



## Excel's New Charting Engine: Preview of an Opportunity Missed

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In 2004, I responded to the mounting pressure from clients to do something that I had been resisting: I developed a workshop that was specific to a particular software product. I focus on teaching simple data visualization concepts—principles and practices—that can be applied to any software. I don't enjoy teaching workshops that involve such uninspiring instructions as "To create a chart, select *Insert* from the menu, then select *Chart*, which will cause the *Chart Wizard* to appear." Prompted by a desperate request from Purdue University, however, I developed a half-day workshop designed to help businesspeople apply these principles and practices to *Microsoft Excel*. I gave this new workshop the title "Excel Charting: An Extreme Makeover." Mostly, it involved teaching people which of the many available chart types were actually useful, how to reformat them to eliminate senseless visual clutter, and how to save the results in a "User-Defined" library of charts so they could get to them fairly easily and ignore the stuff that doesn't work.

When I heard about a year ago that Microsoft was in the process of creating a brand new charting engine for Excel, I let out a shout of joy, recognizing a tremendous opportunity to improve the visual communication of quantitative data for millions of people. More charts are probably created with Excel than with all other products combined. Improving Excel's charting functionality could be a great leap forward for humankind. All right, I know this isn't in the same league as solving world hunger, but for someone like me who works hard everyday to improve the effectiveness of data communication for businesspeople, this is a big deal.

With the assistance of a colleague at the University of California, Berkeley, I learned who at Microsoft was responsible for the development of the new charting engine and quickly sent him an e-mail. In it, I introduced myself and offered to send him my suggestions for shaping Excel's new charting functionality. With his polite assent, I submitted a list of recommendations. In response, I received a very courteous e-mail. Here's an excerpt:

*Thanks. This was quite interesting and useful. I think you'll be pretty happy with some of the changes we are making for Office 12...I did read your book for inspiration (as well as Tufte, Cleveland, Wilkinson, Zelazny, etc).*

I realized that he couldn't commit himself to specific changes to Excel and that his good intentions would probably be forced to compete with various interests and powerbrokers within Microsoft, but I held out hope that some positive changes would be forthcoming. I kept my fingers crossed for months, having no way to know what was coming.

Having no relationship with Microsoft that grants me access to the beta version of Excel 2007, I've had to be patient, satisfying my curiosity with the crumbs of information that have sifted out through official channels. I have now seen enough, however, mostly through the

official Microsoft Office 2007 preview blog, to be reduced to near clinical depression were it not for the wonders of modern drugs. What follows is my sad account of travail. Briefly put, lovers of superficial decoration with no regard for the data can breathe a sigh of relief, for chartjunk will continue to rule the day.

## **Fluff, Fluff, and More Fluff**

Here's a recent entry in the [blog](#) dedicated to previewing the next release of Excel:

Wednesday, April 12, 2006 5:44 a.m. by Helen

*Looking at what users do is not necessarily the best way to think about what should be done... Just because everybody does it, doesn't mean it's good.*

*Please, consider talking to experts instead of polling the public (which is what you've effectively done...)*

*The average user is far too easily charmed by visual effects that are actually misleading and detract from the quality of the chart. 3-D charts are a good example—and the cone charts in Excel are an absolute abomination, because they distort data. Likewise the average user is likely to add noise to their charts in the shape of gridlines, borders, patterned lines, shadows, etc.*

