Creative Visualization: Best in Show
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This is the final column in a series that features the winners of DM Review's 2005 data visualization competition. In the fourth and final event of the competition, participants were given the opportunity to showcase their data visualization skills and imaginations without restriction to a prescribed set of instructions. Here are the only instructions they were given:

> *This scenario is not prescribed. You may present any real-world data and message that can be addressed through a data visualization. It may be a graph, a dashboard, or any other visual presentation of quantitative data. This is your opportunity to showcase a data visualization of which you are particularly proud.*

I was especially excited about this part of the competition because it would invite innovative approaches to the visual presentation of data. I wasn't disappointed. In fact, a few of the submissions expressed imagination that ventured well beyond the bounds of effectiveness.

The winning solution was submitted by Jock Mackinlay of Tableau Software, who also took the prize for scenario number one and for the competition overall. Given his pedigree, it's no surprise that Jock's entries did well. Jock has a Ph.D. in computer science from Stanford, where he began his research in the field of information visualization many years ago, before joining the user interface research group team at Xerox PARC. He worked there from 1986 until recently when he became the director of interface design at Tableau Software. Jock was also one of the three authors, along with Stuart Card and Ben Shneiderman, who wrote the best overview to date of research in the field of information visualization, entitled *Readings in Information Visualization: Using Vision to Think (1999).*

The data visualization that Jock created using Tableau's software was designed to help a video game company analyze its competitors' advertising strategies. Before reading the following description, take a minute to examine the solution in Figure 1.
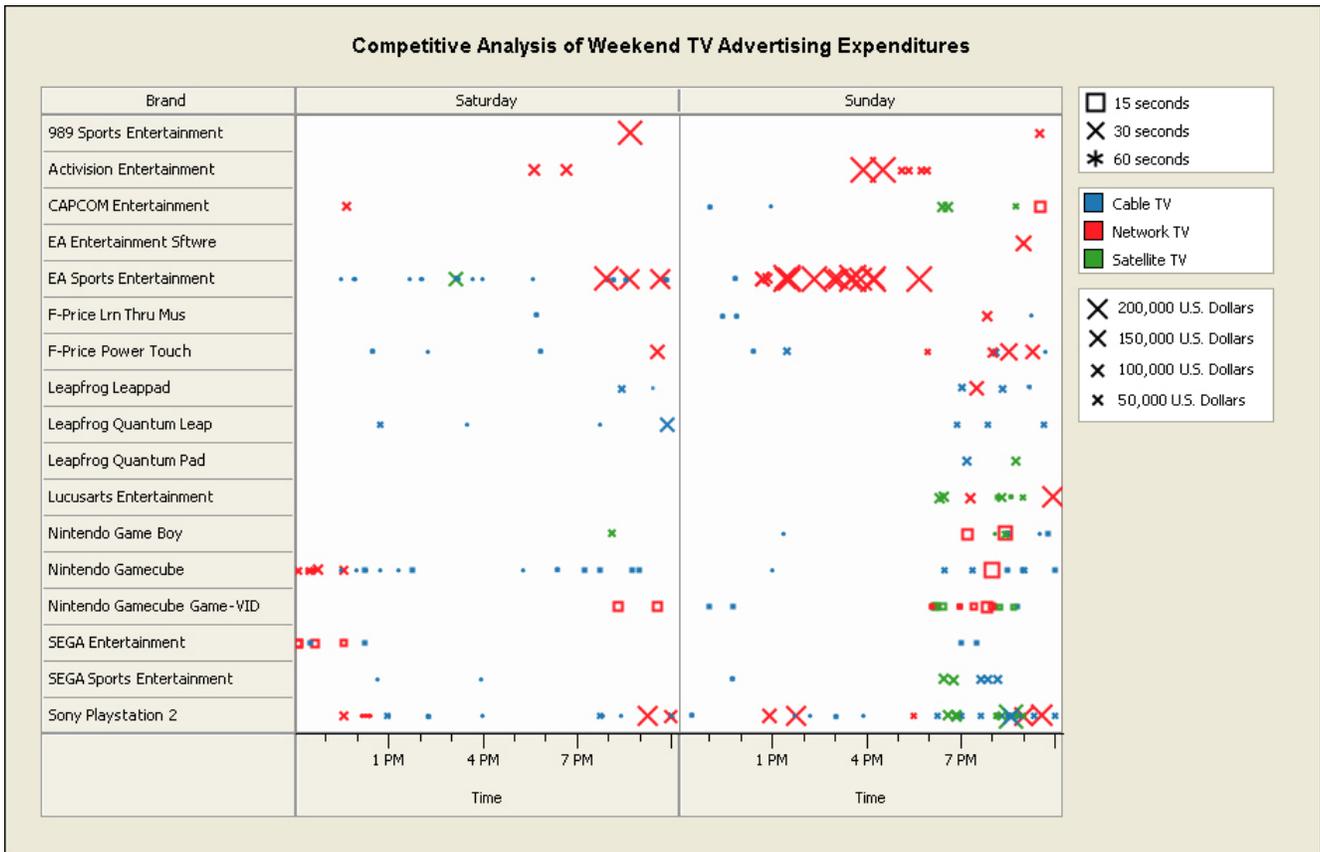
Figure 1: Winning Data Visualization Created by Tableau Software to Analyze the Advertising Strategies of Video Game Companies

