

Introducing Dashboards

In This Chapter

- Defining dashboards and reports
- Determining user requirements
- Establishing visualization and design principles
- Reviewing your dashboard prior to distribution

Creating a dashboard in Excel is not the same as creating a standard table-driven analysis. It's tempting to jump right in and start building away, but a dashboard requires far more preparation than a typical Excel report. It calls for closer communication with business leaders, stricter data modeling techniques, and the following of certain best practices. It's helpful to be familiar with fundamental dashboard concepts before venturing off into the mechanics of building your own. In this chapter, we discuss basic dashboard concepts and design principles and what it takes to prepare for a dashboarding project.



On the Web

All workbook examples that we list in this book are available on this book's companion website at www.wiley.com/go/excelldr.

What Are Dashboards and Reports?

It isn't difficult to use the words *report* and *dashboard* interchangeably. In fact, the line between dashboards and reports frequently gets muddled. We see countless reports that are referred to as dashboards just because they include a few charts. Likewise, we see many examples of what could be considered dashboards but are called reports.

Now this may all seem like semantics to you, but it's helpful to clear the air a bit and understand the core attributes of both dashboards and reports.

Defining reports

Reports are probably the most common way to communicate business intelligence. A *report* can be described as a document that contains data used for viewing and analysis. It can be as simple as a data table (or a database) or as complex as a subtotaled view with interactive drilling.

The key attribute of a report is that it doesn't lead a reader to a predefined conclusion. Although a report can include analysis, aggregations, calculations, and even charts, reports often require the reader to apply his own judgment and analysis to the data.

To clarify this concept, Figure 1-1 shows an example of a report. This report shows National Park visitor statistics by year. Although this data can be useful, this report doesn't steer the reader to any predefined conclusions or in any directions; it simply presents the aggregated data.

	A	B	C	D	E	F
4	Number of Visitors (thousands)					
5		2001	2002	2003	2004	2005
6	Great Smoky Mountains NP	9,198	9,316	9,367	9,167	9,192
7	Grand Canyon NP	4,105	4,002	4,125	4,326	4,402
8	Yosemite NP	3,389	3,362	3,379	3,281	3,304
9	Olympic NP	3,416	3,691	3,225	3,074	3,143
10	Yellowstone NP	2,759	2,974	3,019	2,868	2,836
11	Rocky Mountain NP	3,140	2,988	3,067	2,782	2,798
12	Cuyahoga Valley NP	3,123	3,218	2,880	3,306	2,534
13	Zion NP	2,218	2,593	2,459	2,677	2,587
14	Grand Teton NP	2,535	2,613	2,356	2,360	2,463
15	Acadia NP	2,517	2,559	2,431	2,208	2,051
16	Glacier NP	1,681	1,906	1,664	2,034	1,925
17	Hot Springs NP	1,297	1,440	1,561	1,419	1,340
18	Hawaii Volcanoes NP	1,343	1,111	992	1,307	1,661

Figure 1-1: Reports present data for viewing but don't lead readers to predefined conclusions.

Defining dashboards

A *dashboard* is a visual interface that provides at-a-glance views into key measures relevant to a particular objective or business process. A dashboard consists of three key attributes.

- Displays data graphically (such as in charts). Provides visualizations that help focus attention on key trends, comparisons, and exceptions.
- Displays only data that is relevant to the goal of the dashboard.
- Contains predefined conclusions relevant to the goal of the dashboard and relieves the reader from having to perform her own analysis.

Figure 1-2 illustrates a dashboard that uses the same data shown in Figure 1-1. This dashboard displays information about National Park attendance. As you can see, this presentation has all the key attributes that define a dashboard. First, it's a visual display that allows you to quickly recognize the

overall trend of the attendance. Second, not all the details of the data are shown in this presentation; only the key pieces of information that support the goal of this dashboard. Finally, by virtue of its objective, this dashboard effectively presents you with analysis and conclusions about the trending of attendance.

