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VIRTUES OF VERISIMILITUDE IN DESIGN AND ART

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Abstract—While most design firms, professional artists, and educational programs continue to use conventional graphic modalities to communicate design intent and aesthetic expression, recent developments in computer graphics promise to revolutionize attitudes artists and designers now hold toward their work. Artists and designers will have to adopt new attitudes regarding the information utility of optical realism now found only occasionally in architectural rendering and the visual arts. Old attitudes relegate optical realism to a limited role in sales and promotion. New attitudes promise to relegate conventional graphics to history and substitute a seamless, nonsymbolic, information laden, visual, tactile, and kinetic art and design communication technique called virtual reality.

1. INTRODUCTION

This paper investigates the nature of one fundamental attitude that must change before developments in virtual reality can be fully utilized in design, education, and art. The attitude that pictorial graphics, optically realistic drawing and painting, are informatively and aesthetically deficient must change to the more enlightened realization that greater verisimilitude yields greater information and expression, not less.

2. VERISIMILITUDE DEFINED

The attribute of verisimilitude in the arts refers to a compelling sense of reality and truth. Writers, for example, are lauded if they are able to give verisimilitude to descriptions of settings and situations. Imparting to the reader a feeling of familiarity, reality, and truth through an abstract medium such as language is a hallmark of an excellent fictional writer. Because language is a symbolically coded form of communication, the writer cannot present the reader with a reproduction or clone of the truth being expressed. Instead, the writer enables the reader to imagine the reality being described. The writer causes a sense of verisimilitude to arise in the reader.

The visual artist, however, is able supply an optical clone of the sensible truth or reality being expressed. Western art from the fourteenth through the sixteenth centuries was a succession of improvements in optical verisimilitude [1]. Optical verisimilitude improved greatly in the late nineteenth and early twentieth centuries with the development of photography and cinema. Maya Deren suggests that photography "exercises an authority comparable in weight only to the authority of reality" [2, p. 57].

3. THE ARTIST'S ATTITUDE TOWARD VERISIMILITUDE

It is important to note that while optical verisimilitude matured in photography and cinema, painting became evermore abstract as artists came to regard optical reality as pabulum for the uninitiated. Gablik states "Along with the descriptive function, the idea of truth—that is, of a description which fits the facts—disappears from art, together with the disappearance of the goal of verisimilitude" [1, p. 157]. During the twentieth century the visual arts have become ever more nonrepresentational. Naming the "isms" in the art history of this century reveals a relentless flight from optical verisimilitude in the visual arts. The phrase "mere illustration" is the artist's condescending way of labeling optically realistic work superficial and of limited merit.

4. THE DESIGNER'S ATTITUDE TOWARD VERISIMILITUDE

As a central tendency, designers appear to have sided with painters with regard to the merits of verisimilitude. Lee [3] reports that Christopher Alexander believes conceptual drawings, such as bubble diagrams and venn diagrams, are preferable to more pictorial forms of graphic communication because abstract, symbolic drawings communicate design intent without the interference of graphic issues such as formal elements used for illusionistic and aesthetic effects.

This author has heard many architects repeatedly undervalue the informational utility of verisimilitude in design communication graphics such as rendering. The phrase "pretty pictures" is the designer's condescending way of labeling such work superficial and of limited utility.

5. INFORMATIONAL UTILITY OF VERISIMILITUDE

Computer scientists know that processing a photo-realistic computer rendering will strain even large computers more severely than processing a schematic or diagrammatic drawing because the former contains much more information than does the later. Most laymen realize that realistic graphics can clarify much of the information contained in schematic drawing as well as present information not contained therein.

The problem with realistic graphics is not that they are too shallow, but instead, that they are too deep and overloaded with information. As with photography, cinema, and realistic painting one has to sort through the information and inductively derive abstract or general concepts.

6. INDUCTIVE REASONING DEFINED

Inductive reasoning derives generalized concepts from the observations of particular instances [4]. For example, one might observe that the bus one rides to work has always been on time and then induce that chances are the bus will be on time on any given day. A key attribute of inductive reasoning is that it yields a probabilistic result. The bus could be late, but it is not likely based on experience. Words and phrases such as probably, chances are, and in all likelihood signal inductive reasoning [5].

7. INDUCTIVE REASONING APPLIED TO OPTICALLY REALISTIC GRAPHICS

Optically realistic works require the viewer to induce generalizable conclusions from the particular works observed. Individual graphic works are the individual instances from which abstract or general concepts are derived.

Gablik [1], interpreting E. H. Gombrich, gives insight into how induction might operate as the artist creates a realistic painting. The artist views nature, tries to optically mimic nature, and then tests their work against additional views of nature. Corrections are made and the results compared to nature again. The artist observes particulars in nature, induces general optical principles, tests them in their painting, and then compares the result to additional particulars in nature.

Gablik's interpretation of Gombrich provides an analogue to use in speculating how design graphics operate. The designer, like the artist, observes pre-existing buildings, landscapes, figures, *etc.*, and induces optical principles based on their observations. The result is an "optical model" which is used when graphically communicating particular design intents. However, since any particular graphic expression of design intent has no specific referent in the outside world, that expression itself becomes the particular from which general ideas can be derived. By looking at several rendered design options the viewer might induce structural principles, principles of spatial organization, principles of color theory, *etc.* For example, one might observe that spaces relate to each other dramatically and handsomely in specific presentations of design intent and then observe that the spaces are interlocked in each variation. One could then validly induce that the interlocking configuration of the spaces probably has something to do with the perceived drama and beauty.