Here's Jock's description:

> *What are the advertising strategies of my competitors? A company required a competitive analysis comparing the weekend TV advertising strategies of different companies in the video game industry. The companies have similar overall strategies with more ads running Sunday evening than Saturday evening. However, EA Sports stands out as having an unusual advertising strategy: running a lot of low cost, 15-second cable TV spots throughout the weekend with several high cost, 30-second network TV spots Sunday afternoon. The motivation was immediately clear: live Sunday sports broadcasts are an ideal advertising venue for sports video games.*

This analysis involves the simultaneous visualization of five variables: 1) video game brand, 2) time the ad ran, 3) ad length (15, 30 or 60 seconds), 4) type of television broadcast (network, cable or satellite) and 5) ad cost ($0 to $200,000). Each of these variables was encoded in a different manner, consisting of the following visual attributes: 1) vertical 2-D location, 2) horizontal 2-D location, 3) symbol shape, 4) color and 5) symbol size. The size of an object usually doesn't display quantitative values effectively because it is difficult to compare their 2-D areas to one another with any degree of accuracy. However, in this case, precise comparisons of ad costs weren't necessary, only a rough sense of relative size. Visualized in this way, the insight that Jock reports in his description jumps out quite clearly. You don't have to be a genius or have a degree in statistics to make sense of this visualization. Despite the concurrent presentation of five variables, this solution is simple and

clear—it communicates! Chances are you would have difficulty visualizing multivariate data in this way unless you have Tableau's software. Only a few commercial products today incorporate useful visualization functionality like this. Most vendors are too busy trying to get the needles on their dashboard gauges to bounce around when the values change. (Apologies to my colleagues in the BI industry who have proudly shown me this feature in their software.)

I get very excited whenever I'm shown true innovations in the field of data visualization. Much of my time is spent teaching people the fundamental skills of graph design because so many of those who routinely communicate quantitative business information require help at this level. It is always refreshing to see effective new approaches to data visualization for communication and analysis, but too many of these efforts are misguided and simply don't work. The biggest problem today involves attempts to make data visualizations look impressive, pretty and photo-realistic in apparent imitation of the video game industry. Jock's solution analyzed data related to the video game industry, but he knew better than to do so using visuals designed to look like a video game.

I appreciate everyone who spent the time required to participate in the data visualization competition and don't wish to show disrespect for anyone's efforts. However, it is useful to include examples that illustrate what can happen when creativity is misapplied. The map-based visualization in Figure 2 displays the annual amount of snowfall at several ski resorts in Idaho. It is beautifully rendered. However, the eye-catching imagery distracts from the actual data, and the use of green circles, blue squares, and black diamonds to encode the amount of snowfall is not intuitive. The designer of this display did not focus on the goal of communication.
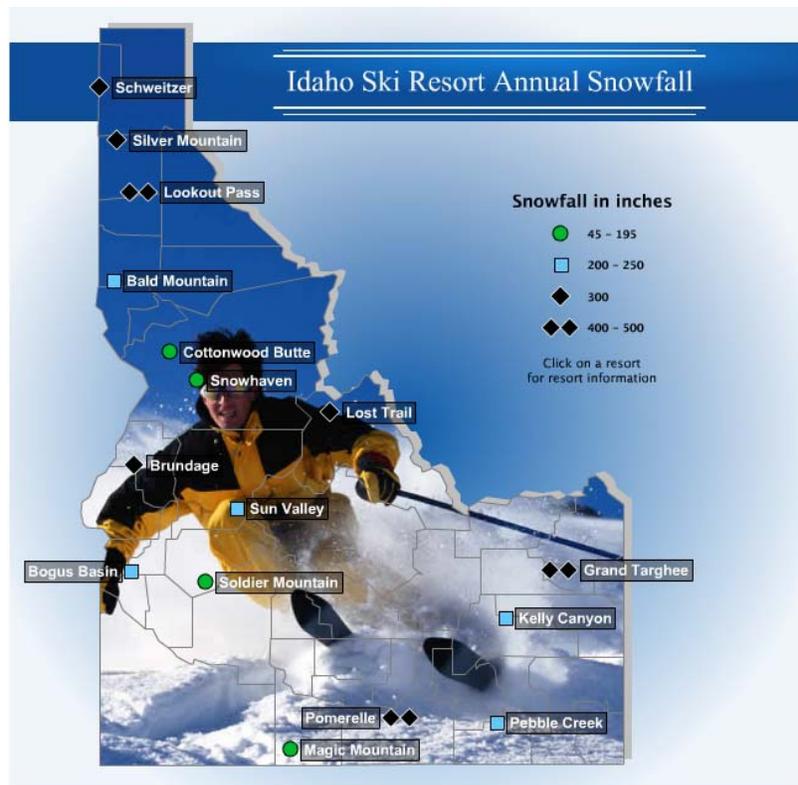