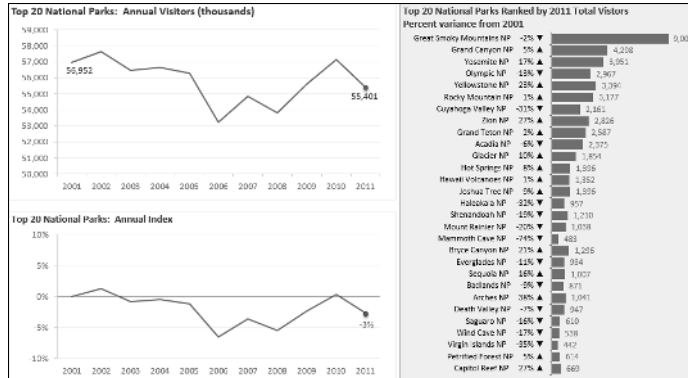


Figure 1-2: A dashboard provides an at-a-glance view into key measures relevant to a particular objective or business process.

As you take in this concept of reports versus dashboards, remember that Excel doesn't provide tools specifically designed for dashboards or reports. The beauty of Excel is that any of its tools can be used to perform virtually any task that you need. For example, you can use the chart, pivot tables, and macros features in a basic report or to play a key role in a dashboard presentation. In this book, we introduce you to the many ways that you can leverage everyday Excel tools to build your own dashboard components.

Establish the User Requirements

Imagine that your objective is to create a dashboard that provides information about monthly service subscriptions. Do you jump to action and slap together whatever comes to mind? Do you take a guess at what information would be useful in a dashboard like this? These questions sound ridiculous, but it happens more that you think. We are constantly called to action but are rarely provided the time to gather the true requirements for the project. Between limited information and false deadlines, the end product often ends up not being used or causing more work than value.

This brings us to one of the key steps in preparing to build a dashboard — collecting user requirements. These user requirements include defining your audience, data sources, performance measures, refresh schedules, and so on.

In the non-IT world of the Excel analyst, user requirements are practically useless because of the hard left and right turns we're asked to make every day. So the gathering of user requirements sometimes seems like a waste of valuable time in the ever-changing business environment.

But it's time to get into the dashboard state of mind. After all, would you rather spend your time upfront gathering user requirements or at the end painstakingly redesigning the dashboard you'll surely come to hate?

Consider how many times you've been asked for an analysis, only to be told, "No. I meant this." Or, "Now that I see it, I realize I need this." As frustrating as that can be for a single analysis, imagine running into this during the creation of a complex dashboard with several data integration processes.

The process of gathering user requirements doesn't have to be an overly complicated or formal one. Here are some simple things you can do to ensure that you have a solid idea of the purpose of the dashboard.

When collecting user requirements for your dashboard, focus on the types of data that you need, the dimensions of data that you require, the data sources that you will use, and so on. This is a good thing; without solid data processes, your dashboards won't be effective or maintainable.

Define the message(s)

When receiving requirements for a new dashboard project, don't be afraid to clarify who exactly is making the initial request and talk to them about what they're really asking for. Discuss the purpose of the dashboard and the triggers that caused them to ask for a dashboard in the first place. You may find, after discussing the matter, that a simple Excel report will meet their needs, foregoing the need for a full-on dashboard.

Establish the audience

If a dashboard is warranted, talk about who the end users will be. Take some time to meet with some of the end users and talk about how they plan to use the dashboard. For example, will the dashboard be used as a performance tool for regional managers or perhaps to share data with external customers? Talking through these fundamentals with the right people will help align your thoughts and avoid missed requirements later.

Define the performance measures

Most dashboards are designed around a set of measures called *Key Performance Indicators (KPIs)*. A KPI is an indicator of the level of performance of a task deemed to be essential to daily operations or processes. The idea around a KPI is that it will reveal performance that is outside the norm, signaling the need for attention and intervention. Although the measures you place into your dashboards may not officially be called KPIs, they undoubtedly serve the same purpose — to draw attention to problem areas.