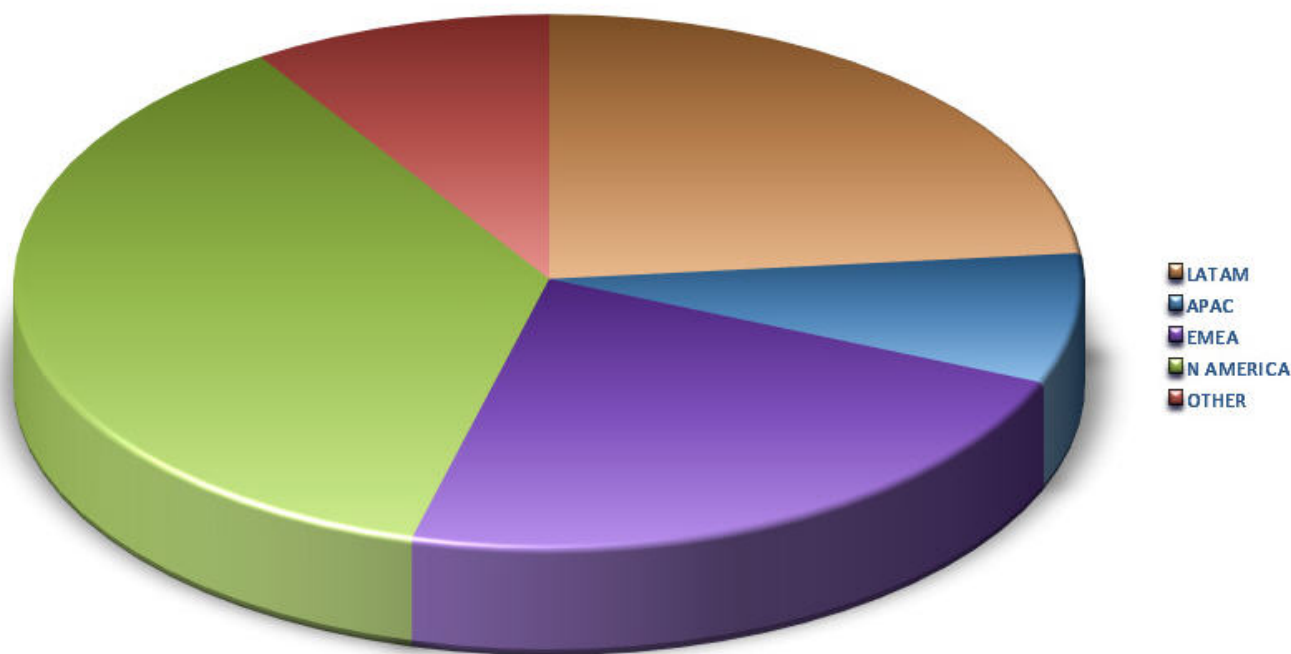
*Excel should guide its users towards good design, not towards common design mistakes.*

My sentiments exactly. When I read this, I wanted to give Helen a hug. Software vendors should rely on their customers to tell them what they need to accomplish, not to tell them how the software should be designed to meet those needs. Most customers are far too susceptible to superficial flash and dazzle. If you are a prominent software vendor, such as Microsoft, and you provide senseless and data-subverting fluff, customers will use it. This is especially true of Excel, one of the most pervasive software products in existence today and for most of the PC's history. Excel users will waste countless hours finding the prettiest nonsense to throw onto their charts, rather than focusing on what they need to say and finding the best way to clearly and accurately say it.

Excel is the one product that could stand up to superficial and uninformed customer demands by giving them what they need and what really works. Excel has no credible competition in the spreadsheet market, so customers would continue to use it regardless and would in no time embrace the value of well-designed, spot-on functionality. Most software vendors feel trapped by customer demands and are cowed into submission, even when they know how silly there are. Microsoft has the opportunity to make a stand for excellence, but either lacks the courage, doesn't understand what works themselves, or doesn't care. Regardless of the reason, it's the customers who will suffer.

The pie chart in Figure 1 provides a good example of how the Microsoft development team spent its time. Have you ever seen a more delicious looking pie?

