

Designing Visual Information for a Global Audience

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Abstract

This paper explores the design process in visualizing information that communicates to a global audience. The target audience is for educators and new media specialists who conceptualize, design and develop interactive multimedia applications and graphics for Web-based content. This paper reports on facilitating cross-cultural communication in interactive design being taught at Rochester Institute of Technology (RIT).

The Web has evolved into a virtual global community. Global companies are spending an exorbitant amount of money and time in the localization of content. In an effort to reduce cost but still maintain cross-cultural communication, companies are focusing their attention on computer graphics designers. Can these designers push the visualization of information to communicate effectively with a global audience? The answer is right in front of us. We live in a visual world. The world's population may not share a common language, but we are all exposed visually to what is around us. Designers can reproduce what we see into visual roadmaps of information. Visual signposts act as navigational devices that require little translation yet remain instinctively comprehensible on a global level.

1 Introduction

A great challenge facing designers is visualizing information. We are bombarded with extreme amounts of data everyday. How do we make sense of it all? Data, by itself, is meaningless. A visual presentation of facts and figures is still just a pile of data. Designers must first decode the data and understand it. Only then can they achieve their goal to construct a visual display that translates the data into information in a precise, functional, easy-to-use, and aesthetically pleasing form. Visualizing data and have it communicate to a global audience is not easy. It requires a planned-out solution based on the data and the delivery method.

Several undergraduate and graduate courses at Rochester Institute of Technology experiment in designing visual information and developing user interfaces for cross-cultural communication. Visualization issues are explored as they relate to international communication – both cultural and technical. A balance between these two topics is then evaluated in determining if the visual information is easily accessible via the Web.

2 The Language of Visual Design

RIT course lectures and assignments promote visual thinking and meaning through semiotics and semantics. Before students begin designing a visual interface, they must first understand the “language” of graphics. How do images speak? Graphic images operate on many levels. These include iconic, symbolic and indexical. Students start with iconic representations.

Undergraduate graphic design students enrolled in *Symbols and Icon Design* develop Pictograms, simple shapes that represent a

basic vocabulary of objects and concepts. Their objective was to design a series of pictograms that would cause the viewer to recall the object, concept, or activity to mind, not its name (Figure 1).

Simplicity, recognizable forms, contrast, similarity, and consistency are important components to a successful pictogram. One must be concerned with the “user” who will be viewing the pictogram to obtain the message it depicts. In addition, cultural issues, including visual symbolism, color, stereotyping, and religion, have to be considered in developing visual symbols. Being aware of negative connotations, avoid image interpretations that could offend the audience for which it is intended.



Figure 1: Pictogram set for an amusement park.

Ideograms were developed to express more complex objects and concepts. Graduate computer graphics design students enrolled in the *2D Computer Animation* course studied the evolution of the written language from Pictograms to Ideograms to Phonograms. Their assignment was to develop their own personal set of Ideograms and combine them to form a narrative story.

From iconic design, students move to a symbolic representation of information. Symbols represent a more complex visual language. A symbol's message is arbitrary unless it is learned through experience and accepted.

Visual metaphors allow for a varied audience to make connections of the context to familiar experiences through imagery. These are a form of figurative language. Language and image association is common for visual metaphors. Communication of a characteristic is achieved by selecting a familiar visual object that is closely related to that characteristic. This creates a symbolic association - a house is a home base or “home page” (Figure 2).



Figure 2: Symbolic design – visual metaphor

Students study many ways to make images speak. These include: synecdoche – part for the whole (knife and fork for restaurant); hyperbole – exaggeration to make meaningful and get a point across; illustrating change, transition and time – motion graphics, animation, and visual transition.

Digital icons have become a prevalent communication tool for interactive navigation and web design. Figure 3 illustrates a project also completed in the *Symbols and Icon Design* course. Quick and clear image recognition makes the icon functional, and visually appealing. There should be a sense of unity in the design of the icon set. These should also relate to the subject matter and the theme and context of the visual location (web site topic; desktop; software functions).



Figure 3: Digital icon set for a toy store site.

Digital icons must be designed in standard sizes (in pixels):

- 16 x 16
- 32 x 32
- 128 x 128

Often, the set will have adjusted designs for the varied sizes for legibility on screen. Color will vary, but the “style” of design solution used for the must be consistent. When there are varied styles, the set is not cohesive and can be confusing to the viewer.

These small icons have to convey a quick and memorable message to direct the user to complete their task. The designer has to take into consideration the audience, context, and memorability. The elements contained in the icon should not be overly detailed as it will not be viable in the smaller sizes. Icons that are abstract will require the user to familiarize themselves with the relationship to the function - for example, Adobe® CS version of InDesign, Illustrator, and Photoshop software use images of natural elements (flower, feather, butterfly) in its icons.

