a true idea of what they faced in many hours which would be their last.¹⁸⁸

Providing visitors with diverse forms of hands-on experience was effective in making one's learning experience direct and memorable. More than any realistic description or scientific evidence, touching the ice helps visitors to feel and imagine a situation that a huge number of passengers had to endure on that day. It is a unique experience that only the physical exhibit can offer to visitors in contrast to the experience of reading or watching an online experience.

Example analysis 2: David Macaulay's books

David Macaulay is a visual storyteller who is widely known for his work's superb illustrations and lucid text, in addition to his numerous awards.¹⁸⁹ For him, any complicated subject, from a cathedral to a human body, can be better explained based on *how* they work. This is closely related to his keen interest in the way things are organized in a sequence as well as his focus on making information accessible to the reader.¹⁹⁰ He also conceives of a book as a medium that consists of "a series of layers" in which any complex content can be presented gradually by turning pages or opening a

¹⁸⁷ <http://childplay.wordpress.com/2007/09/29/titanic-exhibit/> (accessed September 6, 2010)

¹⁸⁸ Comments from E.& D.K. Seattle, WA.. <http://www.rmstitanic.net/index.php4?page=234> (accessed September 12, 2010)

¹⁸⁹ David Macaulay's books have been acclaimed by numerous national and international awards, including the Caldecott Medal, the MacArthur Fellows Program award, the Boston Globe-Horn Book Award, the Christopher award, an American Institute of Architects Medal, the Washington Children's Book Guild Nonfiction Award, the Deutscher Jugendliteraturpreis, and a Dutch Silver Slate Pencil Award.

¹⁹⁰ Macaulay's interest in *process* stems from his childhood experience in watching his parents making and doing a variety of hands-on crafts, such as sewing or making furniture. Building books: The Art of David Macaulay" Exhibit video, Norman Rockwell Museum, 2004. <http://www.youtube.com/watch?v=-zwHqRzEDEo&feature=related>.

fold-out in the pages.¹⁹¹ For this reason, his design process emphasizes not only generating a great deal of sketches in search for a better depiction, but also putting them into a dummy book to examine how they *flow* within a story. Each of his drawings makes sense when they function in a sequence; each sketch, as a peel of a layer, presents information that is accessible and engaging.¹⁹²

In addition to his emphasis on offering process that makes information accessible as an important aspect of storytelling, the notion of point of view is manifested in his work, such as *Cathedral*, *Unbuilding*, *Rome Antics*, or *The Way We Work*.¹⁹³ Perhaps his books are the best examples of works that demonstrate diverse points of view by offering a *new* way of looking at a mundane subject matter, such as a building or human body; providing *multiple* perspectives to better understanding a complicated concept; or creating a *dynamic* experience. In what follows, I focus on these three uses of point of view with examples (Figure 6.9), specifically in examining how each use is closely related to evoking certain modes of wonder as is shown (Figure 6.10).

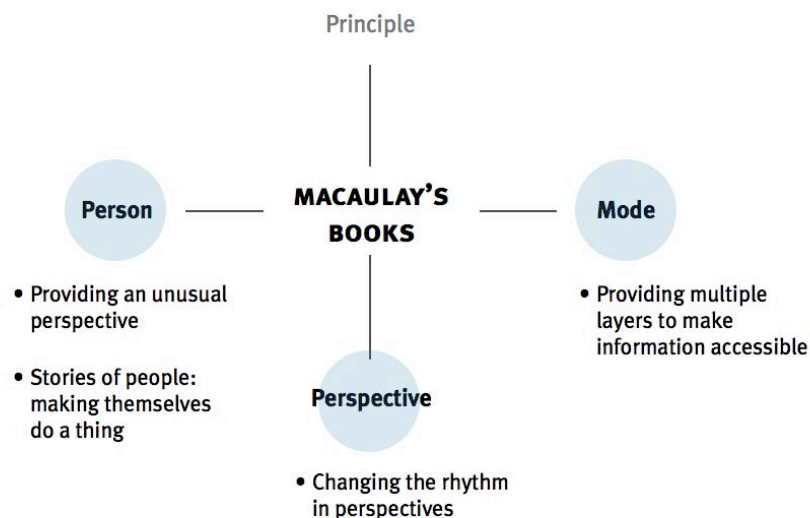


Figure 6.9. Design strategies in Macaulay's books

¹⁹¹ "A book is not only a neat way to collect and store information. It's a series of layers. I mean, you always peel one layer off another – we think of them as pages, doing it a certain way. But think of them as layers. I mean, Rome is a place of layers – horizontal layers, vertical layers. And I thought, just peeling off a page would allow me to – if I got you thinking about it the right way – would allow me to sort of show you the depth of layers." Macaulay's *Rome Antics* in TED 2002. (filmed on February 2002, posted February 2008) http://www.ted.com/talks/david_macaulay_s_rome_antics.html.

¹⁹² Macaulay regards *drawing* as a means of understanding and explaining things. "I draw to better understand things. Sometimes I make a lot of drawings and I still don't understand what it is I'm drawing." "I also draw to help people understand things. Things that I want them to believe that I understand." Ibid.

¹⁹³ *Cathedral: The Story of its Construction* (1973), *Pyramid* (1975), *Castle* (1977), *Unbuilding* (1980), *Rome Antics* (1997), *Mosque* (2003), *The Way We Work* (2008),

