

UI for BI: Designing High-Impact Dashboards

**Guiding Principles of UI/UX
for Business Intelligence**



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Foreword

Transforming Products with Extraordinary Dashboard Design

By Laura Klein, author of *Build Better Products* and *UX for Lean Startups*, and Principal at Users Know

Great analytics can transform your product.

They keep users coming back as they discover more value from repeat usage. They give users insight into their own behaviors and help them make important changes.

Whether your users are managers trying to improve their team's performance or long-distance runners trying to beat their best times, analytics give them the knowledge and incentives they need to keep going.

Of course, analytics are only useful if people can understand them.

Too often, great data is obscured by a horrible presentation. Overcrowded dashboards, meaningless charts, and confusing information

architecture keep people from getting the insights they need from their metrics. In the worst cases, users start ignoring data or making bad decisions based on misunderstood information.

I've been designing dashboards for a very long time, and of course I always tried to make them usable and useful. But it never occurred to me just how bad the consequences could be of poor data presentation. Then I read the article **How Bad UX Killed Jenny** by Jonathan Shariat, which tells the story of how badly designed alerts on a medical records system dashboard led a nurse to deliver a fatal dosage of medicine to a young girl.

Thankfully, not all dashboard design failures are this catastrophic—but the consequences can still be bad. I've personally seen cases where bad analytics dashboards led companies to lose customers and make terrible product decisions. I've used (and stopped using) dozens of apps that promised to make me more productive, fitter, and happier, just because the information wasn't engaging or compelling enough to hold my interest.

Fortunately, most of these problems can be solved with a solid understanding of a few key user interface design guidelines. This ebook clearly explains several concepts that will help you create clear, useful data presentations that will help your users understand and use critical data.

You don't need to be a designer to follow these very simple instructions and improve all your dashboards, analytics, and reports.

You'll no longer have an excuse for creating sloppy charts or hard-to-understand data visualizations. As a bonus, every one of these tips is equally applicable to any sort of screen design, which means that you'll get a quick overview of core graphic design concepts that you can use to improve anything visual. Most importantly, you don't need to be a designer to follow these very simple instructions.

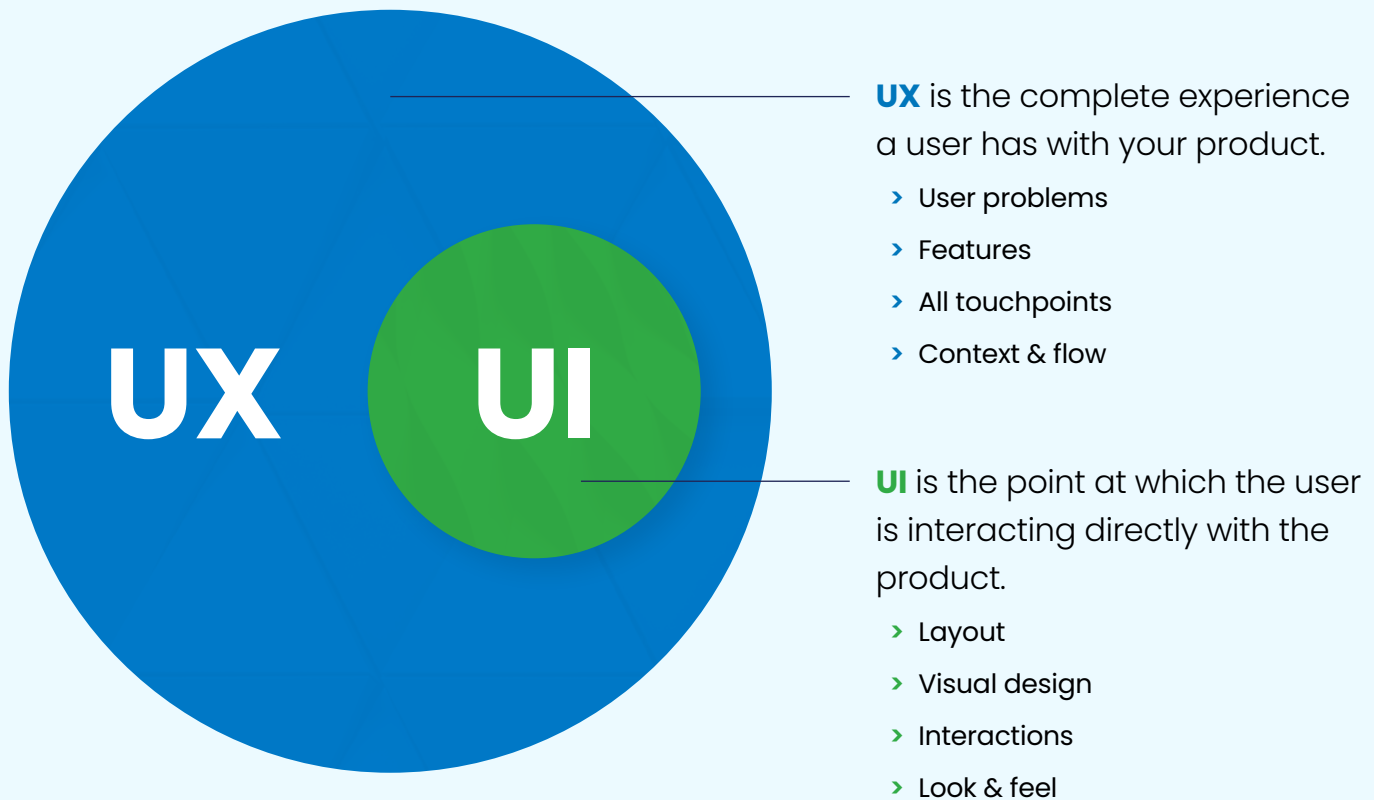
Don't let terrible presentation get in the way of great data. Use these tips to improve all your dashboards, analytics, and reports right now.