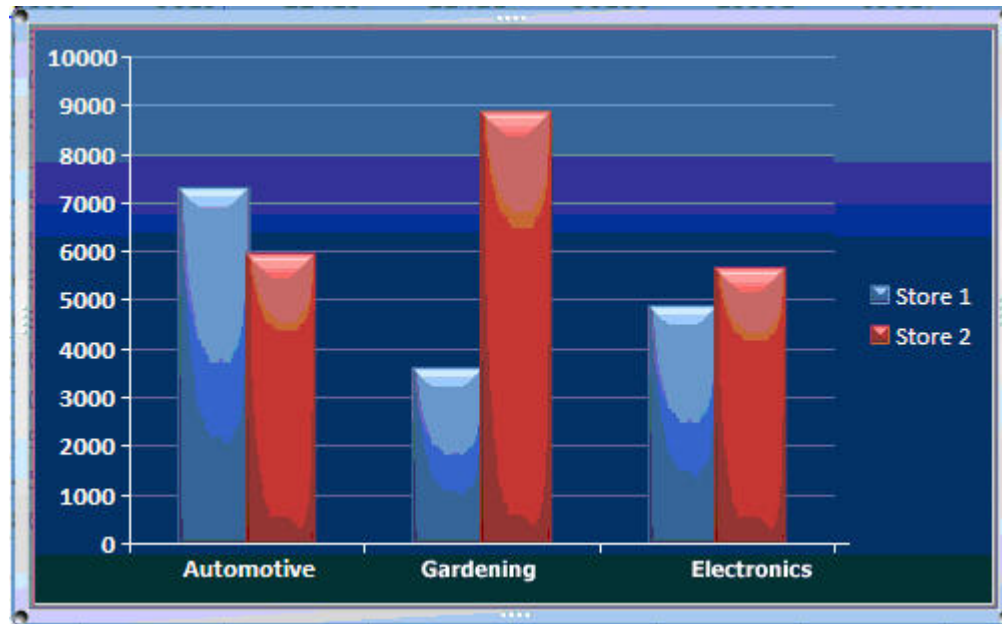
### Evidence Break Out By Geography



**Figure 1:** A pie chart good enough to eat, but so what?

Making a chart three-dimensional and tilting it not only adds no value, but actually takes away value by making it harder to read. This graph's sole purpose is to communicate the relationship of five geographical regions to one another and to the whole, but this information is poorly served by a pie chart and especially by one that is rendered in 3D. The lighting effects that appear as gleam, reflection, and shadow, add photo-realistic physicality to the pie, but in so doing distract from the actual message. The information this chart was created to communicate is not three-dimensional, and it certainly doesn't exist as an object in the real world upon which the sun shines resulting in shadows. Visual effects such as these are not benign—they distract and suggest to users that what really matters is not the meaning of the information but how cleverly they can dress it up.