The topic of creating effective KPIs for your organization is worthy of its own book and outside the scope for this endeavor. For a detailed guide on KPI development strategies, pick up David Parmenter's book, *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs*, published by John Wiley & Sons, Inc. This book provides an excellent step-by-step approach to developing and implementing KPIs.

The measures that you use on a dashboard should support the initial goal of that dashboard. For example, if you create a dashboard that focuses on supply chain processes, it may not make sense to have HR head count data included. It's generally good to avoid *nice-to-know* data in your dashboards simply to fill white space or because the data is available. If the data doesn't support the core goal of the dashboard, leave it out.

Here's another tip. When gathering the measures required for the dashboard, we find that it often helps to write out a sentence to describe the measure needed. For example, instead of simply writing the word "Revenue" into our user requirements, we write what we call a *component question* such as "What is the overall revenue trend for the last two years?" We call it a component question because we will ultimately task a single component, such as a chart or a table, to answer the question. For instance, if the component question is "What is the overall revenue trend for the last two years?" you can imagine a chart component answering that question by showing the two-year revenue trend.

We sometimes take this a step further and actually incorporate the component questions into a mock layout of the dashboard to get a high-level sense of what data the dashboard will require. Figure 1-3 illustrates an example.

Each box in this dashboard layout mockup represents a component on the dashboard and its approximate position. The questions within each box provide a sense of the types of data required to create the measures for the dashboard.

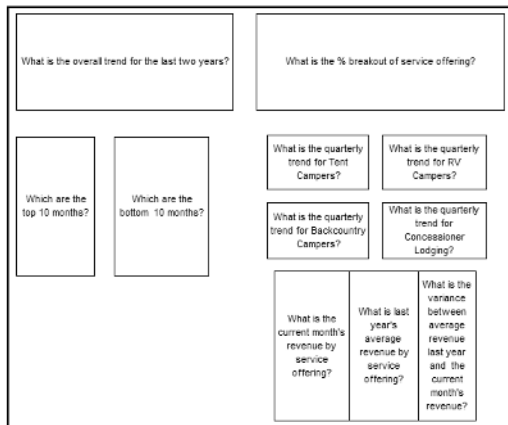


Figure 1-3: Each box in this dashboard layout mockup represents a component and the type of data required to create the measures.

List the required data sources

After you have the list of measures that you need on the dashboard, it's important to take a tally of the available databases or other source systems to determine whether the data required to produce those measures is available.

- Do you have access to the data sources necessary?
- How often are those data sources updated?
- Who owns and maintains those data sources?
- What are the processes to get the data from those resources?
- Does the data even exist?

You'll need answers to these questions when negotiating development time, refresh intervals, and phasing.



Tip

Conventional wisdom says that the measures on your dashboard should not be governed by the availability of data. Instead, let dashboard KPIs and measures govern the data sources in your organization. Although we agree with the spirit of that statement, we've been involved in too many dashboard projects that have fallen apart because of lack of data. Real-world experience has taught us the difference between the ideal and the ordeal.

If your organizational strategy requires that you collect and measure data that is nonexistent or not available, press pause on the dashboard project and turn your attention to creating a data collection mechanism that will help you to get the data you need.

Define the dimensions and filters

In the context of building a dashboard, a *dimension* is a data category that you use to organize business data. Examples of dimensions are region, market, branch, manager, and employee. When you define a dimension in the user requirements stage, you can determine how the measures should be grouped or distributed. For example, if your dashboard should report data by employee, you will need to ensure that your data collection processes include employee details. As you can imagine, adding a new dimension after the dashboard is built can get complicated, especially when your processes require collecting data across multiple data sources. The bottom line is that locking down the dimensions for a dashboard early in the process will definitely save you headaches.

Along those same lines, you want to know the types of filters that you'll need. *Filters* are mechanisms that allow you to narrow the scope of the data to a single dimension. For example, you can filter by year, employee, or region. Again, if you don't account for a particular filter while establishing your data collection process, you will likely be forced into an unpleasant redesign of both your processes and your dashboard.