UX and UI: What's the Difference?

UX stands for user experience, which refers to the overall interaction that a user has with your company, product, application, or service. It's every little detail rolled up into one term, including every touchpoint and feature. Understandably, application teams dedicate a lot of time and attention to creating a user experience that makes their product a joy to own and a joy to use.

The user interface (UI) is the way that a user accesses and interacts with your system. It's the physical characteristics, whether digital or tangible; it's literally the part that you interact with, the face of the system to the user, and how they think of it. Meeting your users' needs with simplicity and elegance are crucial to an outstanding user interface.



Courtesy of Laura Klein

UI/UX Doesn't Always Mean It's Gorgeous

Craigslist is a great example. Even if the UI for buying and selling isn't pretty, and it's not all that well organized—it's feature packed. People have a positive user experience on Craigslist despite the general lack of design.

If you want an item and you find it on Craigslist, that's an overall good experience whether or not you clicked on something beautiful to get there. Despite the fact that it's not the prettiest thing to look at, it can still be a positive experience. **What UI/UX comes down to is usability.**

Usability

Usability is an attribute or a characteristic of a user interface. It can describe several things including:

- **Learnability:** How easy is it for someone to pick up and go?
- **Efficiency:** Once they are up and running, how quickly can they complete tasks?
- **Memorability:** When you come back after an extended period of time, can you reestablish your proficiency? Can you pick back up where you left off?
- **Satisfaction:** How does the user interface design interact with the overall experience design? Does it leave you happy?

Guiding Principles of Great UI/UX

Visual design, usability, and psychology all play a part in how we design user interfaces and user experiences. Let's explore these key aspects as they relate to business intelligence—including data visualizations and reporting interfaces.

Interfaces are often visual, right? But not always. Some are audible, such as when you send a voice command: "Siri, what's the weather going to be like?"

Or tactile: Like how a car interface is a steering wheel and pedals.

However, most interfaces that we're talking about today— whether on the web, your phone,

tablet, or laptop—are visual. That means you need to pay attention to a few elements.

CRAP

If we had to come up with a one-slide crash course in visual design tips that best apply to interface design principle, it would be this:

- **Contrast**
- **Repetition**
- **Alignment**
- **Proximity**

Contrast

Here, you're trying to draw in your users' eyes. Their eyes are following a page, and you can influence that. Contrast is an important tool to visually distinguish and highlight important content. With an analytics dashboard, you're creating data-driven content to communicate a point. Charts can be un-opinionated by just nonchalantly displaying a series of data. But you have the option to make charts opinionated—which can help your users understand important information quickly. It's almost as if you're standing next to the person looking at it, yelling in his ear, "Look at Bob's performance last quarter, it's bright red! It's jumping off the page! We need to work on this." **This is a great way to communicate a particular piece of content.**

The contrasting red line indicates we need more successful evaluations to be submitted.