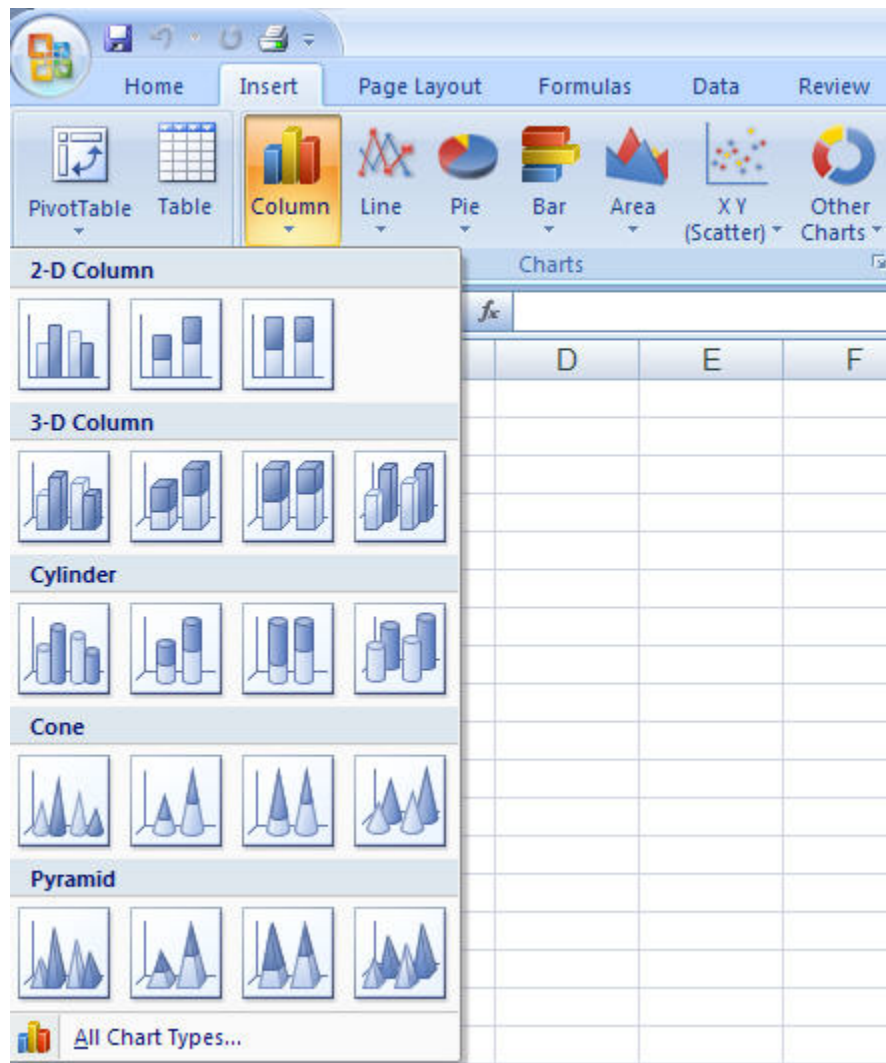
Figure 2 reveals what a bar chart can look like with a layer of gaudy makeup:



**Figure 2:** When light reflects on shiny objects in the real world, we find it annoying, but evidently in bar charts this is a useful feature.

The only question you should ask when looking at a bar chart is: Does it communicate the data in the clearest and most accurate way possible? Unfortunately, several aspects of this chart's visual design undermine the simple message in the data.

