Visual Representation for Viewpoints, Concepts, and Persuasiveness

TINGYI S. LIN, MFA/PhD

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ABSTRACT Visual information is capable not only of delivering messages to its viewers, but clarifying the underlying concept of the message as well. As the design process may be said to rest upon problem solving, visual mapping can be understood to rest upon the process of structuring and analyzing data. This process will result in better understanding and better decision making.

Methods and tools necessary for the successful visualization of information form the backbone of analytical and systematic approaches are essential. This article will consider multiple ways of organizing a wide range of viewpoints, of defining various concepts, and of making design decisions through an information design framework (from which general design theory and information design primitives, the most basic building-block design concepts, can be seen). Visual information can: present parallels, derive comparisons, map relationships and values, present differences and variables, and show multiple features simultaneously.

The process of creating visual information can be divided into discrete, numbered steps. These steps can then be collected into two basic, overlapping phases. The design phase includes Steps 1–8. The bridging phase includes Steps 5–10. Singularly, the steps, or sub-phases, are: (1) definition, (2) outreach, (3) synthesizing and mapping, (4) understanding, (5) problem discovery, (6) problem solving, (7) solution envisioning, (8) prototyping, (9) testing and revision, and (10) publishing or marketing.

Effective information design frameworks address both visual aesthetics and functionality. General design theory, generated from design research and craftsmanship, enhances the visually friendly nature of content for users. These steps lead to quality outcomes in design, connecting the representation with its audience. In this manner the user absorbs the information pleasingly and effectively.

INTRODUCTION From the perspective of the information design profession, content that people visualize must be accessible and understandable. Information satisfying these two criteria is meaningful and self-explanatory. It sparks user’s interest in seeing the information, complements user’s ability to understand it, and possibly inspires the user to engage further.

The design of visual information proceeds from the creative insights and activities that information designers use to structure and present concepts. Good visualization functions to make the information accessible, available, and understandable. Informative visualization focuses on “communication production that helps explain, entertain, and inform audiences regarding a wide range of topics.” The presentation of visual information could be broadly used for various disciplines that present results, patterns, and creativities. It has become essential, and indeed, the related dilemmas underline the importance of visual information design and its representations: the real problem we are facing is not how and where to seek information but how and where to organize and delineate the information.

Many insights from information design experts have taught us that well-planned and sophisticated visual representations have the potential to tell stories comprehensively and to make complex ideas clear. Visual information design has the significant potential to present quantity, processes, spatial relations, and many interdisciplinary issues in one object. Several emerging specialties, such as infographics, explanation graphics, multifaceted graphics, information architecture, and experience design, not only makes the visual creativity much more exciting but also makes the communication of scientific knowledge more effective through the illumination of visual graphics.

A successful designer can make significant contributions to the presentation of data, the integration of information elements into one another, and the organization of information output—all to augment the resulting product’s creativity and accessibility. However, with such great possibilities of achievement, it is essential for designers to understand effective approaches and procedures to confirm the quality of visual representation. Also, as design comprises various problem-solving processes, visual mapping is the representation of structuring and analyzing data for better understanding and decision making. Successful visualization of information rests on methods and tools that form the backbone of analytical and systemic approaches. This article will discuss the ways of organizing myriad viewpoints, of defining concepts, and of making design decisions through information.
design frameworks to balance functionality and aesthetics. General design theory and information design primitives are also involved in these practices.  

**THE ORGANIZATION OF VISUAL INFORMATION**

Visual information is becoming increasingly important as the fields of information expand. Concurrently, information design is also becoming “popular.” A core problem is for designers. The functionality is for practical considerations, while the aesthetic aspects would bring the representation “closer” to people. The answer to this question is two-fold: What kind of media carries the information through to the recipient? And what type of visual representation characterizes the presented information content? These two interdependent issues affect each other’s outcomes.

Media constitute the vehicle that carries information in various forms. The style and tone of a visual representation should possess what designed material attributes to itself, as well as including ideas and values that designers infuse into the material. The messages that any medium and technology carry also affects users’ values and behaviors, obviously or subtly. These changes in turn shape the pace and the patterns of society over time. Rapid changes in technology and media increase the amount of information and its representation in various forms. The characteristics and qualities of visual representation require more awareness and solutions, especially insofar as the representation itself is information content.