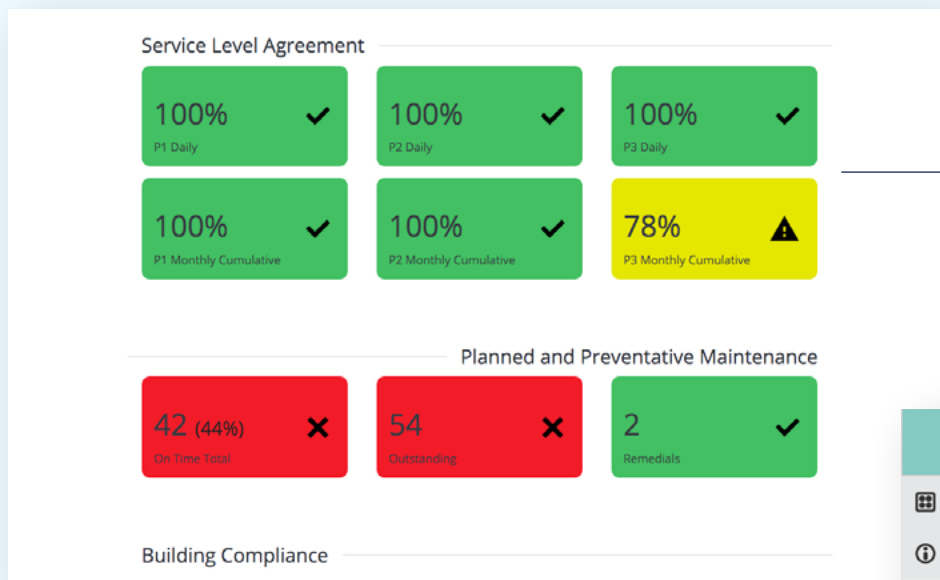
Repetition

You could also call this one "consistency." Basically, this means you should make similar stuff look similar, and do that consistently.

It applies to your analytics interface and even to every visualization. If you have a set of bars that are all one color, then try highlighting one. If you repeat that consistently on any other charts you're showing, it's a great way to show that this highlight indicates a corresponding factor, or they have some relationship. Making buttons, links, fonts and, often most importantly, layout consistent with users' expectations, you'll immediately eliminate a lot of the learning curve.

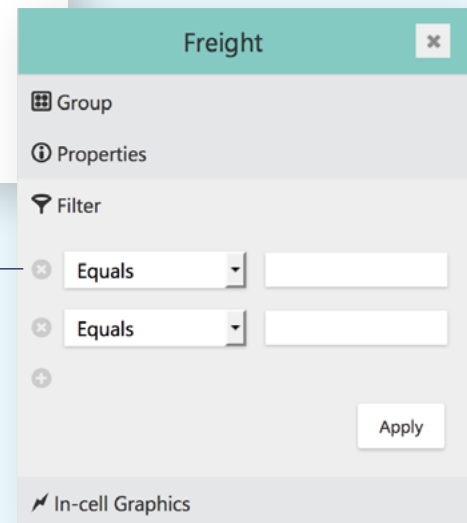
Jakob Nielsen, a pioneer in the usability field, has had a law for a while that says users spend a lot of their time on other sites or other apps. They aren't devoted to your app: They're using dozens or hundreds of other interfaces. The more repetition and consistency you can include in your interface, the easier it will be for your end users to understand what a button is going to do, or what a link is going to do. Your dashboards will follow basic standard practices so users know what to expect going forward.

Repetition is keeping the title and legend for each chart in the same format and style.



Modules are all uniformly aligned so even at first glance, the dashboard is easy to understand.

Here is a data column being filtered. To group some elements together, such as a series of rows, place them fairly close together but not too close, so your users' eyes can follow it.



Alignment

Once your users are inside a BI tool such as a dashboard or a report builder, you can use alignment to help them find what they need.

One of the most straightforward ways to organize a design is to align it to a grid. Best practices should incorporate horizontal and vertical alignment between every element that you're incorporating. This uniform sizing reduces distractions by clearly identifying dashboard features for your users, and helps you make the design process less iterative. While more of a best practice, this nascent trend is becoming more prevalent as designers are proving that it's a step that should not go overlooked.

Proximity

Finally, proximity. Much of this refers to visual search. Just like with contrast and repetition, you're guiding your users' eyes by grouping like with like and moving them around the page to help them insinuate a story. Your goal is to put the tools at your users' fingertips and organize everything in a way that makes sense.