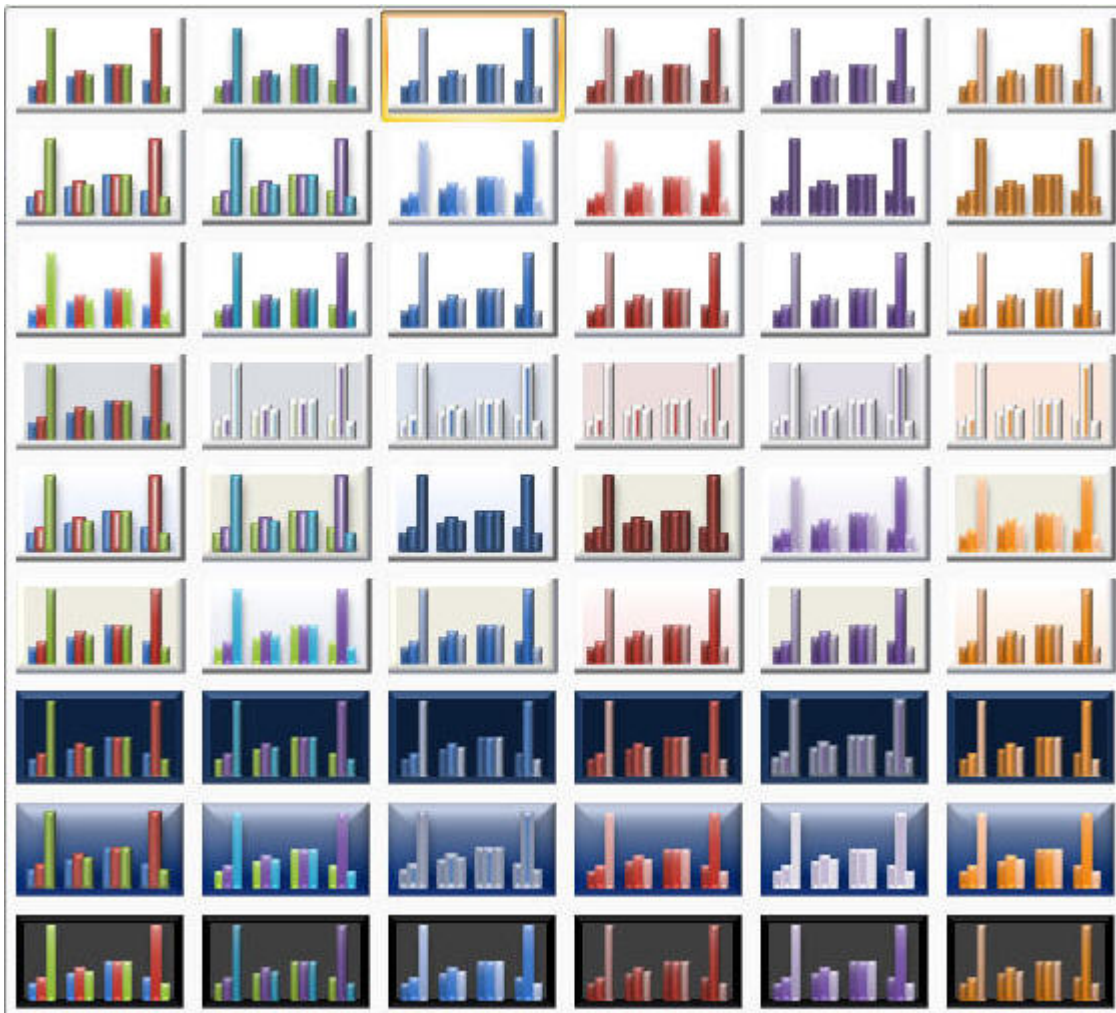
Not only is chartjunk the order of the day, but Excel will now offer it in infinite variety. Want to create a column (vertical bar) chart? What kind of bars would you like? You can have plain old 2-D bars if you insist (but please dress them up with lighting effects, color gradients, and...you know the story), 3-D bars, cylinders, cones, or pyramids (see Figure 3). Why stick with simple rectangular bars with consistent size and shape from bottom to top when you can obscure the data by tapering, rounding, or adding meaningless depth to them?



**Figure 3:** The new version of Excel will make it even simpler to select silly variations of tried and true graphs that undermine their ability to communicate.

So, you insist on sticking with the old classic look, do you? Well, that's all right, there's still much that you can do to adorn it with cheap costume jewelry. How about one of these (see Figure 4)? Go ahead and have some fun with it. It may be paste, but no one's going to look closely enough to notice. That's the problem, isn't it? Senselessly adorned graphs don't get examined closely.

In an official blog entry that proudly describes the superiority of the new charts, a Freudian slip of the fingers crept into the claim that it “draws smooth antialiased **lies**, which makes line charts look so much better.” [Emphasis mine.] With this much emphasis on meaningless visual effects, people are encouraged to treat the data as superficially as it is displayed. That's one way to keep people from looking too closely at your work or the numbers. What a shame! Those numbers just might be important.



**Figure 4:** A new *Design* tab now gives you easy access to a variety of pre-designed visual styles, each one equally awful.

Is this what businesses, which claim to base their decisions on information, have come to? Have we entirely lost track of a graph's objective, which is to visually represent quantitative data in a way that brings to light meaningful patterns that could not easily be seen in a table of numbers?