Determine the need for drill-down details

Many dashboards provide drill-down features that allow you to click through to the details of a specific measure. You want to get a clear understanding of the types of drill downs your users have in mind.

To most users, a drill-down feature means the ability to get a raw data table supporting the measures shown on the dashboard. Although this isn't always practical or possible, at minimum, you can set expectations and document the request for future dashboard versions. This allows you to plan for any macros, links, or other solutions that you may have to include with your dashboards.

Establish the update schedule

An *update schedule* refers to how often a dashboard is changed to reflect the latest information available. As the one who will build and maintain the dashboard, it's important that you have a say in these schedules. Your customer may not know what it will take to update the dashboard in question. While talking about this schedule, keep in mind the refresh rates of the different data sources you will need to get the measures. You won't be able to refresh your dashboard any faster than your data sources. Also, negotiate enough development time to build macros that will automate redundant and time-consuming updating tasks.

A Quick Look at Dashboard Design Principles

Excel users live in a world of numbers and tables, not visualization and design. Your typical Excel analyst has no background in visual design and is often left to rely on his own visual instincts to design his dashboards. As a result, most Excel-based dashboards have little thought given to effective visual design, often resulting in overly cluttered and ineffective UI.

The good news is that dashboards have been around for a long time, so we have a vast Knowledge Base of prescribed visualization and dashboard design principles. Although many of these principles seem like common sense, these are concepts that Excel users don't think about regularly. Let's break that trend and review a few dashboard design principles that will improve the design of your Excel dashboards.



Note

Many of the concepts in this section come from the work of Stephen Few, visualization expert and author of several books and articles on dashboard design principles. Because this book focuses on the technical aspects of building dashboards in Excel, this section offers a high-level look at dashboard design. If you find yourself captivated by the subject, feel free to visit www.perceptualedge.com to see Stephen Few's website.

Rule number 1: Keep it simple

Dashboard design expert Stephen Few has the mantra, “Simplify, Simplify, Simplify.” A dashboard that is cluttered with too many measures and too much eye candy can dilute the significant information that you’re trying to present. How many times has someone told you that your reports look busy? In essence, they’re saying that you have too much on the page or screen, making it hard to see the actual data.

Here are few actions you can take to ensure a simpler and more effective dashboard design.

Don’t turn your dashboard into a data mart

Admit it. You include as much information in a report as possible, primarily to avoid being asked for additional information. We all do it. But in the dashboard state of mind, you have to fight the urge to force every piece of data available onto your dashboard.

Overwhelming users with too much data can cause them to lose sight of the primary goal of the dashboard and focus on inconsequential data. The measures used on a dashboard should support the initial purpose of that dashboard. Avoid the urge to fill white space for the sake of symmetry and appearances. Don’t include nice-to-know data just because the data is available. If the data doesn’t support the core purpose of the dashboard, leave it out.

Forget about the fancy formatting

The key to communicating effectively with your dashboard is to present your data as simply as possible. There’s no need to wrap it in eye candy to make it more interesting. It’s okay to have a dashboard with little to no color or formatting. You’ll find that the lack of fancy formatting only calls attention to the actual data. Focus on the data and not shiny happy graphics.

To help drive this point home, we created the chart shown in Figure 1-4 (formatting and all). Excel makes it easy to achieve these types of effects with its layout and style features. The problem is that these effects subdue the very data we’re trying to present. Furthermore, if we include this chart on a page with five to ten other charts with the same formatting, we get a dashboard that’s difficult to look at — much less to read.

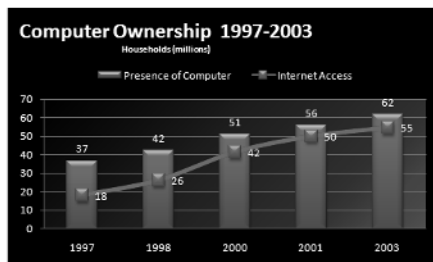


Figure 1-4: Fancy formatting can be overwhelming, overshadowing the very data you’re trying to present.