Many designers and non-designers alike tend to waste time judging every extra pixel of wasted real estate, but this is far from productive. Fortunately, the trend now is to allow padding, margins, and plenty of space for your elements to breathe. The white space helps align everything and organize elements into easily digestible groups.

How the Brain Works

When it comes to dashboard design, you want to understand the user's mental model as much as possible. A **mental model** is "an explanation of someone's thought process about how something works in the real world."

For instance, if you asked several people to describe a trip to McDonald's, you'd probably get several versions of the same story. Our mental model of McDonald's is mostly concerned with the interface. We go up to the counter, speak with someone either face-to-face or via a crackly speaker, then we pay, wait a few seconds, and receive a bag of food. If you asked the manager of a McDonald's to describe the way that he represents McDonald's in his head, it's undoubtedly a complex whirlwind of payroll, inventory management, staffing, and customer service initiatives, and that's actually closer to how a McDonald's system actually works. That's the **system model**. It's all about perspective.

In the context of business intelligence, different audiences have different needs, and perceive systems in sometimes wildly different ways. This, in turn, influences what kind of actions you can expect from them, and what they expect to be able to do. These sorts of questions affect how people behave, perform tasks, and solve problems. And because people have various informational needs, you need to personalize capabilities to those users' roles and skills.



Color Principles for Dashboard Design

Use Color Sparingly

For dashboards and reports, color is not just aesthetic—it also conveys meaning. Dashboard colors can immediately draw your eye to critical information, identify data relationships, or highlight potential issues before they become big problems.

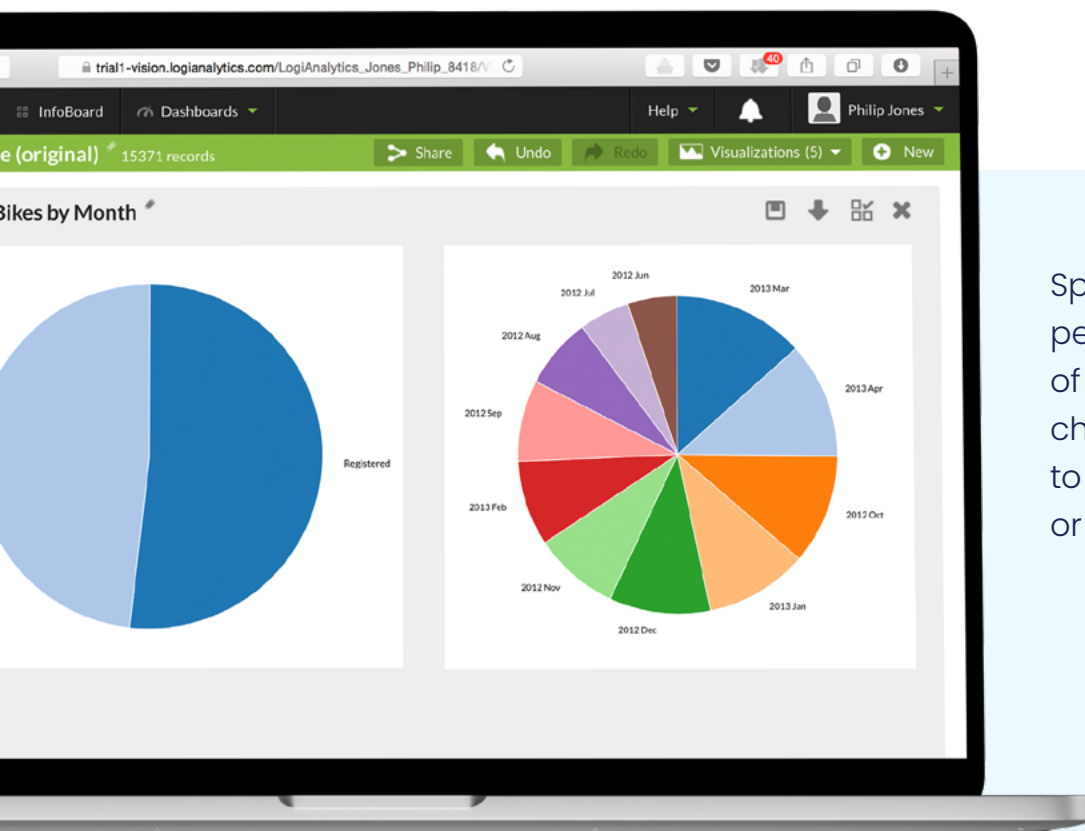
Use color only when it serves a particular communication goal. Every color choice should make your information attractive, easy to use, and easy to read.