MODES OF WONDER: MACAULAY'S BOOKS

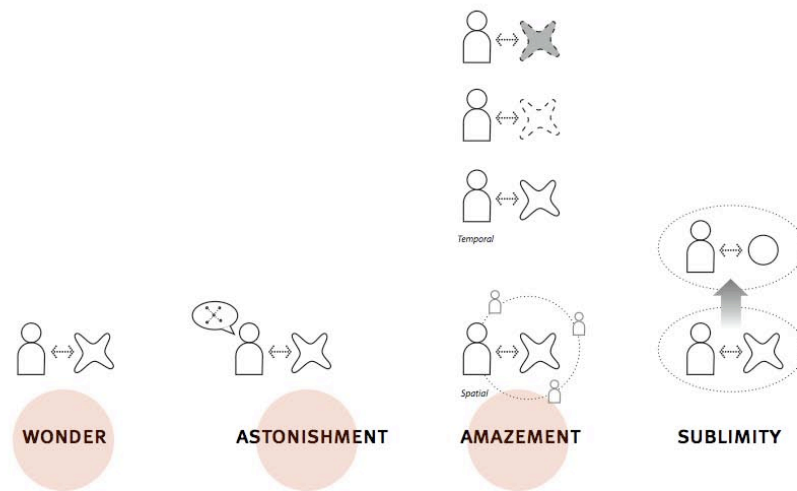


Figure 6.10. Modes of Wonder found in Macaulay's books

I. Providing a new way of experiencing the subject matter and sustaining interest

Macaulay uses *perspective* not only to provide an *unusual* way of looking at a subject matter but also to communicate his own feeling and understanding of a subject matter to readers so as to create a personal and engaging experience.¹⁹⁴ This is clearly reflected in his talk at TED in 2002 where Macaulay presented his thoughts and his process in creating *Rome Antics*:

Rome is a city full of surprises. I mean we're talking about *unusual perspective*. We're talking about narrow little winding streets that suddenly open up into vast, sun-drenched piazzas – though piazzas that are humanly scaled. Part of the reason is that they grew it organically. That amazing juxtaposition of old and new, the bits of light that come down between the buildings that sort of create a map that's traveling about your head – usually blue, especially in the summer – compared to the maps that you would expect to see of conventional streets.¹⁹⁵

In order to express this sense of surprise and wonder about Rome, Macaulay chooses a homing pigeon's point of view, as it flies through the city to deliver a message.¹⁹⁶

¹⁹⁴ "I began to think about how I could communicate this in book form. How could I share my sense of Rome, my understanding of Rome?" (Emphasis added) David Macaulay's Rome Antics in TED 2002. (filmed on February 2002, posted on February 2008)

http://www.ted.com/talks/david_macaulay_s_rome_antics.html

¹⁹⁵ Ibid.

¹⁹⁶ Before he came up with this final version of the story, a pigeon's journey through Rome, he tried out a few different versions of the storyline, one of which was about a story of Beatrix and her dog Ajax who travel in a dirigible through Rome. This plot had an interesting storyline with various characters and was

Illustrating various parts of Rome from a bird's point of view depicts unusual scenes of various places. For example, the upside down view of a plaza from the falling pigeon's perspective¹⁹⁷ or a panoramic aerial view of the Colosseum.¹⁹⁸ These are not scenes captured from a human's perspective on the street level. Macaulay's choice of unusual perspectives, from that of a worm which is crawling underground to that of a bird in Rome, is effective in eliciting a sense of *wonder* by allowing a new way of looking at the world. Another example of unusual perspective is found in Macaulay's book on the human body, *The Way We Work* (2008), in which he visualizes a human body as a theme park where each body system is described as a type of machine. By visually conceptualizing the circulation system as a roller coaster ride, seemingly complex ideas can be transformed into accessible and engaging ones.

In addition to his use of unusual perspectives which instantly grasp the reader's attention, another distinctive use of point of view is found in its *multiplicity*. For Macaulay, multiple perspectives have three functions: providing multiples ways to explain; creating a dynamic experience; offering multiple voices to engage the readers' interest. First, multiple perspectives make information more accessible to the reader, specifically by offering more than one way of looking at the same thing. This is particularly useful for educational purposes because people learn and comprehend in different ways as individuals possess differing degrees of skills.¹⁹⁹ For example, in his book *Cathedral: The Story of its Construction* (1973), Macaulay presents diverse perspectives of the building in order to highlight different aspects of the architecture which are impossible to grasp from a single perspective. Breaking down a complex content like the Gothic Cathedral into multiple accessible parts helps readers better understand the structure and the construction process.

Second, multiple perspectives engage readers, not only by changing the reference point but also by constantly changing rhythms in space and time, such as zooming in and out into buildings or varying the pace of the story from fast to slow. While *Cathedral* (1973) elicits a sense of wonder from the readers using multiple perspectives, *Rome Antics* (1997) elicits wonder and amazement through his deliberate

effective in showing Rome in various perspectives; yet the story itself became too complicated to convey what Macaulay wanted to convey about Rome in a *simpler* way. Ibid.

¹⁹⁷

¹⁹⁸ David Macaulay, *Rome Antics* (Boston: Houghton Mifflin Books, 1997), 13.

¹⁹⁹ American developmental psychologist and professor of cognition and education Howard Garner calls this set of "abilities, talents, or mental skills" *intelligences*. In his seminal book *Frames of Mind*, he introduces seven multiple intelligences that are based on the assumption that "people have different cognitive strengths and contrasting cognitive styles." See Howard Gardner, *Multiple Intelligences: New Horizons*. (New York: Basic Books, 2006). (First edition published 1993).

play of rhythm as readers turn pages. The bird's movement in *Rome Antics* is incredibly dynamic in terms of distance and speed. Unlike the tourist's steady walk on street level, the city of Rome presented from a flying bird's perspective evokes *amazement* to readers; just as they turn every corner of Rome, they can hardly expect what is coming on the next page. Presenting the city of Rome this way help even those who have visited Rome several times find something new and different.

A third use of point of view is Macaulay's sense of humor, which is attributed to a delightful reading experience. For him, transforming complicated and boring subject matters into engaging concepts is significant not only in enhancing readers' understanding but also in sustaining readers' interest in a subject. Therefore, small cartoon characters with expressions in a word bubbles in *The Way We Work* (2008) and a mammoth in *The Way Things Work* (1998) play the role of adding a sense of humor to his books. Locating these little voices on each spread also creates another layer of discovery to keep the readers' interest.