Figure 1-5 shows the same data without the fancy formatting. Not only is the chart easier to read but also you can process the data more effectively from this chart.

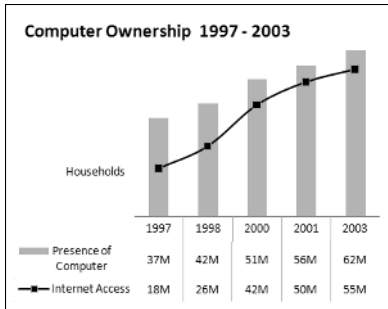


Figure 1-5: Charts should present your data as simply as possible.

Here are some simple tips to keep from overdoing the fancy factor:

- Avoid using colors or background fills to organize your dashboards. Colors, in general, should be used sparingly, reserved only for information about key data points. For example, assigning red, yellow, and green to measures traditionally indicates performance level. Coloring sections of your dashboard only distracts your audience from your message.
- De-emphasize borders, backgrounds, and other elements that define dashboard areas. Try to use the natural white space between your components to partition your dashboard. If borders are necessary, format them to lighter hues than your data. Light grays are typically ideal for borders. The idea is to indicate sections without distracting from the information displayed.
- Excel 2013 makes it easy to apply effects that make everything look shiny, glittery, and generally happy. Although these formatting features make for great marketing tools, they don't do you or your dashboard any favors. Avoid applying fancy effects such as gradients, pattern fills, shadows, glow, soft edges, and other formatting.
- Don't try to enhance your dashboard with clip art or pictures. They do nothing to further data presentation, and they often just look tacky.

Skip the unnecessary chart junk

Data visualization pioneer Edward Tufte introduced the notion of data-to-ink ratio. Tufte's basic idea is that a large percentage of the ink on your chart (or on your dashboard) should be dedicated to data. Very little ink should represent what he calls chart junk: borders, gridlines, trend lines, labels, backgrounds, and so on.

Figure 1-6 illustrates the impact that chart junk can have on the ability to effectively communicate your data. Notice how convoluted and cramped the data looks in the top chart.

The bottom chart actually contains the same data. Yet, it more effectively presents the core message that driver registrations in Texas rose from approximately 10.5 million to almost 17 million. This message was diluted in the top chart by excess clutter. So you can see from this simple example how your chart dramatically improves by simply removing elements that don't directly contribute to the core message.

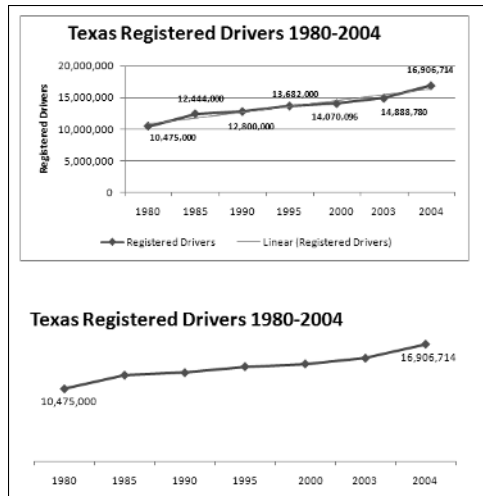


Figure 1-6: Charts with too many chart elements can become convoluted and hard to read. Removing the unnecessary elements clarifies the message.

Here are a few ways to avoid chart junk and ensure that your charts clearly present your data.

- **Remove gridlines:** Gridlines (both vertical and horizontal) are almost always unnecessary. The implied reason for gridlines is that they help to visually gauge the value represented by each data point. The truth is, however, people typically gauge the value of a data point by comparing its position to the other data points in the chart. So gridlines become secondary reference points that simply take up ink.
- **Remove borders:** You'll find that eliminating borders and frames gives your charts a cleaner look and helps you avoid the dizzying lines you get when placing multiple charts with borders on a single dashboard. Instead of borders, make use of the white space between the charts as implied borders.