Colors are helpful when you want to highlight something, such as a certain bar in a bar chart. Many colors have certain meanings attached to them, which you can use to your advantage. For instance, red and green often indicate

danger (red) and positive feelings (green). As long as you're answering, "What purpose does this color serve, and will it serve it effectively?" then use of color is entirely appropriate.

Differentiate Meaningfully

Make sure to use different colors only when you want to communicate differences in meaning. If you're showing two different colors on a chart, they should represent something distinct and probably something meaningful. Whether you have one color on a table or graph or a spectrum of different colors, make sure the background is consistent to help visually distinguish the chart.



Spatially, it is hard for people to judge the area of a circle, which is why pie charts are an effective way to see two parts of a whole... or many parts.

Using Gradients

Gradients and variants make it difficult to tell if the color is changing. If a bar in a bar chart is darker at the top and then the background fades to white at the bottom, it's hard for people to tell how high it is or what the relative color is. Often, it's best to use one color. Natural colors display most of your information, and that lets you reserve bright and dark color to highlight information which requires greater attention.

Single colors are often clearer than using gradients.



image courtesy of Dribbble



Focus

Anything that's not data in a chart or graph—such as labels, callouts, or secondary graphic elements—should be just visible enough to perform its role, but not so visible that it distracts from important information. So, no visual effects. No lights, shadows, or 3D effects.

The gradient colors and visual effects on these charts make them hard to read.

Examples of Great UI for BI

The general principles of visual graphic design, usability tips, and splash of human psychology we've outlined here will help even non-designers create visually effective BI. Here, we'll explore some examples of good analytics in action.

Basic Home Screen

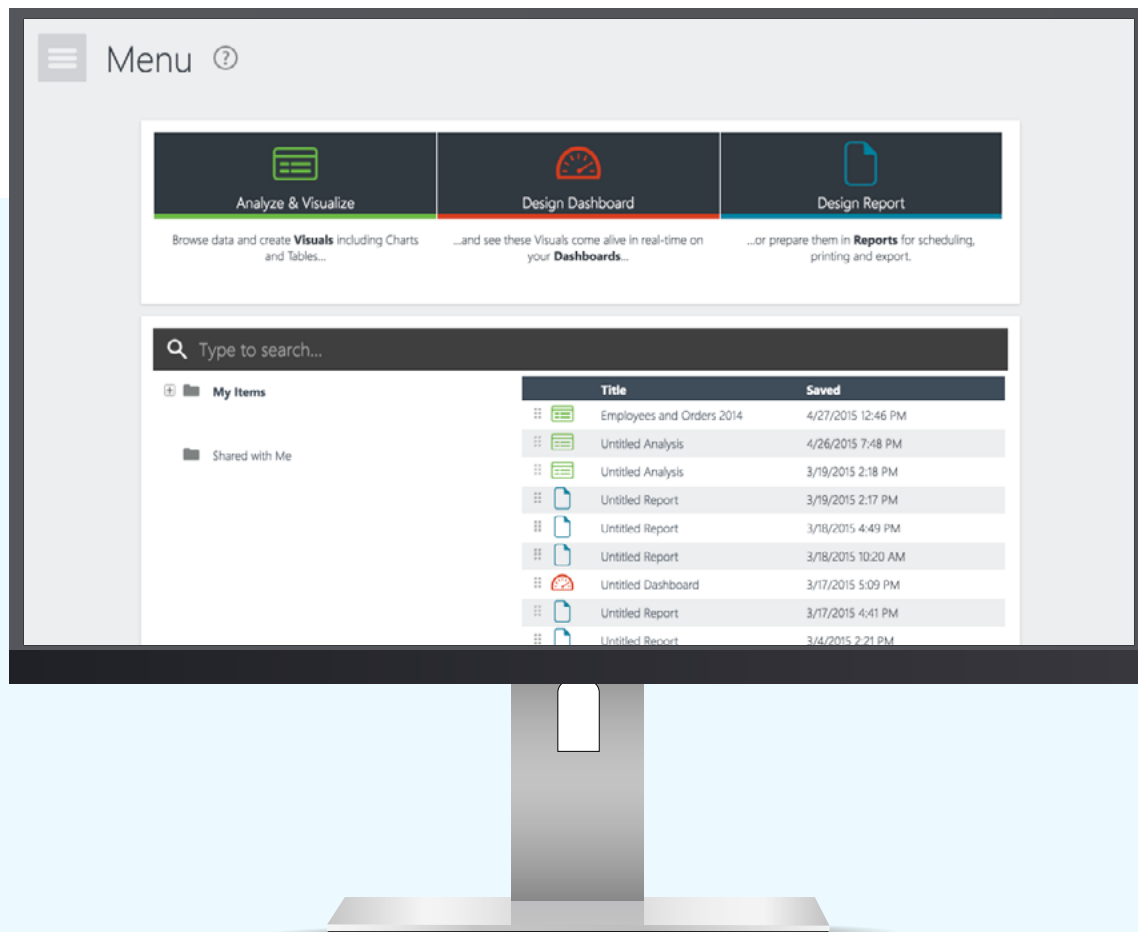
This is a screenshot of a self-service reporting and dashboarding solution that helps users quickly review and share analytics. Note the clear contrast here: We have dark buttons on top of white panels, on top of a gray background. That allows each section to