Figure 2: The Image on this Map Distracts from the Snowfall Data

The image that you see in Figure 3 is a snapshot from an interactive 3-D virtual environment that you can roam through in the form of an avatar to view a collection of interactive graphs. Virtual environments that simulate physical space can be effectively used when the experience of that environment is critical to the information that you're exploring or the skills you're trying to learn. Flight simulators are a great example. Navigating through a physical world of sales figures, however, adds no value.
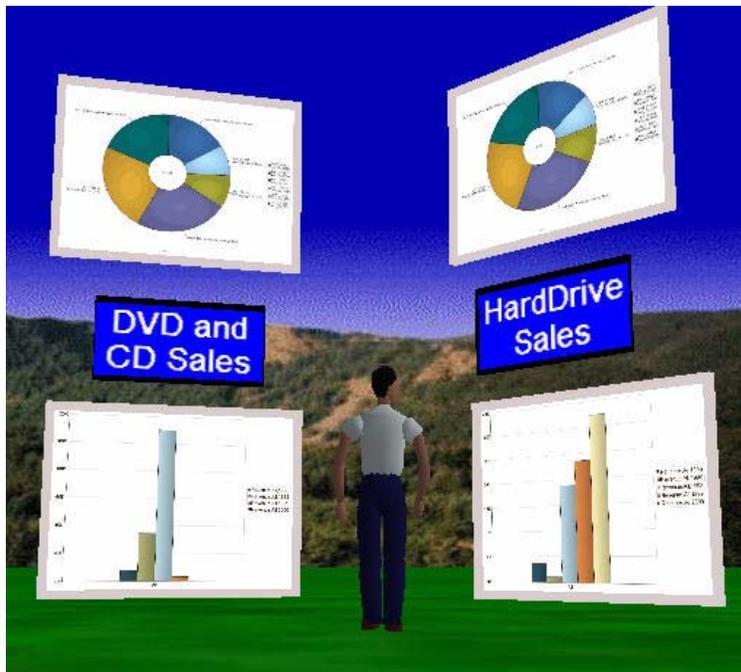

Figure 3: This Solution Misapplies a Virtual Reality Environment to the Communication of Numbers

As long as business intelligence software vendors continue to market flash and dazzle and spend their time adding features that are seldom useful rather than developing software that works seamlessly as an extension of human perception and intelligence, most BI users will continue to waste much of their time on window dressing rather than squeezing valuable insights out of their data. Most—but not all. You can choose to be an exception.

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About the Author

Stephen Few has worked for over 20 years as an IT innovator, consultant, and teacher. Today, as Principal of the consultancy Perceptual Edge, Stephen focuses on data visualization for analyzing and communicating quantitative business information. He provides training and consulting services, writes the monthly _Visual Business Intelligence Newsletter_, speaks frequently at conferences, and teaches in the MBA program at the University of California, Berkeley. He is the author of two books: *Show Me the Numbers: Designing Tables and Graphs to Enlighten* and *Information Dashboard Design: The Effective Visual Communication of Data*. You can learn more about Stephen's work and access an entire library of articles at www.perceptualedge.com. Between articles, you can read Stephen's thoughts on the industry in his blog.