The field of visual-communication design trains practitioners to make visuals that quickly attract viewers’ attention for commercial-design purposes. On the other hand, visual information designers try to make visual representations accessible enough so that viewers quickly grasp not only the main idea but also peripheral contents and contexts. We consider “efficiency” and “effectiveness” to be two norms reflective of a successful information production. With today’s rapid changes in technology platforms in communication have grown more and more varied—while forms of representation have grown more and more dynamic. These two complementary phenomena could easily give one the impression that dynamic representation relay complex information more clearly than non-dynamic representation. However, Neal J. Roese and Kathleen D. Vohs suggest that “computer-animation visualization is appealing because it can help [viewers to] make sense of highly complex information, but it is also, quite literally, a point of view.” Interpreting, dynamic stimuli can reinforce viewers’ interests and understanding; yet, it may not be able to tell the story holistically because of inherently eye-catching angles, emphases, and effects. This argument represents a change in the original notion of dynamic visual information design, which we used to consider capable of telling a story in its entirety and of effectively clarifying complex concepts. If this rule of thumb no longer holds, it nevertheless remains a great strategy in guiding designers who seek to render information noticeable, unforgettable, and understandable by means of dynamic angles, emphases, and effects. There are exciting moments that bring a wide range of possibilities to visual representation. Those vibrant ways of presentation also cause various outcomes in learning and receiving the information. Visual information design tells stories by creating a framework (i.e., a creative, aesthetic, and informative setting) for an intellectual journey that, if taken by users, enables them to experience and to receive information (see Figure 1).

**FIGURE 1**: Visual information design storytelling framework. Visual information design tells stories for an intellectual journey and allows users to experience and to receive information.

**VISUAL INFORMATION TOOLS FOR PERSUASION AND DECISION MAKING**

From the perspective of information design, visualized information should be accessible and understandable. That is, designers should make meaningful content self-explanatory—enough for users to take note of it, to understand it, and possibly to draw inspiration from it. In order to create works that are both aesthetically pleasing and functional, most general design theories advocate user-friendliness and generate it from design research and craftsmanship. Tools such as information designed frameworks and information design primitives serve essential notional and practical techniques of visual information design to ensure both the aesthetics and the functionality of visual
information design, which affect people’s decision making. “Design Information Framework” was introduced by Y.K. Lim and Keiichi Sato as a gadget that accommodates a wide range of viewpoints, manages design concepts, and presents effective information. It provides a structured form for following the required design activities, thereby helping designers effectively identify design problems, engage in question-and-answer analysis, and solve problems. Information design primitives are carefully considered in order to ensure that the representation is usable, legible, and understandable. Therefore, design information frameworks and primitives are useful in the development of such matters as checklists, task tests, and recognition tests. Information design primitives help in “defining concepts and frameworks of design information by combining a set of very basic types of information concepts such as entities, attributes, states, actions, and time.”

The concept of visual information design for successful persuasion amounts to a new conceptual model that explains concepts clearly and that, by endowing users with access to designed production via various media, enables them to understand the concept from different perspectives. The designed artifacts promote cognitive and experiential development, with which users not only grasp complex concepts from the combination of textual and graphical information but also learn the contents effectively. Unlike advertising design, which seeks to promote instant decisions on the sale of merchandise, this kind of persuasion often changes and influences one’s mindset unobtrusively and imperceptibly. Through the cognitive process, knowledge that is presented and learned often embodies certain messages and beliefs that are acquired.

**METHOD AND FRAMEWORK**

The balance between aesthetics and functionality has been a long-standing theme in design fields. The general consensus is that effective information design must at a minimum be accessible, readable, and understandable. The phrase “one big heart, two small hands, and three keen eyes” has been proposed as the characteristics attributable to visual information designers who can use their craftsmanship wisely. That is, this type of designer is well-trained to fine-tune works by harnessing sophisticated craftsmanship and to complete productions by harnessing a beautiful mind coupled with a broad view. To do so a designer needs to stay prudent and to penetrate the surface of a problem with a keen eye. Moreover, a designer should have that proverbial third eye—to see what others cannot see. In sum, observation, thinking, organization, and action are four critical means by which designers cultivate their own clever mind and foster diverse intellectual creativities, whether their own or the viewers’.

Visual information can present parallels, can elicit comparisons, can map out relationships and values, can present differences and variables, and can present multiple features simultaneously. The chief goal of visual information design—also referred to as visual-communication design—is to organize, delineate, and present information that is viewable. To help achieve this goal, the visualization processes of visual information design have two broad phases: the design phase (1–8) and the bridging phase (5–10). Note that these ten steps overlap:

1. **DEFINITION:**
   Define concrete subjects or themes

2. **OUTREACH:**
   Reach out for all kinds of resources

3. **SYNTHESIZING AND MAPPING:**
   Organize and manage the information with diverse resources

4. **UNDERSTANDING:**
   Understand the contexts and start visual mapping and visual thinking

5. **PROBLEM DISCOVERY:**
   Frame the problems

6. **PROBLEM SOLVING:**
   Solve the problems and explore alternatives

7. **SOLUTION ENVISIONING:**
   Envision the solutions

8. **PROTOTYPING:**
   Prototype or design the production

9. **TESTING AND REVISION:**
   Undertake a usability test and revisions

10. **PUBLISHING/MARKETING:**
    Engage in revision cycles and finalize the project
The design phase, ranging from Step 1 through Step 8, starts from the very beginning of framing the subject to creating a representation evocative of the final product. The bridging phase, ranging from Step 5 through Step 10, connects the design development with its users. Through the processes of problem solving, testing, and revision, this design method serves to make visual representations not only satisfactorily meet users' needs but also positively influence the users during their use of the product (see Figure 2).