### **Choices, Choices, and More Choices**

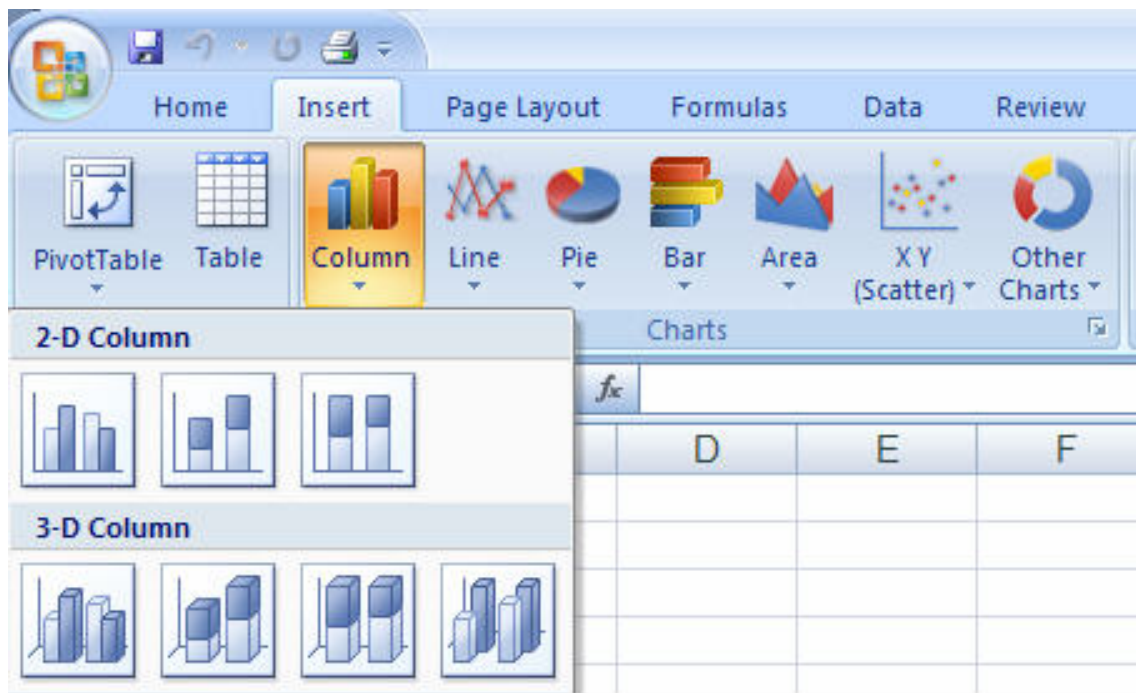
Getting back to the official blog once again, the benefit of choices, choices, and more choices is explained: "The overall goal is to provide a wide gamut of designs, so that users can create very simple or very showy charts quickly and without a lot of fiddling." And immediately following this statement, the writer admits that, unlike the new styles for cells and tables, "Users cannot create their own chart styles..., they will be limited to the several hundred that ship in the box." Thank god, what would I do with my time if I didn't have several hundred charting styles from which to choose?

This is definitely one of those situations in which less is more. Rather than giving users the ability to choose from hundreds of styles, most of which don't work, how about simplifying matters by only giving them the best styles, the ones that actually communicate effectively?

Several times in the blog, a great deal of emphasis is placed on the conscientious effort of the development team to make it easier for users, with fewer steps, to create effective charts. I see signs of this attempt and believe that the team's effort was sincere. I also believe that they missed the mark.

I'll let the official blog explain what they've done to make things simpler:

*In current versions of Excel, when a user creates a chart, the first thing they need to do is select the type of chart—column, line, scatter, pie, surface, and etc. In Excel 2007, we've made the variety of chart types available a lot more visible, and we have offered help for users to choose between them. To insert a chart, a user would start with the Insert tab. Excel 2007 has an insert chart type "group" (7 related controls) on the ribbon's insert tab. This makes it easy to pick a chart type, with large icons and tooltips that describe when to use a particular type.*



**Figure 5:** It will now be easier to select the most common types of charts.

So far, so good, except that as you can see in Figure 5, once you select a basic chart type from the ribbon, such as *Column*, you then choose a specific version from a lengthy list of variations. In Figure 5, you see only the top portion of a list that begins with *2-D Column* and *3-D Column* and continues with four choices in each of three categories: *Cylinder*, *Cone*, and *Pyramid*. It continues downhill from here.