show clear highlights and distinction from each other.

There's repetition, and consistency since the top menu button stays accessible in that spot through every screen.

Alignment shows in the horizontal and vertical grid displayed grids that everything aligns to here.

And, proximity—the three action buttons are grouped together at the top while the placement of content list at the bottom right shows its relationship to the folders on its left.



Analysis

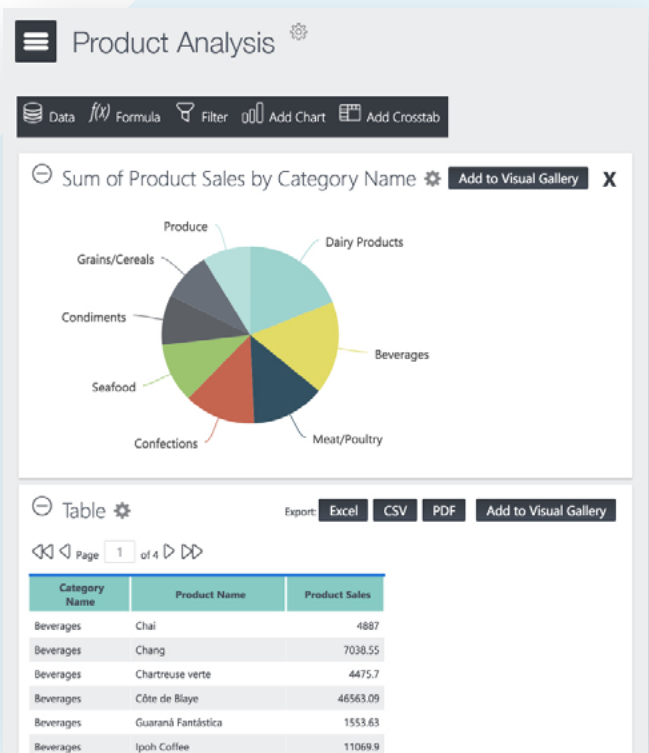
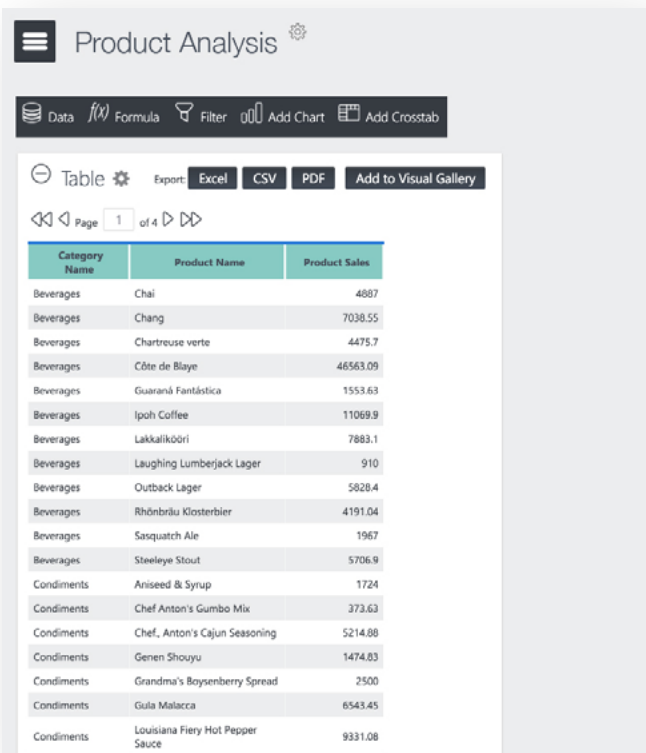
This screenshot highlights good use of contrast and color themes. The table has several actions and interactions available. There's contrast with the dark buttons, white panels, and gray background. We also have the primary theme color backing the table headers.