Among the complete design method described above, the formation of visual representation comprises three parts: (1) visualizing inner processes, (2) strategizing the content delivery, and (3) visualizing outer processes. The inner process of visualization starts with visual mapping and visual thinking during the “understanding” step (Step 4). While the very earliest contours of the structure are forming, content strategy is also developing, thus ensuring that the design works in specified ways. The development of content strategy provides core values to the production and can meet users’ needs and wants. The outer process of visualization concerns how the craftsmanship of visual communication can apply to the representation. There is no clear boundary or order delineating these three parts from one another. Personal preferences will somewhat direct the presentation of information, but the general structure of visual representation depends upon the type and the complexity of the information. Thinking about and sketching the content in different forms helps a designer to decide which style or format of representation can improve the conveyance of information.

Design techniques have to be good enough to support unconventional concepts—in this manner rich creativity can be fulfilled, no matter how dramatic the changes in technology are. However, concepts and techniques shift with circumstances. In order to make visual information noticeable, readable, and unforgettable, information designers usually apply several basic principles. Take for example styling, which comprises the characteristics of the visual production: color and size differentiation can make information stand out. The proper uses of well-designed icons can remarkably speed up a user’s comprehension of the visual information. Nevertheless, misused or imprudent icons can confuse users. Other techniques such as highlights of relationships or patterns (including such elements as zebra stripes) can help viewers’ eyes follow the line of communication and the floating information. Last, but not least, presenting minimal but essential information within a clean and subtle grid system can avoid both redundancies and overload of information, enabling users

**Figure 2:** The visualization processes of visual-information design include two phases: the design phase (1–8) and the bridging phase (5–10). The problem-solving cycle (5–7) and testing-revision cycle (7–9) may repeat according to various cases and circumstances.
to concentrate on important content without having to navigate through irrelevant distractions.

Chiqui Esteban, the Director de Nuevas, translated and elaborated on one of Armando Sotoca’s articles (originally written in Spanish) identifies “ten tips” for making an infographic for a newspaper: (1) identify the important information; (2) organize the information; (3) select the colors; (4) make the images clean and clear; (5) show, do not tell; (6) compare and measure; (7) don’t break scales (if it is not absolutely necessary); (8) use documentation; (9) treat writers as allies; and (10) keep learning. Among these tips listed above, Sotoca clarifies that the main purpose of an infographic is to provide the information. Rather than be a goal, the design technique in this circumstance is a tool for delineating and presenting information visually, either by itself or with other forms of representation. Nevertheless, sophisticated visual information (e.g., infographics) can communicate ideas effectively and efficiently in lieu of unplanned visuals or other forms of representation because “graphics are fast reading elements,” according to Sotoca and Esteban. Moreover, color management is well worth paying great attention to. The management and planning of these elements should proceed through strategic and technical processes, not haphazardly.

CONCLUSION
Visual information can deliver messages to its viewers as well as can play an important role in structuring and representing concepts. Frameworks, methods, theories, design tips, and craftsmanship constitute the backbone of efforts to ensure distinctive characteristics of representation. Those requirements not only confirm the quality outcomes in design but also connect the representation with its audiences so that they can absorb the information pleasingly and effectively. Within the ten steps of information design thinking and design processes laid out in this article, visual information is designed to help viewers understand contexts better and frame problems more clearly. The goal underlying the approach of visual information design is not simply to present the concepts in an accessible manner, but to delineate the relationships among them as well. To understand these relationships is to represent the depth of information as a unified whole. It is important to delineate what is meant—and not meant—by new forms of information design, and to consider their significance in our rapidly changing era.

BIOGRAPHY
Tingyi S. Lin received her MFA in 1999 and PhD in 2006 from the University of Wisconsin-Madison. Her creative art/design interests include graphic design, video production, and computer/multimedia art. Dr. Lin is an Assistant Professor at National Taiwan University of Science and Technology where she currently teaches courses in new media and visual information design. Her visual language and information design focus on the art, design, and human learning fields. More about Tingyi please visit http://tingyilin.wordpress.com/

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