- **Skip the trend lines:** Seldom does a trend line provide insight that can't be gained with the already plotted data or a simple label. In fact, trend lines often state the obvious and sometimes confuse readers into thinking they are part of another data series. Why place a trend line on a line chart when the line chart is in and of itself a trend line of sorts? Why place a trend line on a bar chart when it's just as easy to look at the tops of the bars? In lieu of trend lines, add a simple label that states what you're trying to say about the overall trend of the data.
- **Avoid unnecessary data labels:** Nothing states that you need to show the data label for every value on your chart. It's okay to plot a data point and not display its value. You'll find that your charts have more impact when you show only numbers that are relevant to your message.
- **Don't show a legend if you don't have to:** When you're plotting one data series, you don't need to display a space-taking chart legend. Allow your chart title to identify the data that your chart represents.
- **Remove any axis that doesn't add value:** The purpose of the X and Y axes are to help a user visually gauge and position the values represented by each data point. However, if the nature and utility of the chart doesn't require a particular axis, remove it. Again, the goal here is not to hack away at your chart. The goal is to include only those chart elements that directly contribute to the core message of your chart.

Limit each dashboard to one viewable page or screen

A dashboard should provide an at-a-glance view into key measures relevant to a particular objective or business process. This implies that all the data is immediately viewable at one time. Although this isn't always the easiest thing to do, it's best to see all the data on one page or screen. You can compare sections more easily, you can process cause and effect relationships more effectively, and you rely less on short-term memory. When a user has to scroll left, right, or down, these benefits are diminished. Furthermore, users tend to believe that when information is placed out of normal view (areas that require scrolling), it is somehow less important.

But what if you can't fit all the data in one viewable area (one page or one screen)? First, review the measures on your dashboard and determine if they really need to be there. Next, format your dashboard to use less space (format fonts, reduce white space, adjust column and row widths). Finally, try adding interactivity to your dashboard, allowing users to dynamically change views to show only those measures that are relevant to them.



Cross-Ref

We discuss how to add interactive features in Chapter 12.

Use layout and placement to draw focus

As discussed earlier in this chapter, only include measures that support your dashboard's goal. However, just because all measures on your dashboard are significant, they may not always have the same level of importance. In other words, you will frequently want one component of your dashboard to stand out from the others.

Instead of using bright colors or exaggerated sizing differences, you can leverage location and placement to draw focus to the most important components on your dashboard.

Various studies have shown that readers have a natural tendency to focus on particular regions of a document. For example, researchers at the Poynter Institute's Eyetracker III project have found that readers view various regions on a screen in a certain order, paying particular attention to specific regions on the screen. They use the diagram in Figure 1-7 to illustrate what they call *priority zones*. Regions with the number 1 in the diagram seem to have high prominence, attracting the most attention for longer periods of time. Meanwhile number 3 regions seem to have low prominence.

1	1	2	3
1	1	2	2
2	2	2	3
3	3	3	3

Figure 1-7: Studies show that users pay particular attention to the upper left and middle left of a document.

You can leverage these priority zones to promote or demote certain components based on significance. If one of the charts on your dashboard warrants special focus, you can simply place that chart in a region of prominence.



Tip

Surrounding colors, borders, fonts, and other formatting can affect the viewing patterns of your readers, de-emphasizing a previously high-prominence region.

Format numbers effectively

Undoubtedly, you will use lots of numbers in your dashboards. Some of them will be in charts, whereas others will be in tables. Remember that every piece of information on your dashboard

should have a purpose. It's important that you format your numbers effectively so your users can understand the information they represent without confusion or hindrance.

Here are some guidelines to keep in mind when formatting the numbers in your dashboards and reports.