II. Creating a pathway to the subject matter by imagine themselves doing a thing

Another design strategy in Macaulay's books is inviting readers into an actual making or working process, specifically by having them imagine themselves doing a thing. Macaulay's interest in process is clearly reflected in numerous works that explain the construction of a cathedral, a castle, a mill, or a city. Even in his book on the human body, *The Way We Work* (2008), Macaulay attempts to explain one of the most complicated systems in the function of our bodies. There are two reasons Macaulay is particularly interested in process as a form of storytelling. First, Macaulay believes that a seemingly complex system, whether it's a complicated building or a human body system, can be better understood by breaking it down into manageable steps. There are numerous books on explaining various types of complex architecture; yet what Macaulay desires is to create a book that is readily understandable and accessible to readers from school-age children to adults. In his interview with the New York Times, he states, "I've never thought about the ages of my readers. I always think about how I would understand it."²⁰⁰ In order to achieve this lofty goal, Macaulay focuses on visualizing how it works. In this respect, he attempts to create a pathway to seemingly complex and inaccessible subject matters by putting readers in the process of

²⁰⁰ Patricia Cohen, "Explaining That Most Remarkable Structure," *The New York Times* (October 2, 2008)

constructing a cathedral or a mosque. This way they not only understand how it is built but learn that they are capable of building one.

As important as this is, there is another reason Macaulay emphasizes process. He is interested in connecting readers to a subject matter. Take *Cathedral* (1973), and *Mosque* (2003), as examples. Although many people know that a cathedral is a man-made architecture, visiting a Gothic cathedral in France or a mosque in Turkey often leaves them in awe or elicits a sense of wonder because the scale of these structures, their patterns, or their use of color is beyond one's grasp and understanding. For this reason, Macaulay transforms the story of building to a story of people who constructed for many years. In order to describe this process in detail, he illustrates tools and the devices used to build as well as various roles and steps that individuals take. Instead of conceiving of a cathedral or a human body as an object of wonder, just as a masterpiece painting in a museum, detached from the audience, these structures become an environment that allows various activities by people.

III. Creating an inquiry as a learning process

Macaulay describes his approach to creating a book as a learning process.²⁰¹ In most of his book projects, he states that he knew little about the subject matter from the beginning. Although he does not follow the user-centered or reader-centered approach by observing and analyzing the needs of potential readers, his attitude as a learner rather than an expert is relevant to making information accessible to a wide range of readers in the following two ways. First, he believes careful observation and hands-on experience is necessary. For instance, when he worked on *The Way We Work* (2008), his personal investigation into the human body took almost six years to complete because he spent a great deal of time conducting research by taking courses in medical school and observing surgeries so as to perform his own inquiry into the difficult subject of the human body. This emphasis on his hands-on experience is also found in his remark, "being there is important."²⁰² For him, one of the challenges for a visual storyteller is to put the reader in a position that he or she has never experienced before, but is believable and plausible. This is impossible if a writer and illustrator's imagination is not grounded on his or her own careful observation of a particular subject matter.

²⁰¹ "You can seduce your readers into observing the information without realizing that they are actually learning something [...] that's been my goal all along [...] I don't profess to teach anything. I just hope to provide an engaging and an enjoyable opportunity." Ibid.

²⁰² Ibid.

Imagination leads to possibility, yet it needs to be supported by actual practice in order for it to make sense.

The second way that his attitude as a learner is relevant is found in Macaulay's remark that the common sense that organizes bits of information into a coherent structure is closely related to a learner's attitude. This is manifested in his explanation of his process in making *The Way We Work*. Unlike his books on architecture, which have a clear sequence based on the construction process, his book on the human body required a different sequence to explain such a complex system. Therefore, Macaulay approached the organization of information as answers to a series of questions, such as "what is the most important information in human body?" and "what is needed next?"

As he notes:

There's no point of taking people through digestive systems or a circulatory system, a respiratory system without per saying why we need those systems. If you don't have cells, if you don't have any little organism waste that need oxygen that need nutrients, and building materials and so forth. Sort of each survive. [...] So it makes sense from the starting with cells. Which are starting from molecules or atoms. Where does the cell come from? [...] with questions keep backing up. And starting with cells was the most important thing from the beginning because not only creating a reason for explaining all those systems but also so much work being done about that.²⁰³

Following his common sense perspective about the human body, Macaulay creates a flow based on the simple to complex systems; the seemingly complex system begins with a cell and ends with a cell again in the discussion of the reproduction system.

Example analysis 3: I like Seoul campaign

The *I like Seoul Campaign (ILSC)* is a social campaign project that demonstrates the role of design in society, not only in its goal to solve problems in the surrounding environs, but also in its ability to raise issues to which the public can become aware and actively respond. The ILSC was initiated by a group called design group FF, which includes a small number of college design students and alumni. In one sense, their motivation for creating the *I Like Seoul Campaign* series came from their personal search for answers to the question, "why do I (we) like Seoul?" Thus, the ILSC began as a personal journey from the perspective of people who had grown up and lived in Seoul. However, we may consider the significance of this work from another perspective; it can serve as a model for critiquing a number of other design projects and internationally organized

²⁰³ Ibid.

design events implemented by the Seoul Capital Government.²⁰⁴ Designing Seoul Campaign posters was just one of the projects among Design Seoul Campaigns which were placed all over the city, from subway stations and bus stops to newsstands (Figure 6.11). The goal of these posters was to promote new facilities and new services provided by the government, including daycares, public parks, saving accounts, and Wi-Fi internet services. Each poster advertises different facilities or services but contains the same message in the bubble: “I like Seoul” in Korean (Figure 6.15).