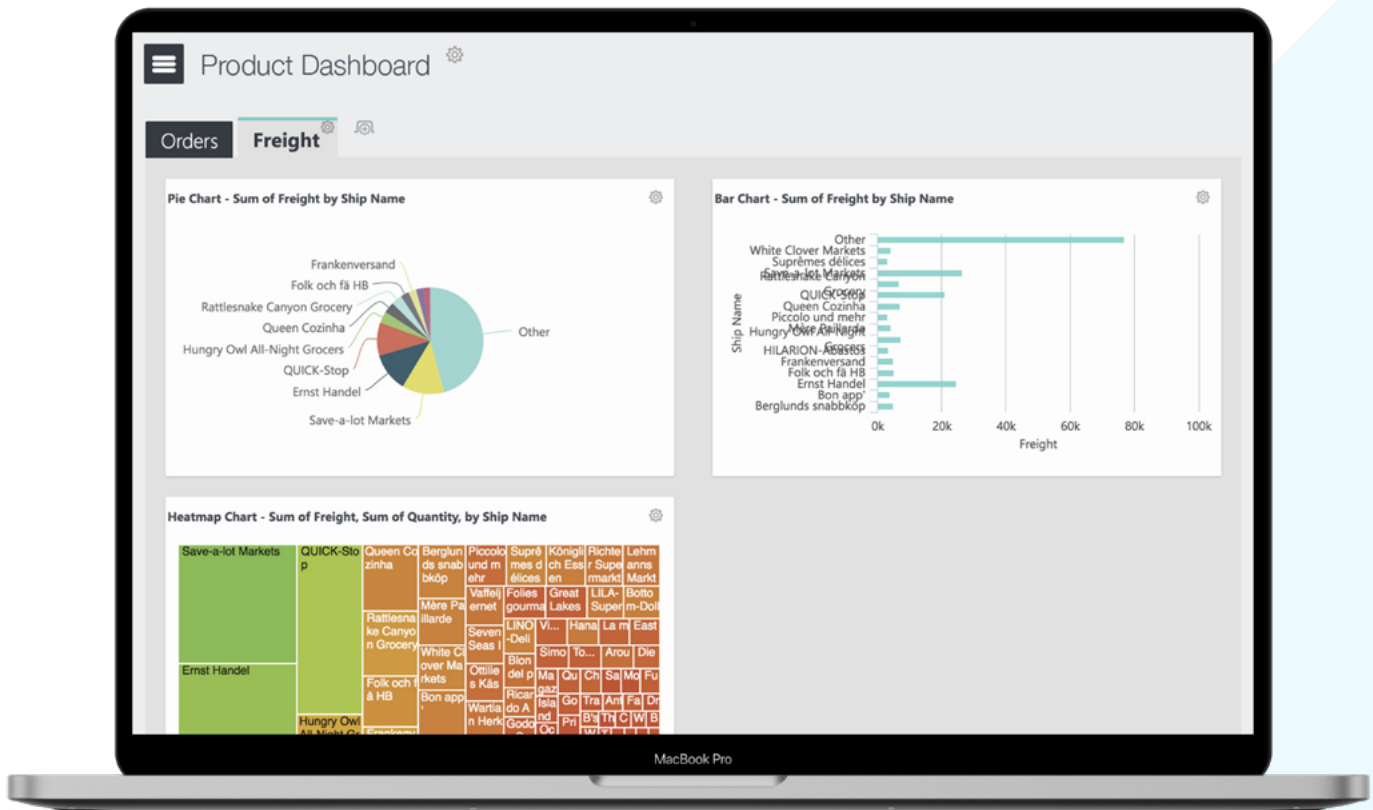
Since we're repeating elements, the top left menu button stays accessible in that spot (shown here as enabled).