- Always use commas to make numbers easier to read. For example, instead of 2345, show 2,345.
- Only use decimal places if that level of precision is required. For instance, there is rarely a benefit for showing the decimal places in a dollar amount such as \$123.45. Likewise in percentages, use only the minimum number of decimals required to represent the data effectively. For example instead of 43.21%, you may be able to get away with 43%.
- Only use the dollar symbol when you need to clarify that you're referring to monetary values. If you have a chart or table that contains all revenue values, and there is a label clearly stating this, you can save room and pixels by leaving out the dollar symbol.
- Format very large numbers to thousands or millions place. For instance, instead of displaying 16,906,714, you can format the number to read 17M.

In Chapter 2, you explore how to leverage number formatting tricks to enhance the readability of your dashboards and reports.

Use titles and labels effectively

It's common sense, but people often fail to label items on dashboards effectively. If your customer looks at your dashboard and asks, "What is this telling me?" you likely have labeling issues. Here are a few guidelines for effective labeling in your dashboards and reports.

- Always include a timestamp on your dashboard or report. This minimizes confusion when distributing the same dashboard or report in monthly or weekly installments.
- Always include some text indicating when the data for the measures was retrieved. In many cases, timing of the data is a critical piece of information for analyzing a measure.
- Use descriptive titles for each component. This allows users to clearly identify what they're looking at. Be sure to avoid cryptic titles with lots of acronyms and symbols.
- Although it may seem counterintuitive, it's generally good practice to de-emphasize labels by formatting them to lighter hues than your data. Lightly colored labels give your users the information they need without distracting them from the information that's displayed. Ideal colors to use for labels are colors that are commonly found in nature: soft grays, browns, blues, and greens.

Key Questions to Ask Before Distributing Your Dashboard

Before you send out your finished dashboard, it's worth your time to step back and measure it against some of the design principles we discuss in this chapter. Here are some key questions you can use as a checklist before distributing your dashboard.

Does my dashboard present the right information?

Look at the information you're presenting and determine whether it meets the purpose of the dashboard identified during requirements gathering. Don't be timid about clarifying the purpose of the dashboard again with your core users. You want to avoid building the dashboard in a vacuum. Allow a few test users to see iterations as you develop it. This way, communication remains open, and you won't go too far in the wrong direction.

Does everything on my dashboard have a purpose?

Take an honest look at how much information on your dashboard doesn't support its main purpose. In order to keep your dashboard as valuable as possible, you don't want to dilute it with nice-to-know data that's interesting, but not actionable. Remember, if the data doesn't support the core purpose of the dashboard, leave it out. Nothing says you have to fill every bit of white space on the page.

Does my dashboard prominently display the key message?

Every dashboard has one or more key messages. You want to ensure that these messages are prominently displayed. To test whether the key messages in a dashboard are prominent, stand back and squint your eyes while you look at the dashboard. Look away and then look at the dashboard several times. What jumps out at you first? If it's not the key components you want to display, then you'll have to change something. Here are a few actions you can take to ensure that your key components have prominence.

- Place the key components of your dashboard in the upper-left or middle-left of the page. As I noted earlier, studies show that these areas attract the most attention for longer periods of time.
- De-emphasize borders, backgrounds, and other elements that define dashboard areas. Try to use the natural white space between your components to partition your dashboard. If borders are necessary, format them to lighter hues than your data.
- Format labels and other text to lighter hues than your data. Lightly colored labels give your users the information they need without distracting them from the information displayed.

Can I maintain this dashboard?

There's a big difference between updating a dashboard and rebuilding a dashboard. Before you excitedly send out the sweet-looking dashboard you just built, take a moment to think about the maintenance of such a dashboard. You want to think about the frequency of updates and what processes you need to go through each time you update the data. If it's a one-time reporting event, then set that expectation with your users. If you know it will become a recurring report, you'll want to really negotiate development time, refresh intervals, and phasing before agreeing to a time table.

Does my dashboard clearly display its scope and shelf life?

A dashboard should clearly specify its scope and shelf life. That is to say, anyone should be able to look at your dashboard and know the time period it's relevant to and the scope of the information on the dashboard. This comes down to a few simple things you can do to effectively label your dashboards and reports.