Many icons use familiar elements. A travel site might use a plane, car, and palm tree to represent air travel, car rental, and beach vacations.

3 Application for Communication

RIT students continue their studies utilizing basic strategies for displaying complex data. Some strategies seem simple and unremarkable, that is only because we take their subtle utility and explanatory power for granted. Indeed, when analyzed carefully, even the most elementary of these display formats (e.g., simple lists, tables, and charts) prove to be brilliant inventions - cognitive

tools as essential to the world of information design as screws, levers, and pulleys are to the world of mechanical labor.

Tables. Even the plainest table, properly organized and neatly laid out, can be an effective showcase for information that might otherwise take pages of cumbersome verbal description. A simple grid matrix, for example, is usually an appropriate format for presenting many types of data, from baseball standings to airline schedules.

Type size, weight, alignment and spacing should be used to keep the information in a clear hierarchy and easy to read. Minimal lines should be used as they create visual clutter and can compete with the content.

Diagrams. Any binary process or branching hierarchy can be simply and economically represented by a system of bifurcated brackets (e.g., NCAA pairings) or by so-called tree diagrams (commonly used in genealogies and, in the form of semantic networks and propositional databases, in technical systems of formal logic and linguistics)

A diagram shows how pieces work together. Instructional diagrams are used to demonstrate how to put together a do-it-yourself furniture product, or a step-by-step process in a cookbook. We encounter diagrams on a daily basis.

Flow charts and organization charts. Flow charts depict movement through a system or stages in a process. Organization charts portray structural relationships within a corporation or organizational hierarchy. Web sites and interactive media products require clear information architecture for their content and usage. Laying out the structure and flow allows for better development of user navigation and information presentation.

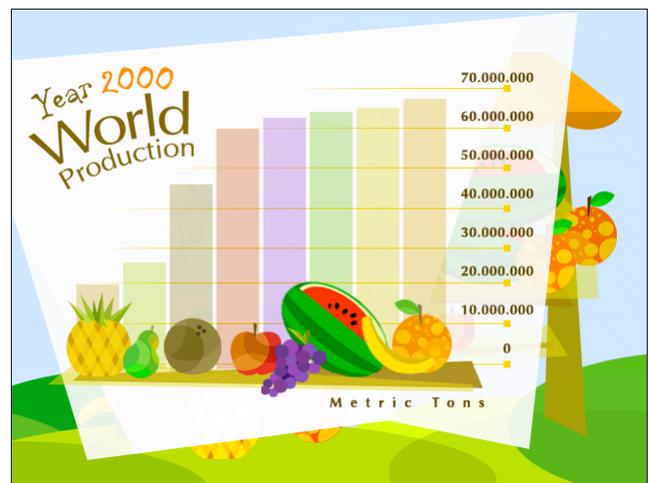


Figure 4: Informational Graphic - Chart

Maps. There is probably no better-known or more widely used example of a two-dimensional figure being used to represent complex, multi-dimensional data than an ordinary map. (Though to anyone schooled in information design, no map can seem ordinary at all. Instead, the discerning information designer will recognize every successful map as a powerful, imaginative, and often ingenious solution to a difficult communication problem.

Maps of course come in a number of shapes and styles and serve a multitude of purposes (Figure 5).

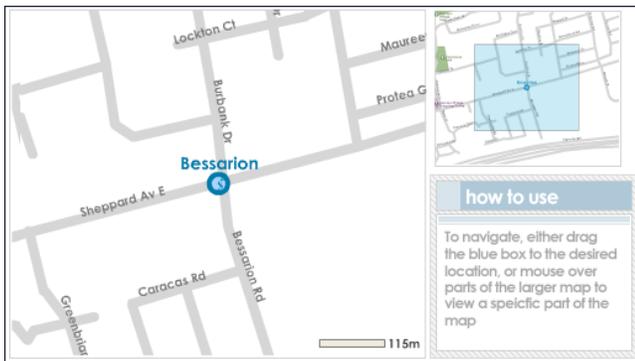


Figure 5: Map Design

4 Communicate Better to a Wider Audience

Global companies are recognizing visual information as a method to unite and communicate with other cultures. This is evident through the widespread global use of visual design on the Web. Why do graphics communicate better to a wider audience?

One advantage is easier communication. Global companies conduct business worldwide through spoken language. Most of the time, employees are not speaking their first learned language. This can lead to miscommunication. Visual design helps ease this transference of information. Content can be visually illustrated into quantitative diagrams and charts. These illustrations provide instant recognition of objects and actions possible.