While the Design Seoul Campaign posters represent the voice of the Seoul Capital Government, the ILSC posters attempts to reflect the voices of multiple and diverse citizens, as the design group FF states:

There may be more than one answer why we like Seoul. Sharing and exchanging various voices enables people not only to seek their own answers but also to discover the true identity or the value of the place in which they live (translation mine).²⁰⁵

Their claim is that most of the Design Seoul Campaign projects attempt to promote the idea that new design is good, and tend to renovate the old into the new, yet do so without careful consideration of important issues, such as: sustainable design, protecting local cultures, and creating a harmony between old and new. This motivated the design group to launch a series of campaigns, including the I like Seoul Campaign in season 1 (I like Seoul Campaign Posters) and season 2 (G20 Seoul Summit Project).²⁰⁶

²⁰⁴ Seoul has been chosen as the second World Design Capital by ICSID in 2010, followed by the first WDC, Torino, in 2009. Numerous projects were conducted under the Design Seoul Campaign by organizing exhibitions and international conferences, redesigning public parks, design centers and developing the new symbolic icon, “Haechi” for Seoul. See <http://www.wdcseoul.kr/> <http://haechi.seoul.go.kr/> (accessed September 13, 2010)

²⁰⁵ The design group FF sent their first message on Twitter when they launched this project: “we are against a Design Seoul campaign that does not communicate to citizens.” www.ilikeseoul.org (accessed December 29, 2010) Original text was in Korean.

²⁰⁶ For more information about the project, see www.ilikeseoul.org. For their current and future projects, visit <https://www.facebook.com/ffgroup>. There are also some videos available on Youtube. See <http://www.youtube.com/watch?v=RXYmvc1XKKs&feature=related>; http://www.youtube.com/watch?v=d_kRe9Hy1xg&feature=related; http://www.youtube.com/watch?v=_tEHa_LUlh4&feature=related; <http://www.youtube.com/watch?v=xsNtdlnQWUs>



Figure 6.11. Posters displayed at subway stations, on the subway, at bus stands, on buses ²⁰⁷

For the ILCS season 1 project, which transforms the “government monologue” into “open public dialogues,” FF adopted the idea of using bubble stickers as a communicative space through the *Bubble Project*, which was originally conceived by designer Ji Lee.²⁰⁸ The goal of the *Bubble Project* is to provide public “free spaces” that allow people to express their thoughts by filling in the blank bubbles with their own voices (Figure 6.12). In 2002, Lee printed 20,000 bubbles stickers and placed them on top of advertisements throughout New York City; later, he photographed the bubbles after they were filled in with various responses and published them in a book and an online forum (Figure 6.13).²⁰⁹ FF also used bubble stickers as a primary means of

²⁰⁷ All images of I Like Seoul Campaign (Figure 6.11, 6.14, 6.15, 6.18, 6.19, 6.20, 6.21) are made available under *Creative Commons 3.0 Attribution License*: commercial and non-commercial use permitted; can be copied, enhanced and redistributed but attribution is required. These images are available at <https://picasaweb.google.com/ilikeseoulff/Seoul>.

²⁰⁸ Lee conceived this idea from advertisement posters he had noticed on every corner in New York. For Lee, these posters are seen as visual pollution, as most advertisements scream at people in an aggressive manner, although he had been working in the advertising industry for four years. This frustration led him to create a simple device that would “transform these annoying corporate monologues into open public dialogues” by offering people a way people to respond: through a bubble sticker.

²⁰⁹ The project became so popular that he launched the *Bubble Project* on a global scale. People from different cities can download bubble stickers from their project website and post them to advertisements in any part of world, such as London, Milan, and Buenos Aires; responses from other cities were recorded, uploaded and shared online. To access the detailed design process and the recorded photographs, see <http://www.thebubbleproject.com>; Ji Lee, *Talk Back: The Bubble Project*. (New York: Mark Batty Publisher, 2006).

communication, yet modified the idea in a way that it is relevant to the purpose and effect of the ILSC project.



Figure 6.12. Bubble Project. Copyright © Ji Lee



Figure 6.13. Bubbles filled with text. Copyright © Ji Lee

While the goal of *Bubble Project* is to provide the public with a way to express their individual voices against the corporate monologue in advertising, that of the ILSC is to inspire the public to search for the value and the true identity of Seoul against the monolithic message that is repeated in the “I like Seoul” campaign posters. In order to search for diverse yet collective voices to express why they like Seoul, FF gathered diverse opinions about “why I like Seoul” through social networking channels, including the project website, twitter, and me2oday. Afterwards, they printed each message onto bubble stickers (Figure 6.14) and placed the bubble stickers with their new messages all over the city on top of the Design Seoul Campaign posters (Figure 6.15).²¹⁰ Figure 6.15 shows how the message in the middle, “Seoul is dead. Seoul is now dying” contrasts with the original message, “I like Seoul” on the left and the right. While the former reflects one of the opinions generated by citizens, the latter represents only the voice of the Seoul Capital Government, which attempts to promote a variety of services and policies under the Design Seoul Campaign project.

²¹⁰ A video demonstrating the process is available on Youtube.
http://www.youtube.com/watch?v=R_iiQbXFSTU



Figure 6.14. The process of the I Like Seoul Campaign Posters



Figure 6.15. Posters displayed at subway stations, originals (left, right), a poster with a new bubble (middle)

In what follows, I use the Point of View framework as a tool of analysis (Figure 6.16) to examine two design strategies found in the *I Like Seoul Campaign* posters, which are intended to foster open public dialogue and to employ irony as a means of communication. In the section that follows, I discuss how each strategy, with an emphasis on *mode* and *principle*, elicits *amazement* and *sublime* (Figure 6.17).

