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Data Science For Dummies ED 1 & 2

Exploring Best Practices in Dashboard Design

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Big data, data engineering, and data science are revolutionizing business. While more and more data is collected at faster and faster rates, the demand for clear and meaningful data insights increases. Organizational decision-makers need information delivered quickly, and in a concise and easy-to-understand format.

In this context, data analytics dashboards are one of the more popular methods for delivering such information. Acting as (you hope!) a user-friendly software interface, such dashboards can provide a single-page, easy-to-understand summary of information that's vital to organizational and managerial decision making. A dashboard can also serve as a portal through which users can drill down to obtain more detailed information when needed.

Although dashboards have the potential to be highly effective communication mediums, their usefulness is heavily dependent on the designers' implementation of strategic and thoughtful design principles. In this chapter, I introduce you to the best practices of dashboard design, and explain why those practices are important.

<remember>

As with any type of design, you can find a lot of good and bad dashboard examples out there. Bad design is usually the direct result of a poorly scoped purpose. Dashboards, like all visualizations, have to be designed for a specific audience to serve a specific function. If you don't define the audience and function clearly in advance, the dashboard probably can't succeed.

<tip>

The term *dashboard* was adopted from the automobile panel. Don't let the metaphorical title "dashboard" shape your image of the analytics dashboard, though. Dashboards that incorporate illustrations of gauges and odometers are now considered old-fashioned and clunky. These design elements consume a lot of screen space, deliver sparse information, and create needless visual clutter on a layout that should be clear, concise, and to the point. Use cleaner, more compact elements instead.

Focusing on the Audience

Dashboards are all about communication, and the golden rule in communication is *know your audience*. One of the most common errors in dashboard design happens when a designer tries to make a dashboard be all things to all people. This designer inevitably uses every type of doodad and gewgaw to visualize every possible item of interest, thus creating a dashboard that's so cluttered and unfocused that it's nearly impossible to use.

A business intelligence dashboard for upper management should have an entirely different focus than that of a small-business e-commerce dashboard. Focus less attention on what your audience *might want* to know and more attention on what your audience *needs* to know. Focus on what's useful to your audience in an at-a-glance resource. Set up your dashboard in such a way that users keep coming back precisely because your dashboard is the one that delivers actionable, timely insights that they can turn to for quick and easy decision support. If the insights aren't actionable, or if they're too hard to understand, your target audience won't adopt the dashboard as a decision-support instrument. This is generally just how things turn out.

<tip>

One important, yet often overlooked, best practice in dashboard design is to plan your dashboard as though every user is seeing it for the first time. To secure the comfort of your users, your dashboard must be self-explanatory and intuitive. For this reason, you need to keep your dashboards simple. Use icons, as well as text; label everything; use tooltips, where appropriate; and never expect a user to read a Help file before getting started.

Starting with the Big Picture

In design, there are large-scale issues and smaller, more detail-oriented issues. The space limitations implicit in dashboard design require that you hold strong focus on purpose and carefully integrate and harmonize both large-scale and detail elements to fulfill that purpose. Most industry standard best practices for dashboard design have been established through trial-and-error procedures. When conceptualizing your dashboard's design, it also helps to study what clients and managers have found most useful and helpful in their previous dashboards.

Here are a few best practices to keep in mind when designing the overall, big-picture layout of your dashboard (in the next section, I drill down to the detail level):

- * **Keep it on a single page.** Dashboards are supposed to be an at-a-glance resource, and you can glance at only one page at a time. Therefore, when designing a dashboard, find a way to fit everything on that one page. Also, don't get sucked into the trap of thinking that you need to fit tons of stuff on that page — leave out everything except the most important information.
- * **Let it breathe.** *White space* — the blank white space on a screen where no text or images are placed — is vital in design. If you pack everything in closely, the eye has trouble focusing on anything. Carefully chosen white space can guide your users to focus on only the most important parts of the dashboard.
- * **Give the layout a natural flow.** Your dashboard should flow from top to bottom and from left to right. This logical progression intuitively makes sense to users. The progression can be from more specific to more general, it can follow a workflow pathway, or it can simply follow some path of dependencies between one concept and another.

<tip>

Of course, reading from top to bottom, and from left to right, is the standard practice of western cultures. If you're Japanese, you'd read from right to left, and you should design a visualization that naturally flows in that direction. What's important is that you design your dashboard so that it makes the most intuitive sense for your particular audience, according to their specific cultural norms.

