Book Review

Information Visualization: Perception for Design
By Colin Ware

Written by:
Jason Cubberley
IST 413
I chose *Information Visualization: Perception for Design* because I have an interested in designing GUI’s and what the user will see. I am also a visual learner and searching for topics of intuitive design. If a user just ‘knows’ how to use the interface of a piece of software, they are more apt to use that software or site. The overall time it takes for a user to learn one of those mediums makes-or-breaks the chance of that consumer to return to buy or use. I also wanted to learn what makes an aesthetically pleasing visualization and types of techniques.

This book also had a catchy title on the book list and synopsis when I checked it out on Amazon.com. Since a book review was also required, I hoped to find a book that would fit in with my interest. The quote that caught my attention, “Most designers know that yellow text presented against a blue background reads clearly and easily, but how many can explain why?” It made me think why does certain conventions like color schema work while others do not, and with this information I would hope to derive some firm understanding of this “visualization.”

This book is known as *Information Visualization: Perception of Design* written by Colin Ware. The publisher is Morgan Kaufmann Publishers of Elsvier. This was bought for 63 dollars from Amazon.com. The topics are design for different array of audiences: “Multimedia designers specializing in visualization, researcher’s info both industry and academia, and anyone who has a deep interest in effective information display.” Few topics are also scientifically explained with the use of calculus-level equations. Topics covered in this book are the foundation for a science of data visualization, visual attention and information that pop outs, visual and data objects, and interacting with visualizations. These topics are discussed in great detail and split in eleven chapters.

The main theme of this book is visualization and the human visual system, and how and why we understand what we see. The human visual system is “a pattern seeker of enormous power and subtlety” and that the brain “forms a massively parallel processor that provides the highest-bandwidth channel into human cognitive centers.” The topics written are about this science of perception and what this science can tell us about visualization. The author’s purpose of writing this book is “to extract [a gold mine of information] of research literature those design principles that apply to displaying information effectively.”

The first chapter fully explains this “visualization” concept. We acquire more information through vision than any of our other senses combined. Visual information can be rapidly interpreted if it is present well and is capable of showing vast amount of data. Processing these,
visualizations occur in four stages: data collection/storage, processing the data, displaying, and the understanding of such visualization. Data can presented in diagrams or other semiotic forms, at that we must learn the meaning of the data through arbitrary or sensory code. Arbitrary codes have the characteristics of hard to learn, easy to forget, rapid change of meaning, and embedded in culture and applications. Typically, we need to learn the meaning behind the use. For example of arbitrary embedded in culture and applications, an Asian student made visual changes to a piece of software, she chose to represent deleted entities with the color green and new additions with the color red. In our culture, we associate red with danger or an error. In her culture green is associated with death as red symbolizes good luck and fortune. Thus, the conflict of color codes to indicate meaning is culture-specific.

The next two chapters went in great detail about the environment of visible light, our own eye and the science of how it interprets what we see and this “optimal display.” Perception is about understanding patterns of light, and with this perception, a strategy for designing a visualization is to transform data so that it appears like our environment. Our eye notices different textures and surfaces with different shading and acuities/the ability to see detail. The optimal display touches on acuity information and the composition of anti-aliasing, refresh rate (in Hz), Brightness, Lightness, and color. Brightness is the perceived amount of light whereas Lightness is the perceived reflectance of a surface. All of which are used to provide contrast and constancy of what is seen on this optimal display.

Chapter four dealt with color. Color can hindered or facilitate perception of Visualization. Color tells much about the material of properties, which in science, decisions based on what certain condition of our food to eat based on those properties can be life/death. While interaction with visualization usually do not have life/death consequences but can help, reduce the amount of mistakes. Color can be used to express detail usually by contrast, and type of labeling for distinctiveness, color blindness, or for a convention like red signifying hotness/danger. Also taken from class, only use color if they have distinct codes and meaning. Always have considerable luminance contract between the foreground and background information to show detail in any visualization.

Visual attention and information that pops out are the topics of chapter five. The author illustrated the ‘searchlight’ model of visual attention that is the way the eye movements are used to read information. The eye reads visual images that consist of elements of color, form, and
motion. Many lessons can be taken from this chapter about whether to use color, shape, texture, or motion to display a particular set of variables. If we have a set of symbols, small symbols will stand out among larger ones, and that a small set of symbols on a textured background will be hard to read.

Chapters six and seven looks at static and moving patterns, and visual and data objects. The brain perceives segments into regions and finds links, structures, and prototypical objects. Utilizing these segments yield a set of design guidelines for information display. Visual structures should reflect relationships between data entities. Concepts of object display are introduced for using visual objects to organize this information visualization.

Chapters eight and nine focus on display of data in space and the use of images, words, and gestures. Information displays are increasingly becoming done in 3d visual spaces than in 2d layouts. The rational is that we live in a 3d world; progression from 2d to 3d should be a norm at that we evolved utilizing and recognizing 3d objects. Contrary to that argument, a 3d visualization adds less information to be perceived. Visual information and verbal information are processed in different ways and different parts of the brain. The ideal concept to derive from chapter nine is that the use of images and words are ideal.

The last two chapters describe the different of interaction with visualizations and thinking with visualization. The concept to learn is how to make graphic interfaces as fluid and transparent as possible. With those features utilized, providing rapid and consistent feedback, and improved hand and eye coordination are achieved. A hint to take from the chapter is that refining the interface on a regular basis is important for increase cognitive understanding. So what should be displayed or visualized, the chapters addresses the relationship between visual information and textual information. For example, when is it a good time to use more graphics than text and vice versa and find that medium. With a successful use of both, the visualization affords quicker cognitive work.

I personally recommend this book for use of a reference. The books gives plenty detail insight of how humans understand and why they understand what they see. The book’s concepts are useful for overall design and what may be aesthetically pleasing to see and read. The book reads like a textbook with information split up by chapters and major/minor concepts to learn with the overall focus of this information visualization. The use of graphs, diagrams, and other visuals aid the understanding of these concepts without these visuals would absolutely defeat the
understanding of these concepts and why each concept works well with another. The author has strong interest in art and science that led him to this “display of information.” He has a master’s degree in mathematics, which explains the vast complex use of equations. He has published over 100 articles in science and technical journal. He is an author with a credible history to write a book of this caliber.