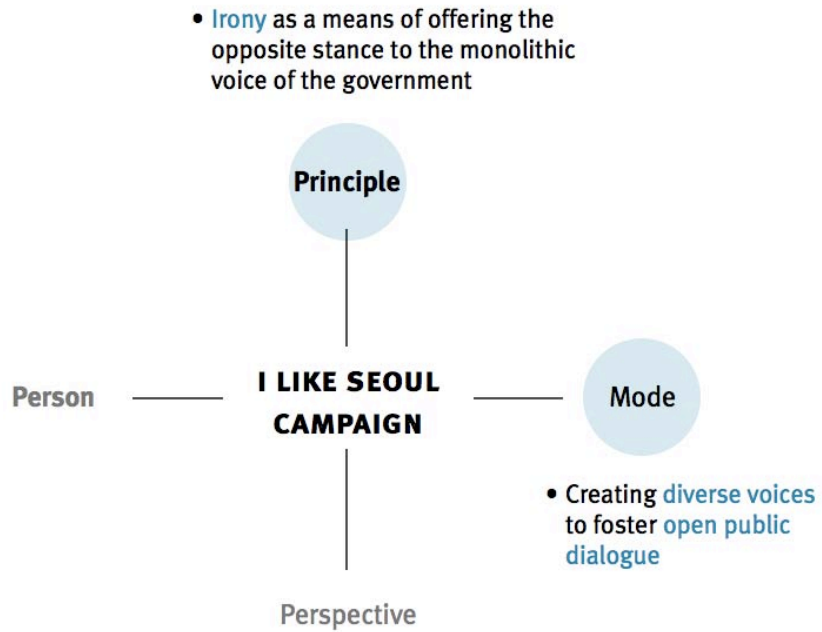


Figure 6.16. Design strategies in *I Like Seoul Campaign*

MODES OF WONDER: I LIKE SEOUL CAMPAIGN

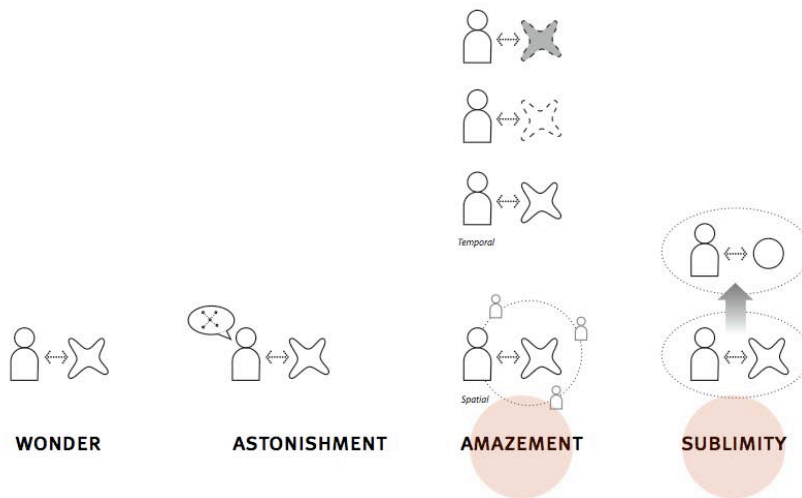


Figure 6.17. Modes of Wonder found in *I Like Seoul Campaign*

I. Creating diverse voices to foster open public dialogue

The first design strategy found in the ILSC posters is to provide a means to convey *diverse* voices about what each citizen loves about Seoul from their points of view. These voices are individual, yet collective and powerful in that they arise from some shared understandings among the collected opinions. This is closely related to the objective of the ILSC in providing a means to collect and communicate these voices in a way that is widely accessible:

We have started to wonder why Seoul has been chosen as the World Design Capital in 2010. What distinguishes Seoul from other cities in terms of design? Why is it Seoul over other cities? We expected to find any answers to these questions in Seoul, where we live now. Therefore, we began our journey to search for these answers by reading books, meeting officials, designers, and citizens, and talking to a wide range of people, to discover something that is not apparent. However, the answers were already with us from the moment we began our search. We realized that they are not only ours, they also belong to all those people who live in Seoul (translation mine).²¹¹

As described above, the idea behind this project is that each citizen differently values what it means to live in Seoul; sharing diverse opinions also fosters open public dialogue in order to discover other values, issues, or problems that were not realized before.

Diverse voices not only allow public dialogue about what it means each to live in Seoul, but also reconsider the common value, not merely as a city of the Design Capital but as an environment in which people live. What is the true identity of Seoul in comparison to other cities? What are the issues or the problems that are identified by citizens? These concerns are expressed in the bubbles by arguing that designing Seoul does not entail renovating every corner of the city without maintaining the identity of Seoul. For example, Figure 6.18 contrasts some opinions against the idea of changing the old to the new, such as “Does design mean to make something new? (left),” “Are you going to design ancient palaces, too? (middle),” or “Leave them as it is: street vendors, undeveloped community, Dongdaemun stadium (right).”²¹² Multiple voices presented in the bubbles shift the conception of Seoul, which elicits amazement by discovering a new way of connecting Seoul and the people who live in the city, from the World Design Capital to the real environment in which people live and interact. In

²¹¹ <http://www.ilikeseoul.org> (accessed December 29, 2010) Original text is written in Korean.

²¹² One of the projects under the Design Seoul Campaign is to transform Dongdaemun stadium into Dongdaemun Design Plaza, designed by renowned architect, Zaha M. Hadid. Building or renovating old architecture that functions as a landmark of the city to a new one is happening in many parts of Seoul; yet it has not been carefully considered whether this new building will be harmonious with its surroundings. In many cases, these structures become new landmarks by making the old and local culture in the area obsolete.

summary, the ILSC challenges existing assumptions and preconceptions about the role that design plays in a society, specifically in response to the political and social changes happening in Seoul in 2010. The ILSC demonstrates the fact that designing for Seoul should mean designing for citizens who live in it rather than designing for the sake of design or for creating a new kind of policy.



Figure 6.18. I like Seoul Campaign Posters

II. Irony as a means of providing an opposing stance to the monolithic voice of the government

Another use of point of view is closely related to the idea that *irony* offers “perspective of perspectives” from a critical stance.²¹³ In rhetoric, the term *irony* refers to a figurative element of speech that expresses an idea as its opposite. According to literary theorist and philosopher Kenneth Burke, the role of irony as one of the four master tropes should not be limited to its figurative and literal usage. Rather, a more important application of the four tropes is to discover and describe “the truth.”^{214 215} The following passage illustrates Burke’s primary concern with irony, which provides useful insight:

Irony arises when one tries, by the interaction of terms upon one another, to produce a *development* which uses all the terms. Hence, from the standpoint of this total form (this “perspective of perspectives”), none of the participating “sub-perspectives” can be treated as either precisely right or precisely wrong. They are all voices, or personalities, or positions, integrally affecting one another.²¹⁶

What is central to irony is to not just show seemingly contrasting ideas and judge whether they are right or wrong, but rather to develop and share many ideas as

²¹³ Kenneth Burke, “Four Master Tropes,” in *A Grammar of Motives* (Berkeley: University of California Press, 1969), 503.

