INTRODUCTION

Tell me and I'll forget…

… Show me and I may remember…

…Involve me and I'll understand.[1]

To accomplish great things we must first dream, then visualize, then plan… believe… act!

—Alfred A. Montapert[2]

The human race is tremendously influenced by sensory perceptions. The way human beings understand, learn, grow, and adapt is based on the ability to perceive, view, and conceptualize thoughts and ideas.

Even the terms people use to describe the process of learning and understanding revolves around the word "see." When an idea pops into our head, or when a new concept moves from static jargon to understandable knowledge, we "see" it. Ideas become "clear," concepts are brought into "focus," and "a picture is worth a thousand words."

The use of visual metaphors to describe cognitive relationships and human thought processes are interwoven into our daily life and activities.

Recent advances in the sciences, technology, and commerce have accelerated the desire of human beings to concentrate and focus on visual representation and metaphor in daily life. The availability and powerful capacity of computers, the explosion of information access and graphics via the Internet and media conglomerates, and the technological visual interfaces now becoming available through high-definition and plasma screens only fuel our desire and indeed our addiction for more visual and sensory input from many sources.

Perhaps the major difficulty people now face is an increasing amount of nonlinearity and complexity in their lives from this technology, which produces a world of counterintuitive inputs and outputs.

The power to visualize and graphically represent results, ideas, solutions, and problems, not just as a flat one-dimensional presentation, but in two- or multiple dimensions, as well as design and present collaborative dimensional spaces where more than one person can contribute to the thought processes of problem-solving and idea generation is a distinct possibility in the near future. This environment is the field of information visualization.

The field of information visualization is relatively new. Its foundational period is now ending, and it is rapidly moving forward into the marketplace. Since its beginnings in the 1980s with high-end, expensive computer workstations that allowed for real-time and advanced interactive graphics for animation, space exploration, and visual effects in two-dimensional (2D) and three-dimensional (3D) formats, information visualization technologies are readily available to anyone with a standard PC platform.

Numerous software companies are being launched that focus specifically on the mass-marketing of information visualization products, services, and experiments. Many of these companies and products are the focus of this report.

PC: personal computer

Many people believe information visualization is poised to go from its current anonymity—in medical and scientific applications—to the mainstream of application design and user interface for anyone with access to a PC.

Information organizations need to begin experimenting and be ready to move forward quickly into offering their information visually in 2D and 3D. The market will soon be inundated with products that focus specifically on serving up information in dimensions other than 1D, or text-based.

This report provides information on what 2D and 3D information visualization is, a short history of its development, why it is so important for information organizations, and who is working in this field.

Current applications of 2D and 3D information visualization technologies are presented in terms of current hardware/equipment, software applications, websites that focus on the use of this technology, and experiments.

Practical applications for information organizations to work with this technology is discussed in terms of economics, staffing, and equipment needed to begin experimentation and presentation to users.

This report ends with a look at what the future of 2D and 3D information visualization for information organizations will be in regards to challenges, concerns, trends, and visionary approaches to this technology.

Chapter 1 focuses on the field of information visualization itself, definitions, conceptualizing data types within the field, the challenges of representing information in 2D and 3D, 2D and 3D information visualization presentation techniques, 2D and 3D information visualization in the Web environment, and an introduction to the Scalable Vector Graphics (SVG) and eXtensible 3D (X3D) standards.

Chapter 2 is an extensive listing of resources in the area of 2D and 3D information visualization, categorized under journals; conferences; significant research groups/people; websites, presentations, news stories, and articles; and software products.

Chapter 3 discusses practical applications of 2D and 3D information visualization. It also provides concrete suggestions for information organizations to experiment and explore this topic in their own localized environment. For suggestions on experimenting with software products, go to this chapter first. In addition, challenges confronting the information visualization community are listed here.

Chapter 4 examines the future of 2D and 3D information visualization, specifically related to information organizations, listing some of the field's future applications and strengths for the processing, organization, description, searching, and presentation of information, and how the Web is a vital part of this transformation.

A small, annotated bibliography is provided.

The scope of this report

Except for introductory material and a history and discussion of various information visualization applications, this report focuses exclusively on 2D and 3D issues, products, and services related to information visualization (and discussions related to the popularity of 2D information landscapes or posters set in a 3D world).

This report does not focus on the computer/technical issues or aspects taught in the computer science field, or on technical applications or discussions related to developments or programming aspects of information visualization. This area is vast and complex, and indeed generates much research and information specifically geared toward the programming and computational side of visualization.

This report is geared toward professionals in information organizations, whose primary focus is helping users access information or in presenting information in various environments. The information is kept simple, understandable, and practical for those who are most likely to read this report.

Resources geared toward those interested in the computer/technical/theoretical side of information visualization are provided in the annotated bibliography at the end of the report, and technical conferences are listed in the resources in Chapter 2.

Websites, software, and experimentation in 2D and 3D information visualization focuses on practical applications, not an extensive understanding of the technologies or programming involved.

The focus of this report is on resource and software discovery by information professionals, at the individual or department level, through downloading of free or purchased software programs and services for experimentation. A knowledgeable systems staff or person may still be needed to implement and service these technologies,

Although examining this topic is difficult without some technological language and discussion, that discussion is kept as practical as possible.

Note: Many critical hyperlinks available on the Web regarding this field are dated and often lead to 404 errors. Apparently, much of the research in information visualization in its early stages (before 2000) was done by various companies and information science students.

Many of the hyperlinks on these websites listed in this report do not work, but the resources themselves are important to list. The sites listed in this report worked as of Nov. 10, 2004.

Notes

[1]Ancient Chinese proverb. Also quoted, in paraphrase, at the beginning of Peter Cochrane, *… I see and I remember …*, in *The Internet in 3D: Information, Images and Interaction*. Ed. Rae Earnshaw and John Vince. San Diego: Academic Press, 1997. p. 2.

[2]The Quotations Page, www.quotationspage.com.