- Always include a timestamp on your dashboard. This minimizes confusion when distributing the same dashboard or report in monthly or weekly installments.
- Always include some text indicating when the data for the measures was retrieved. In many cases, timing of the data is a critical piece of information when analyzing a measure.
- Use descriptive titles for each component in your dashboard. Be sure to avoid cryptic titles with lots of acronyms and symbols.

Is my dashboard well documented?

It's important to document your dashboard and the data model behind it. Anyone who has ever inherited an Excel worksheet knows how difficult it can be to translate the various analytical gyrations that go into a report. If you're lucky, the data model will be small enough to piece together in a week or so. If you're not so lucky, you'll have to ditch the entire model and start from scratch. By the way, the Excel data model doesn't even have to be someone else's. I actually went back to a model that I'd built six or so months earlier, only to find that I'd forgotten what I had done. Without documentation, it took me a few days to remember and decipher my own work.

The documentation doesn't even have to be highfalutin' fancy stuff. A few simple things can help in documenting your dashboard.

- **Add a Model Map tab to your data model.** The Model Map tab is a separate sheet you can use to summarize the key ranges in the data model and how each range interacts with the reporting components in the final presentation layer.
- **Use comments and labels liberally.** It's amazing how a few explanatory comments and labels can help clarify your model even after you've been away from your data model for a long period of time.

- **Use colors to identify the ranges in your data model.** Using colors in your data model enables you to quickly look at a range of cells and get a basic indication of what that range does. Each color can represent a range type. For example, yellow could represent staging tables, gray could represent formulas, and purple could represent reference tables.



Cross-Ref

In Chapter 2, we introduce you to data models and building a data model map.

Is my dashboard user-friendly?

Before you distribute your dashboard, you want to ensure that it's user-friendly. It's not difficult to guess what *user-friendly* means.

- **Intuitive:** Your dashboard should be intuitive to someone who has never seen it. Test it out on someone and ask her if it makes sense. If you have to start explaining what the dashboard says, something is wrong. Does the dashboard need more labels, less-complicated charts, a better layout, more data, less data? It's a good idea to get feedback from several users.
- **Easy to navigate:** If your dashboard is dynamic, allowing for interactivity with macros or pivot tables, then you want to make sure that the navigation works well. Do users have to click several places to get to their data? Is the number of drill-downs appropriate? Does it take too long to switch from one view to another? Again, you'll want to test your dashboard on several users. And be sure to test any interactive dashboard features on several computers other than yours.
- **Prints properly:** Nothing is more annoying than printing a dashboard only to find that the person who created the dashboard didn't take the time to ensure that it prints correctly. Be sure you set the print options on your Excel files so that your dashboards print properly.

Is my dashboard accurate?

Nothing kills a dashboard or report faster than the perception that the data in it is inaccurate. It's not within my capabilities to tell you how to determine whether your data is accurate. I can, however, highlight three factors that establish the perception that a dashboard is accurate.

- **Consistency with authoritative sources:** It's obvious that if your data doesn't match other reporting sources, you'll have a data credibility issue — especially if those other sources are deemed to be the authoritative sources. Be sure you are aware of the data sources that are considered to be gospel in your organization. If your dashboard contains data associated with an authoritative source, compare your data with that source to ensure consistency.

- **Internal consistency:** It's never fun to explain why one part of your dashboard doesn't jibe with other parts of the same dashboard. You want to ensure some level of internal consistency within your dashboard. Be sure comparable components in different areas of your dashboard are consistent with each other. If there is a reason for inconsistency, be sure to clearly notate those reasons. It's amazing how well a simple notation clears up questions about the data.
- **Personal experience:** Have you ever seen someone look at a report and say, "That doesn't look right?" They are using what some people call "gut feel" to evaluate the soundness of the data. None of us looks at numbers in a vacuum. When we look at any analysis, we bring with us years of personal knowledge, interaction, and experience. We subconsciously use these experiences in our evaluation of information. When determining the accuracy of your dashboard, take into consideration organizational *anecdotal knowledge*. If possible, show your dashboard to a few content experts in your company.