²¹⁴ Ibid.

²¹⁵ Burke identifies the four master tropes as metaphor, metonymy, synecdoche and irony. He also explains the four tropes using a different set of names, such as the following: For *metaphor* we could substitute *perspective*; for *metonymy* we could substitute *reduction*; for *synecdoche* we could substitute *representation*; for *irony* we could substitute *dialectic*. These pairs are useful to expand their applications beyond the literal figurative usage. Ibid.

²¹⁶ Ibid., 512. (Emphasis added)

different possibilities so as to create a common ground that is agreed upon. This is closely related to the goal of the ILSC. Since irony is concerned with “resisting affirmation to locate alternate positions,” placing bubbles filled with multiple opinions on the existing Design Seoul Campaign Posters is more effective to show the gap between what citizens desire (middle, Figure 6.18) and what the Seoul Capital Government actually does (right and left, Figure 6.18), than recreating a poster that criticizes the constraints of the Design Seoul Campaign.

The emotional effect that is evoked by the ironic stance can also be discussed with *the sublime*, which is elicited when the idea of connected whole is discovered, particularly realizing the way we are all connected to one another. In the ILSC, what connects individuals to Seoul is an awareness of the idea that we are citizens who are responsible for sharing ideas, raising issues, and resolving relevant problems. This would allow the public to explore alternative possibilities through active participation in a public dialogue.

The following examples (Figure 6.19, Figure 6.20, Figure 6.21) show a set of common issues and themes that arise from these diverse voices.

Sustainability

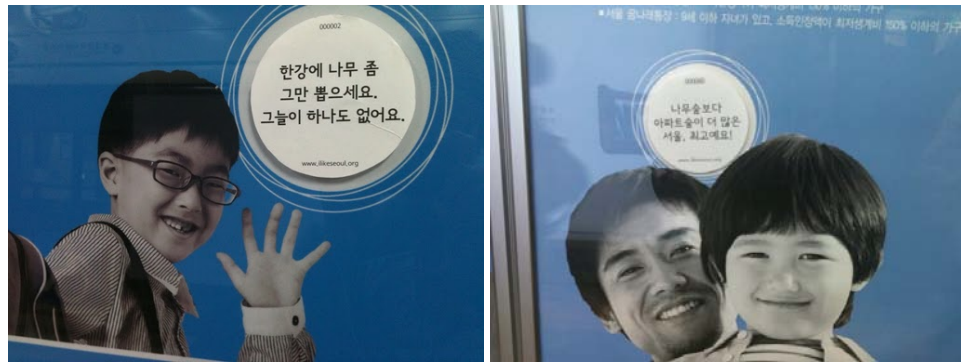


Figure 6.19. I like Seoul Campaign Posters

“Stop uprooting trees at Han River. There is no shade.” (left)

“Seoul has more apartment jungle than forest. Wonderful.” (right)

Loss of Identity



Figure 6.20. I like Seoul Campaign Posters

“Wow. Seoul is turning into Seoul Land (like a theme park with a lot of attractions).”

(left)

“That’s just the way I like Seoul.” (middle)

“Seoul-si, New York-gu, Paris-dong, London Apartment construction site.”²¹⁷ (right)

Goal of Designing Seoul



Figure 6.21. I like Seoul Campaign Posters

“For whom are we designing Seoul?” (left)

“Seoul should be a space where residents feel happy rather than a city for display.”

(right)

Summary

In this chapter, I examined three cases of information artifacts that respond to specific design problems thorough the use of the thematic variations of Point of View and Modes of Wonder as conceptual tools for analysis.

The first case was Titanic, the Artifact Exhibition that represents the story of the legendary ship by laying out the real artifacts that were recovered from the debris. Through the examination of *person* and *mode*, diverse information artifacts and the

²¹⁷ *Si* means city, *gu* means county, *dong* means neighborhood. (the size of a political community). This is a cynical remark expressing that Seoul doesn’t have its own identity.

organization in the exhibit creates an intimate experience from the point of view of a character on board, and develops a story through the deliberate representation of scenes, sequences, and spaces. Modes of Wonder that are related to the use of point of view are wonder, amazement and awe, which are found in the description of the audiences' experiences.

Second, David Macaulay's books demonstrate his dexterity in storytelling through the utilization of *person*, *perspective* and *mode*. Various design strategies based on the unusual, multiple, and dynamic points of view make information accessible and engaging. Wonder, astonishment, and amazement are discussed in relation to the usage of point of view through the examination of specific examples in his books.

Third, the *I Like Seoul Campaign* was a social campaign that fosters collective interaction to actively respond to the problems and issues about the environment. Through the employment of *person* and *principle* as the primary focus, diverse voices are created to foster open public dialogue, and irony is utilized to offer an opposing stance to the monolithic voice of the government. In turn, amazement and the sublime are examined as two modes of wonder that are elicited to discover different ways of connecting among individuals and between individuals and the world.

Wonder as a Principle of Communication

Introduction

This inquiry stemmed from the problem of information design, particularly a lack of substantive theory that can encompass emotion and information design. Although the role of emotion has for some time been central to human communication and other areas of design, no theoretical framework has been developed that would allow design researchers and educators to model the relationship between emotion and information as part of examining the complex relationships among information artifacts, audiences, and designers in specific contexts. Through examination of existing views about information design and the nature of information, this work advanced the idea that information can be better conceptualized as a medium in which designers have the ability to influence situated and value-laden human actions, as well as a medium in which designers can be influenced by situated human actions. This conceptualization of information as two-way mediation between designer and audience allows us to reconsider information design as a meaningful social activity, of which designers are an integral part.

As the inquiry proceeded, Modes of Wonder and the Point of View Framework were proposed as responses to the following two research questions raised at the beginning of Chapter 1. First, how can we describe the audience's emotional experience to information artifacts? Modes of Wonder in Chapter 4 would allow us to articulate the audience's emotional experience to information artifacts. As discussed in Chapter 4, communication begins with wonder – interest or mere curiosity, proceeds with astonishment or amazement, and may or may not be culminated in sublime. Modes of Wonder – astonishment, wonder, amazement, and sublime – provide different ways of connecting the audience to information, as shown in Figure 7.1. Each mode also leads to a different kind of discovery, demonstrating layers of experience.