*Once a user has chosen a chart type, there are a variety of charting features that can help the user communicate their data effectively. In previous versions of Excel, these are scattered around through a variety of dialog boxes, making it hard for all but the most diligent users to take advantage of the settings. For Office 2007, we studied a massive number of charts that we found in publications, books, and Excel spreadsheets to determine the most common*

combinations of chart elements such as titles, legend, data table, etc. From this, we created a gallery of predefined chart layouts (e.g., combinations of chart elements) that can be applied with one click.

Figure 6 gives us a preview of some of these predefined chart layouts. This set is for scatterplots.



**Figure 6:** Sample of the predefined “quick layouts.”

I believe that this is not the way to simplify the creation of charts. Rather than directing users to wade through long lists of predefined combinations of components, each with only a slightly different layout, it would be better to start users out with a good default layout and then make it simple to add and manipulate the components as needed—if needed. The purpose of a good set of defaults is to eliminate the need for further manipulation of the elements, except in unusual situations. Microsoft’s approach is similar to the way that Business Objects forced users to select charts in their original dashboard product, which provided an extensive list of “analytics” (tables and graphs designed for very specific purposes), which were all just slight variations on a few common themes. You could spend hours getting familiar with the extensive variety of combinations, each slightly unique in a way that often took a while to notice.

Once you’ve chosen a chart in Excel 2007, you will be able to modify it in various ways, accessed through three new tabs labeled *Design*, *Layout*, and *Format*. When I first read about this, I had no idea how these tabs differed in functionality, because we tend to use the terms design, layout, and format as synonyms. Expecting that a little reading would clear this up, here’s how the explanation of the design tab begins:

*The Design tab allows users to set the style and **layout** of a chart. In addition, this is where you change the chart type, change the data source, move the chart, and a few other things. [Emphasis mine.]*



By this point in my reading, I was thoroughly confused. If you use the *Design* tab to set the layout of the chart, do you use the *Layout* tab to set the design of the chart? In the current version of Excel, if you want to change the chart type, you right click on the chart and select *Chart Type* from the popup menu, or if you want to change the source data you select *Source Data* from the popup menu. Is it really easier and more intuitive to make these changes by selecting the *Design* tab? I would have a good laugh at this if it weren't describing the next release of Excel. Because Excel is used by millions of people throughout the world, this confusing and inefficient user interface, which directs users to slog through a swamp of needless choices, will result in an incalculable number of wasted hours and, unfortunately, in frequently ineffective and often misleading charts. What a waste!

## Epilogue

So far, I've only seen a tiny bit of Excel 2007 and have narrowed my focus in this review to those aspects that most offend my sensibilities as someone who cares a great deal about the effectiveness of data visualization. We know so much about how to visually communicate quantitative information that it is a travesty to address the need this poorly. If all I cared about was lining my pockets with consulting dollars, I would welcome Excel 2007 as a blessing, because it feeds the need for people like me who specialize in data visualization.

The truth is, I really care about the quality of data communication. Businesses must understand their data to make intelligent decisions. The next version of Excel will do its part to keep businesses in the dark. But we'll just keep right on buying it, won't we?

Short of fomenting a revolt, which is not my intention, I would like to incite you who share my views on the matter to raise your voices, not so much in protest, but to encourage Microsoft to do the right thing by trimming the fluff from Excel and focusing on simple functionality that really works. Give Microsoft your permission, as a powerful constituency of conscientious businesspeople, to rally the courage to take a stand for what works. Take a look for yourself at the [blog](#) that previews Excel 2007, consider it thoughtfully, and then express your concerns and suggestions. Repurpose the blog to serve not only as a tool of marketing but as an agent for meaningful change. If enough of us do this, perhaps we can promote something good for the world by pointing this powerful and ubiquitous tool in the right direction and, in so doing, help it live up to its name: *Excel*.

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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](http://www.perceptualedge.com). Between articles, you can read Stephen's thoughts on the industry in his [blog](#).