Another advantage is easier translation. Companies are spending exorbitant amounts of money and time translating their content into different languages. Visual design communicates the same information without the need for translation. Case studies report that visual design used 20 – 30% fewer words to communicate similar messages.

Graduate computer graphics design students study the localization process in an effort to discover new ways to reduce translation cost and time. From data they research, students organize and fragment the content into smaller, more flexible chunks of information. They utilize multimedia capabilities to stimulate the human senses through visuals, motion, interactivity, and sound. Figure 6 shows a screen shot of a cultural learning project that explored interactive visual expression in interface design.

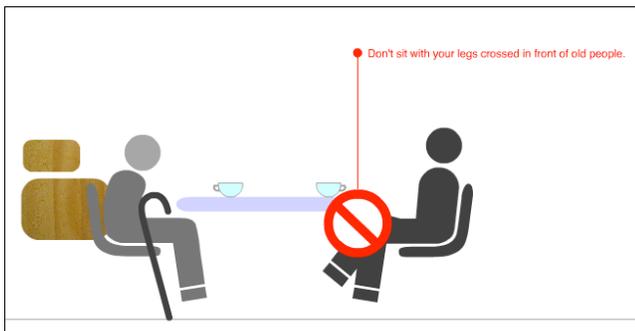


Figure 6: Interactive MFA thesis *Interactive Visual Expression*

5 Cultural Considerations

Equality is not universal. Students at RIT consider cultural values and symbols when developing global graphics. They learn about sexual stereotypes and gender roles. Women’s roles in society and job opportunities differ from culture to culture. As a general rule when designing global graphics avoid using pictures of people unless the subject is a person. Use stylized body parts and unisex figures. Hand gestures can vary from one cultural or geographic group to another. Gestures common for one culture can be offensive to another (Figure 7).

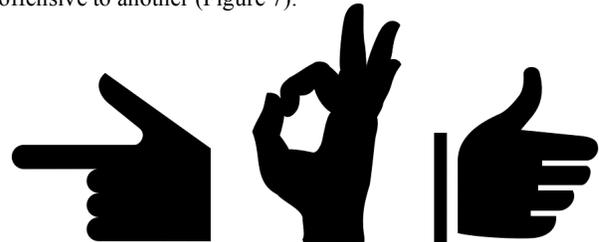


Figure 7: Gestures may be offensive

Color can vary symbolically in different cultures. Association of color to specific meanings can come from literature, religion, and heraldry. Figure 8 shows a screen shot of an interactive learning project that explains color, including cultural use, positive and negative traits, and representations. The project uses international information regarding color interpretation and the theme is based on movie making.



Figure 8: Interactive MFA thesis *Color in Motion*.

The use of simple color “figures” as the actors keeps the project universal as no one particular culture or person is depicted. The use of simple graphic elements and clean navigation keeps this project viable for a multitude of audiences. This was an MFA thesis created by graduate student Claudia Cortes of Bogota, Columbia in 2003. It can be viewed in its entirety at: <http://mariaclaudiacortes.com>. It is available in both English and Spanish.

Using imagery-based instruction with little or no text requires no translation and can address an international market. Visual instructions are often used for public warning signs and traffic

safety signage. Graduate computer graphics design students enrolled in the *Instructional Multimedia* course experiment with visual representations of step-by-step procedures with simple actions (Figure 9).



Figure 9: Visual instruction.

6 Results

The RIT courses demonstrated to the authors the great potential of visualizing information to communicate with a global audience. Students designed and developed richer and intrinsically more robust communication and navigational possibilities. The assignments consisted of practical applications as well as experimental projects. Each project provided students with ways to conceptualize solutions, visualize data, and develop practical interactive applications.

The goal was to create visuals that communicate with a global audience. Undergraduate and graduate students at RIT used this knowledge to create various interactive systems. These creative methodologies expanded the students' development and technical skills. The results demonstrate a broad range of global design applications from website to CD-ROM/DVD delivery.

7 Acknowledgements

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9 Authors

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Nancy Ciolek has an MFA in Graphic Design from Indiana State University (ISU). Currently, she is an Associate Professor in the School of Design, College of Imaging Arts and Sciences at Rochester Institute of Technology (RIT). She has previously served as Graduate Program Chair for Computer Graphics Design MFA, and served for five years as the first Administrative Chair for the RIT School of Design. She has previous experience with designing print collateral and continues as a design consultant for Idea Connection Systems Consulting Group in Rochester, NY. Nancy has also served as an education consultant to the states of New York and Connecticut Departments of Higher Education. She has been published by St. James Press and IDS Publishing (online) and is a member of the Education Committee for ACM SIGGRAPH.