<i>Modes of Wonder</i>	<i>Kinds of Discovery</i>	<i>Experience</i>
Wonder	Connections are made (elements are organized) based on the logic of the designer	Perception
Astonishment	Connections are made on a surface level: in terms of how things are structured and organized.	Interpretation
Amazement	Connections are made based on a particular function and purpose (functional situation) – thinking, doing, making (understanding, performing, inquiring).	Experience
Sublime	Connections are made; unified under a big idea	Awareness

Figure 7.1. Modes of wonder as layers of discovery

The second question we sought to explore was, how can we articulate design strategies that are often implicitly used by designers to create information artifacts that are aimed at producing a particular emotional effect for an audience? The Point of View framework in Chapter 5 presents a means to examine plausible design strategies used in information artifacts. In Chapter 6, three information design cases were analyzed in detail to demonstrate the application of these two frameworks. As a result, a set of design strategies were illustrated in Figure 7.2, particularly those that enable an audience to be emotionally connected to information and various accompanying senses of wonder. The types of examples analyzed in this study vary greatly, from posters to books to interactive visualizations, exhibitions, and social campaign projects. Still, these design strategies can be applied across various form and media.

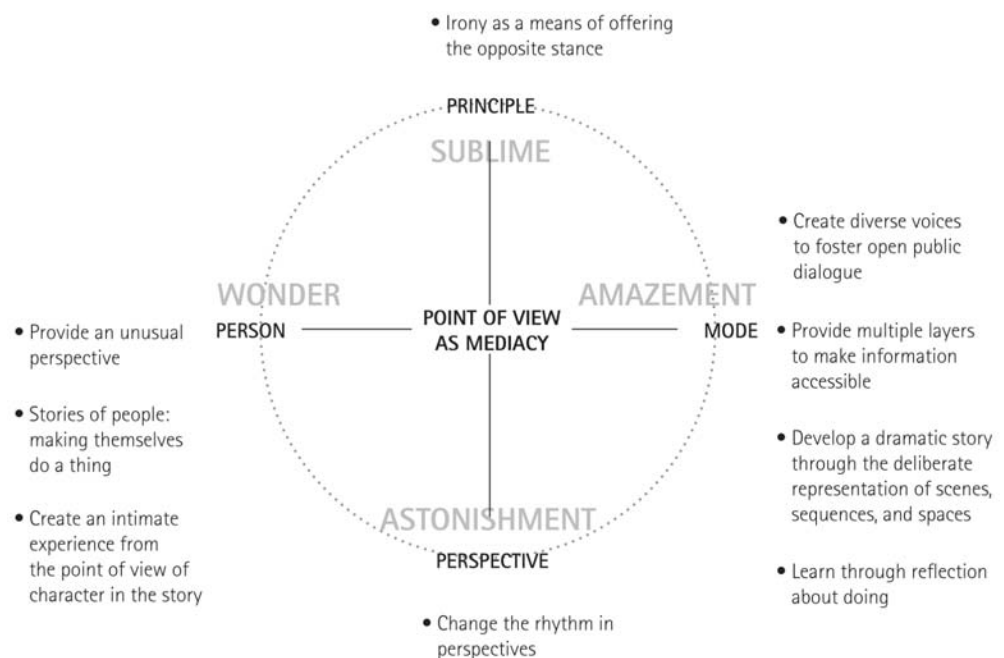


Figure 7.2. Modes of wonder & exemplary design strategies from the example analysis in Chapter 6

In this final chapter, I discuss the significance and contribution of this dissertation, and several research directions for future study.

Significance: wonder as a principle of communication

There are two frameworks presented in this dissertation. The first is Modes of Wonder, which describe and analyze the emotional experience one has with information, based on four thematic variations of wonder. Each of the themes helps to understand a person's emotional connection to information on different levels. While other models focus on the dimensions of experience or specific actions or variables of experience, modes of wonder offers an approach for understanding one's experience in relation to the *effects* and *layers of experience*.²¹⁸ Instead of categorizing an experience into different types, conceptualizing an experience as different layers that unfold over time offers a new approach to understanding, describing, and analyzing various forms of interaction and experience. Furthermore, this way of conceptualizing experience is relevant to illustrating differences as well as the changing nature of experience based on a variety of situational elements. For instance, modes of wonder can offer a reasonable explanation as to why a person's emotional experience with a poster may not be the same as another person's; or why one's emotional connection to a painting changes constantly over time. Since an experience unfolds over time like water flowing in a stream, understanding experience not as different layers, rather than separate categories, is significant, particularly in examining the effect of information design in relation to a situation.

While modes of wonder refers to places for discovery that focus on one's emotional experience with information, the goal of the second framework, point of view as a mediacy of information design, is to analyze information design works. The four themes, person, perspective, mode, and principle, are means for questioning and illustrating the use of point of view in the context of information design. What distinguishes point of view from other descriptive or generative frameworks is its breadth as well as the expandability of each theme. Like modes of wonder, the framework point of view should be regarded as a topic or place for

²¹⁸ Some examples of interaction-based or experience-based models are the following: Wright et al. present four kinds of product experiences: compositional, sensory, emotional and spatio-temporal. Each one is related to an action that creates meaning. Forlizzi, Ford and Battarbee describe user-product interactions as fluent, cognitive, and expressive. For a complete discussion, see Wright et al. (2003), Forlizzi and Ford (2000), Forlizzi and Battarbee (2004); for an excellent summary of interaction-based models, see Jodi Forlizzi, "Product Ecologies: Understanding the Context of Use Surrounding Products" (PhD diss., Carnegie Mellon University, 2007), 86.

discovery, which can be further explored with more variations within each theme. Instead of conceptualizing each of the themes as a fixed category or a definite term, it is significant to conceive each place as a tool for inquiry that can lead to a discovery of numerous series of design strategies in diverse communicative situations.