In terms of alignment, we can see that everything is aligned to a grid. Proximity keeps actions pulled to the top right corner of each panel. The table has actions, and the pie chart has actions.

This is actually a very simple example that highlights the concept of proximity and shows how important it is to keep everything uncluttered as the interface becomes more and more complex.

It's important to keep everything uncluttered as the interface becomes more and more complex.





Dashboards

Users generally want to take a handful of specific actions with their data. Common goals are to stay up to date on information, within one application or interface, and share that content with others.

Let's take a look at one sample dashboard. Note how it repeats similar visual elements to make information immediately understandable. We have a menu at the top left, a clear title, and a few similar-looking panels for consistency. Contrast shows in the darker gray dashboard on top of the light gray background, so the darker dashboard stands out as a container but also allows the white panels to really take center stage here.

Also note the active versus inactive tab at the top left. The active tab feels like a part of the

dashboard, while the inactive tab is waiting, shown here almost as a button. That highlights a clear action that users can take to switch out of this tab and see more content on the second tab.

The use of alignment here shows these three panels can be realigned inside that canvas in a grid, so you can change the number of columns. Remember, keep things aligned and organized for people to understand what you're trying to communicate. Finally, proximity is represented by the little settings, cog icons, and how those elements are relative to each item's title.

Reports

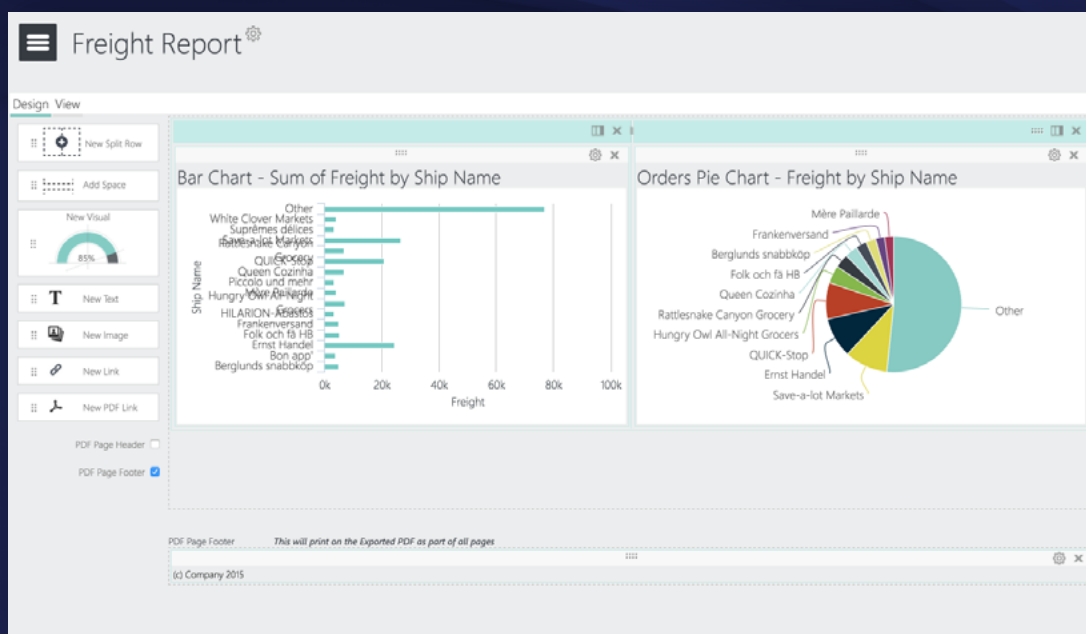
Reports have unique differences from dashboards. With reports, your users often need to export, print, or share data in a PDF. That means users need exact pixel-perfect reporting where what they see is what they get.

With these two reports, you can repetition in the contrast and some similar visual elements. Alignment makes it easy for users to customize the grid, and gives them more flexibility than static reports. Users can actually drag the columns around and adjust their sizes, as well as split them or add a row. Proximity helps

distinguish the toolbox with everything grouped together, clearly separated from the canvas area since the canvas is bounded by the dotted line.

Final Thoughts

User experience is more than just the user interface. Designing a successful UX and UI for BI means adhering to visual and psychological best practices. Designing analytics content within an interface helps fit it all together into a positive and effective user experience.



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About insightsoftware

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