One might observe a successful aesthetic use of color and then observe a numeric ratio of dominate to subordinate areas of intensity in each design variation presented. One could then validly induce that the ratio contributes to the success. These examples illustrate that induction can be a method of creating new knowledge. The new knowledge in the later example being that a particular numeric relationship between dominate and subordinate areas of intensity will increase the likelihood of successful aesthetic color usage. In fact, philosophers are inclined to think that all new knowledge must come from some form of induction [6].

On the other hand, schematic works present information abstractly, in a codified and symbolic fashion disassociated from a specific instance. These drawings are codified reductions of knowledge. The graphic conventions of floorplans and elevations, for example, give only a limited idea of what the design will be and no idea of how the design will be perceived. When faced with schematic graphics, the viewer has to imaginatively fill in information, not contained in the drawing, in order to perceive design intent. The viewer has to imagine how this design would be in reality.

In abstract and nonobjective art the viewer must empathetically fill in information or imaginatively recreate the work to appreciate it aesthetically [7]. For example, when viewers apprehend a painting by Jackson Pollock they empathetically fill in information about how the work was crafted. Viewers fill in information about the characteristics of paint and the motions the artist used to create the work. In the case of Pollock viewers empathetic recreation of the work is so strong they are tempted to believe they could have created it themselves. Viewers also fill in other types of information such as a knowledge of art history and individual life experiences which allow them to participate in recreation of meaning and emotional experience.

8. TOWARD COMPLETE NONSYMBOLIC COMMUNICATION IN DESIGN

Jaron Lanier, who coined the term "virtual reality," believes that the dominant direction of all communication is toward the nonsymbolic and the noncodified [8]. The stronger the sense of verisimilitude, the less symbolic the communication. Lanier explains:

". . . in a good shared virtual reality system, you can just directly make up the objective world instead of using symbols to refer to it . . . It would be a kind of alternate form of communication . . .

. . . At some time in the not-so-distant future, you will be able to come home and put on a pair of glasses and a glove and suddenly this new virtual

furniture will seem to appear in your room. One of the items of furniture will be a big set of shelves that will be lined with fish bowls.

But instead of fish in the fish bowls, there will be little people running around inside them. Each of the groups of people in a bowl will be doing different things. One group might be wandering around in a shopping mall, another group might be visiting open houses with a real estate agent, and another group might be playing baseball.

And all these things will be going on, and you basically just put your hand in one of the bowls and suddenly you swoop down into the scene and then you are there with them. All these people are in their own homes just like you are, but you are all connected to these shared scenes. And when you are ready to go, you make a gesture or something and then you fly out, and there you are" [8, pp. 69–70].

Lanier's insights into implications inherent in virtual reality and nonsymbolic communication causes one to see photo-realistic art and design graphics in a new light and understand why there is such a ground swell of interest in computer generated photo-realistic animation. Certainly today's computer graphic rendering and animation is a step in the direction toward nonsymbolic communication when compared to design rendering and optically accurate works in traditional media.

9. NONSYMBOLIC COMMUNICATION AS A NATURAL LANGUAGE FOR DESIGNERS AND ARTISTS

To communicate nonsymbolically, one must be able and willing to visualize their own virtual worlds to others. Ideally one would have to be comfortable creating virtual worlds in a improvisational way [8]. Designers and artists are educated to do just that. From initial ideation to presentation designers and artists are essentially improvising an aspect of their imagined world in a minimally symbolic way. The use of computer graphic rendering and animation techniques simply reduces the residual symbolism of art and design drawings even further in favor of increased optical verisimilitude.

10. VIRTUAL REALITY AND DESIGN

Virtual reality promises to obliterate symbolistic communication altogether. The stated goal of virtual reality research is to close the perceptual difference between the sensible world and a simulated world. Researchers reduce virtual reality to two concepts: immersion and navigation. Immersion refers to the illusion of being inside a computer generated scene with as much verisimilitude as possible. Navigation refers to the illusion of participant movement while occupying the scene [9]. Thomas Furness III, a researcher at the Human Interface Technology Laboratory in Seattle, believes strongly that complete verisimilitude in virtual reality can be achieved [9]. To that end Furness is researching the possibility of using a laser microscanner to paint images directly on the retina at a extremely high resolution [9].

Even at this writing total immersion virtual reality exists. The user's complete visual field is replaced by a computer simulated environment. The user can manipulate objects and ambulate in this simulated world. Collision detection sensors can create the sensation of bumping into objects, travelling up slopes, or moving across soft surfaces such as carpet [10].

In the design professions it is not difficult to imagine virtual reality supplanting all graphic methods and conventions now commonly used. Imagine virtual reality functioning as design simulator, materials detailer, and construction document simultaneously. Virtual reality promises to be a seamless, nonsymbolic visualization system throughout the design and construction process. The price is a willingness to see verisimilitude in design communication as being much more than "pretty pictures."

11. VIRTUAL REALITY AND ART

Roughly speaking, the visual arts embraced an attitude which was centered on the goal of optical verisimilitude from the Renaissance through the nineteenth century. Beginning with Cubism and continuing to this day mainstream modern art has been based on an attitude which rejects optical realism as a goal [1]. This should not be surprising. By the later part of the nineteenth century artists had come as close to achieving that goal as they could with the media and techniques at hand. However, with the advent of virtual reality, optical realism as a goal is once again viable. Virtual reality promises to be a seamless, nonsymbolic visual medium for artists willing to see verisimilitude as being much more than "mere illustration."

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