Based on the two frameworks described above, I conclude this study by discussing the role and significance of wonder in communication in the following way: wonder is a principle of communication, in that principles are “*methods of inquiry*” which provide a beginning as well as a grounding for activities that follow.^{219 220} Here, principles do not refer to fixed and universally applicable rules. Rather, principles should be understood within the process of experiences of people, so as to lead to a discovery of possible connections through particular elements. As examined in the preceding chapters, wonder is key to creating one’s emotional connection to information, products or an environment because it is a principle that organizes one’s experience when communicating. Wonder provides the beginning that allows communication to function; wonder is a connecting force that sustains the audience’s interest and emotional experience throughout the process; wonder is one’s awareness of a transcendent idea that elevates a common experience into an intellectual one.

Contributions

This work includes three contributions that are worth mentioning as I conclude this dissertation. First, this study provides a theoretical framework that can model the relationships among information artifacts, audiences, and designers in specific contexts. Conceptualizing information as a medium for human action and conceiving emotion as a relationship among various actions, this research leads us to explore a new direction of information design beyond compositional, semantic, and pragmatic levels. Also, rhetoric, as the method of investigation in this study,

²¹⁹ In her Ph.D dissertation, Jafarainaimi refers to principles, saying that they are “the beginning of design activities and provide grounding for the selection of design solutions. They have concrete significances and consequences in particular application.” For a complete account of principles in relation to design, see Nassim Jafarainaimi, “An Inquiry into the Form of Social Interaction in Contemporary Products” (PhD diss., Carnegie Mellon University, 2011).

²²⁰ Dewey argues, “principles treated as fixed rules instead of as helpful methods take men away from experience.” For Dewey, principles are ever-changing like a “hypothesis with which to experiment” because principles are “methods of inquiry” that connect men to their experiences. For a detailed account of Dewey’s conception of principles, see John Dewey, “The Nature of Principles,” in *Human Nature and Conduct: An Introduction to Social Psychology*. (New York: Modern Library, 1922), 238-247.

suggests other directions for design research by discovering diverse possibilities through examination of the thematic variations of a specific theme as was demonstrated in Modes of Wonder and the Point of View framework.

Second, this study provides a metalanguage that would allow design researchers and educators to articulate the complex relationship between information and emotion. Modes of Wonder and the Point of View framework offer thematic variations which allow us to better describe the audience's emotional experience to the information artifact as well as the design strategies used to address a particular design issue or problem. Furthermore, the vocabulary suggested in this work can be used by design educators to foster a students' thinking process in design and to facilitate critique of the effects of information artifacts in class.

Third, this research offers a unique approach for uncovering design strategies that are often implicitly used by designers to create information artifacts that are aimed at producing a particular emotional effect on an audience. The Point of View framework functions as a tool of analysis that would allow us to examine plausible design strategies used in a particular context of information design. In addition, this framework can be used as a tool for production when creating plausible design strategies for information artifacts. It is intended to foster a systematic design approach that would enable design practitioners to reflect on their design process.

Opportunities for future study

There are a number of research directions which this can further be taken for this study. First, this work can be expanded with further examples. Modes of wonder and the Point of View framework should be tested with more example analysis. The information artifacts and the three cases of information design discussed in this dissertation were selected to cover various types of information design, from books and paintings to information visualization and exhibitions; yet each area can be further explored with the analysis of more examples. Based on this further exploration, some issues or distinct patterns may be discovered within each theme or area. In addition, comparative study between these themes or areas can provide another direction for future research.

Second, it is possible to explore variations within each theme in the Point of View framework. For instance, several key topics, such as multiplicity or identity, were discovered under the category *person* in this study. But a number of variations

or types of design strategies can be further expanded by analyzing more examples, comparing and contrasting their use in different contexts, or exploring them within the design process as a number of alternative strategies that determine the focus of the actual information design presentation.

Third, the use of these frameworks may be expanded beyond information design; other areas of design, such as product design, service design, or design methodology, serve as potential areas in which the frameworks can be applied to explore alternative solutions to design problems. For instance, four thematic variations in the Point of View framework are found in existing design methods in that both are a means of exploring and discovering distinct patterns in the ways that users behave, respond, and interact with information, products, or services in situations. While “the persona method” focuses on *person* to better understand the goals that users need to accomplish, “cultural probes” emphasize experience as a *mode* to gain insight about users’ behaviors, needs or ideas which are not yet known.^{221 222}

Finally, Modes of Wonder and the Point of View frameworks can be tested in the design process when developing an information artifact that responds to a specific design problem. The scope of this research was limited to the analysis and the description of existing information artifacts, yet these frameworks can be further implemented by designers to create information artifacts aimed at producing a particular emotional effect for an audience. In addition, the frameworks can be practiced in design education as a tool for analysis, production, and evaluation. These frameworks can serve as a basis for structuring the curriculum for a design theory class or project-based class. Thematic variations of the two frameworks can be used to provide useful terminology or individual topics for further exploration.

²²¹ *The Persona Method* is created by Alan Cooper as one of the methods for goal-directed design. “Personas are not real people, but they represent them throughout the design process. They are hypothetical archetypes of actual users. Although they are imaginary, they are defined with significant rigor and precision.” See Alan Cooper, *The Inmates are Running the Asylum*. (Indianapolis, IN: Sams, 1999), 124.

²²² In 1999, Gaver, Dunne, and Pacenti introduced *Cultural Probes* as “a design-led approach to understanding users that stressed empathy and engagement.” According to Gaver, probes are “collections of evocative tasks meant to elicit inspirational responses from people – not comprehensive information about them, but fragmentary clues about their lives and thoughts.” See William W. Gaver, Tony Dunne, and Elena Pacenti. “Design: Cultural Probes.” *Interactions*, (Jan/Feb 1999): 21-29; William W. Gaver, Andrew Boucher, Sarah Pennington, and Brendan Walker. “Cultural Probes and the Value of Uncertainty.” *Interactions*, (Sep/Oct 2004): 53-56.

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