Information Visualization: Failed experiment or future revolution?

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This is not the whole talk

I tinker with my presentations right to the last minute. This handout includes some important points from my talk, but it's not the whole talk. It's widly incomplete. But fear not! A full transcript will be available after the Summit.

You can get a copy of the full transcript from my site. It will also be available from the conference site.

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Information visualization and information architecture

Information visualization (infoviz, for short) has been dismissed by many information architects as a good idea that hasn't panned out—a failed experiment. Now failure is a strong word that closes a lot of doors, and information architects like to keep their options open, so the preferred phrasing is "I'm skeptical about information visualization's value proposition" or "I'll believe it when I see it" or something like that.

Of course skepticism is a good thing. It's also something information architects know a lot about because we have spent a lot of time on the receiving end of the skepticism stick. It is only half-joking to say that the most common IA activity is not creating wireframes or developing taxonomies, but trying to overcome skepticism about the value of IA and IA methods.

So it's curious that many information architects have approached information visualization the way that others have approached information architecture. The IA looks at visualization and say things like: "I'm skeptical" or "Where are the applications?" or "I'll believe it when I see it."

There are some good reasons for this. In some respects visualization has not lived up to expectations. But some of these expectations are unrealistic, or based on misunderstandings about what information visualization is and what it can do. Also, we should remember that it usually takes decades for technologies to become mainstream. Good examples include hypertext, email, GUI interfaces, the Internet, and information retrieval. This doesn't prove that visualization will become mainstream, but it certainly has some good company.

My goal in this talk is to take a closer look at information visualization. I want to see if it is a failed experiment or might lead to future revolution. And I want to do

it from the perspective of information architecture. I want to see how the two areas are related: what information visualization might do for information architecture, and the reverse.

The talk is in three parts.

In the first part I'm going to cover the fundamentals of information visualization. I want to give you a feel for the field, the basic principles, what it aims to do, what has been done to date, and the major challenges that remain. And I won't kid you: there some major challenges remain.

In the second part I will examine some of the myths and misconceptions surrounding information visualization. I have provided a few of these in this handout.

In the third part I will consider the types of information architecture problems that information visualization can be successfully applied to, or could be.

But that's the full talk. For now, I'd like to provide you with a brief discussion of information visualization and some common misconceptions.

Clarifying information visualization

The standard definition for information visualization is:

> The use of computer-supported, interactive, visual representations of abstract data to amplify cognition. (Card, Mackinlay, & Shneiderman, 1999).

At first glance this appears to be an obvious and transparent definition. But there are some subtleties that are worth noting. The goal of information visualization is not pictures, but insight. And it's not about looking at pictures, it's about interacting with them to 'amplify cognition.'

The subtleties of this definition have led to some misunderstandings and misconceptions about information visualization. These misconceptions are worth considering because they can help us reach a richer understanding of what infoviz is, what it can do, and what it can't.

Major misconceptions include:

Infoviz aims to eliminate text. Very few infoviz applications do away with text altogether. The goal is to find the representation appropriate for a particular task. In many situations text remains the best form of representation. But we all know from experience that many complex ideas are best represented visually. Just as movies did not eliminate the novel, infoviz will not eliminate the need for text.

Infoviz will only succeed if it solves the scalability problem. This view assumes that the really big problems are the only interesting ones, and the only hard ones. It also assumes that if the dataset has billions of elements, it is important to display all of those elements at once. In many situations the real challenge is to narrow the billions down to a more reasonable and manageable subset. This is where data mining begins to play an important role. Size and scalability are important issues, but it is a mistake to think that infoviz only applies to extreme problems. These are edge cases.

Infoviz is about speed. It is sometimes said that infoviz aims to help us move from slow reading to faster visual perception, and that it can help us deal with

information overload by allowing us to process more information faster. This is only true up to a point. Infoviz is about insight, not pictures. Insight means understanding and creating knowledge and learning. Those processes often require reflection, combination, and rearrangement. The speed element of information visualization aims to reduce the cognitive load of certain tasks so that larger, more complex tasks become possible. Particular tasks may be made more efficient, but infoviz can also open up a range of new tasks that were previously impossible or simply not feasible because they were too burdensome.

The work of Edward Tufte is information visualization. Yes and no. Tufte offers useful principles and insights into visually representing complex, multi-dimensional information. However, Tufte's work is rooted in static representations. Interaction is not a sidenote to the infoviz perspective: it the catalytic element.

Information visualization is a commercialization problem. This idea holds that as a research problem, information visualization is sufficiently far enough along that it can be commercialized. There have been some attempts to bring infoviz tools to market, but these have been relatively few. And while they have not been major successes, they have not been massive failures either. Information visualization remains, at least in my view, primarily a research problem. Commercialization opportunities exists, but they are currently relegated to narrow, vertical markets.

Infoviz will take over the world. The rhetoric around new technologies often presents them as a revolutionary and inevitable force. Infoviz will have a major impact in certain areas, yet it remains to be seen if it will have a significant mainstream impact. We should be cautious in making predictions and remind ourselves that information visualization, like information architecture, is merely one piece in a rich array of techniques and technologies.

References and further reading

Card, S. K., Mackinlay, J. D., & Shneiderman, B. (Eds.). (1999b). *Readings in information visualization: Using vision to think*. San Francisco, CA: Morgan Kaufmann.

Spence, R. (2000). *Information visualization*. Harlow: Addison-Wesley.

Biography

Karl Fast is a PhD student in library & information science at the University of Western Ontario. His research interests revolve around information visualization, human-computer interaction, information architecture, and the design of information systems as cognitive tools that support learning, reasoning, and thinking. Each summer he throws a pack on his back and finds enough wilderness for a 500km+ backpacking trip.