- * **Provide a method to drill down to more specific information.** The dashboard should function as an overall summary of the desired information, but if you're including something of particular interest to your audience, users probably want to explore that area more fully. A good dashboard makes getting more information a near-effortless process. Unlike a static snapshot, a dashboard can provide an interactive experience where users can *drill down* — click different parts of the data graphics in order to be presented with a more detailed version. For example, a dashboard shows a Sales Stats by Region section and, when you click any given region, a Sales Stats by County pop-up window appears, to provide you with the more detailed information.
- * **Choose alerts wisely.** Get feedback from end users to determine what's important enough to warrant an alert function. For example, for dashboards that track stock valuations, having a stock price fall below a certain value threshold for an allotted period should trigger a dashboard alert. Because no two users' needs are the same, alerts can be a difficult balancing act. If you flag everything, you're really flagging nothing because people will quickly begin to ignore all the constant alerts. On the other hand, you don't want to let important situations slide by unnoticed. Prepare for a lot of tweaking when configuring alert functionalities.
- * **Less is more.** The dashboard should be attractive and aesthetically appealing, but it mustn't be overdesigned. In every design decision, make sure to focus on utility and usefulness as the top criteria. Let the dashboard's form naturally follow from a simple and functional approach.

Getting the Details Right

After you have conceptualized your dashboard — you know who your audience is, of what they need to be informed, and what elements need to go where on the page — you need to get into the nitty-gritty details. Even if everything was perfect until this point, your dashboard can still fail to deliver if you haven't taken time to think about the look and feel of the individual elements that comprise it. The following list describes a set of best practices that are helpful when planning the details of your design:

- * **Less is more.** Even though this was the last bullet point in the preceding section, I'm reusing it here because it's vitally important in designing dashboard details, as well as in overall dashboard design. Real estate on the dashboard is at a premium, and user time and attention aren't guaranteed. Make it as easy as possible for users to get what they need, by presenting everything as simply as possible. Although green, yellow, and red traffic lights or thermometer bulbs might work in an infographic, they're much too distracting on a dashboard. Use simple bars and dots instead.
- * **Stay current.** *Flat design* — a modern minimalistic design approach that restricts designers to using only 2-dimensional elements, and to placing those elements in an exceptionally clean and clutterfree visual layout — is all the rage these days. The greatest advantage of this style is that it makes user interaction simple and easy. If a flat design approach works with your data, you can increase your hipness factor by making use of it.

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Keeping your source data current is also extremely important. When you're designing a dashboard to support other people's decision making, timeliness is everything — if you haven't equipped your dashboards with real-time updating, they must at least be based on current, up-to-date sources.

- * **Use color sparingly.** Choose a simple, muted color palette that's easy on the eyes without being monotone and boring. Reserve vibrant colors for alerts and notifications — you need them to stand out from the background.

* **Stay horizontal.** Since most people from western cultures read words horizontally, our eyes can better follow representations of data when they're laid out horizontally as well. Make bar charts progress from left to right instead of up and down, and arrange items in lines instead of vertical stacks. These two data graphic innovations are quite useful for designing effective dashboards:

* *Sparkline:* Invented by data visualization pioneer Edward Tufte, sparklines consist of tiny line or bar charts that are presented in the same space and at the same size as words, either in a table or a paragraph. Sparklines offer a compact and effective way to present trends on a dashboard.

* *Bullet graph:* A simple and elegant alternative to the old-fashioned thermometers and progress bars of yesteryear.

Testing Your Design

No matter how careful and strategic your dashboard design, you're bound to come up against trouble when the product goes live. Developing and releasing a preliminary version of the dashboard is just the first step. Dashboard designers must be prepared to see it through until they're certain that the product works, and works well.

You can't please everyone, and you may have to juggle and prioritize a list of complaints, but true testing comes from observing how the dashboard works in action. Because dashboards are almost always web-based nowadays, you can easily get some hard statistics about their performance and usability. Log files can tell you about visitor counts, session durations, and user click patterns. You can even incorporate A/B testing by shuffling items around to see which layout is most effective.

You can't prepare for all potential scenarios in advance, and with a topic as complex and subjective as dashboard design, you're better off adopting a flexible design approach. That way, you have a better chance of designing a product that end users will actually use, and isn't that the point?