



JSI'S CENTER FOR HEALTH INFORMATION, MONITORING & EVALUATION

Designing *a New* Data Dashboard

January 2018



Acknowledgements

This guide was created under JSI's Center for Health Information, Monitoring & Evaluation (CHIME) with efforts led by Allison Schlak and contributions made by Amanda Makulec.

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Designing A New Data Dashboard

The best dashboards give targeted audiences actionable information at their fingertips, and use great design practices to focus a user's attention on the most important information on the page. If you're embarking on the process of designing a new dashboard with data you already have (or plan to collect), a bit of advance planning can set you up for success in how your dashboard is used for decision-making.

Dashboards can take many forms, including:

- Visual reports of routine data (monthly, quarterly) by site or across sites
- Interactive visual displays that let the user explore the data within a file
- Interactive web-based visual displays that simplify access across multiple sites (but come with their own cost and data sharing considerations)

In this guide, we'll break down designing a dashboard into a series of steps and share considerations about dashboard designers and users; user requirements gathering; common pitfalls in dashboard design and how to avoid them; dashboard software for consideration; and recommended reading to dig deeper into dashboard design.

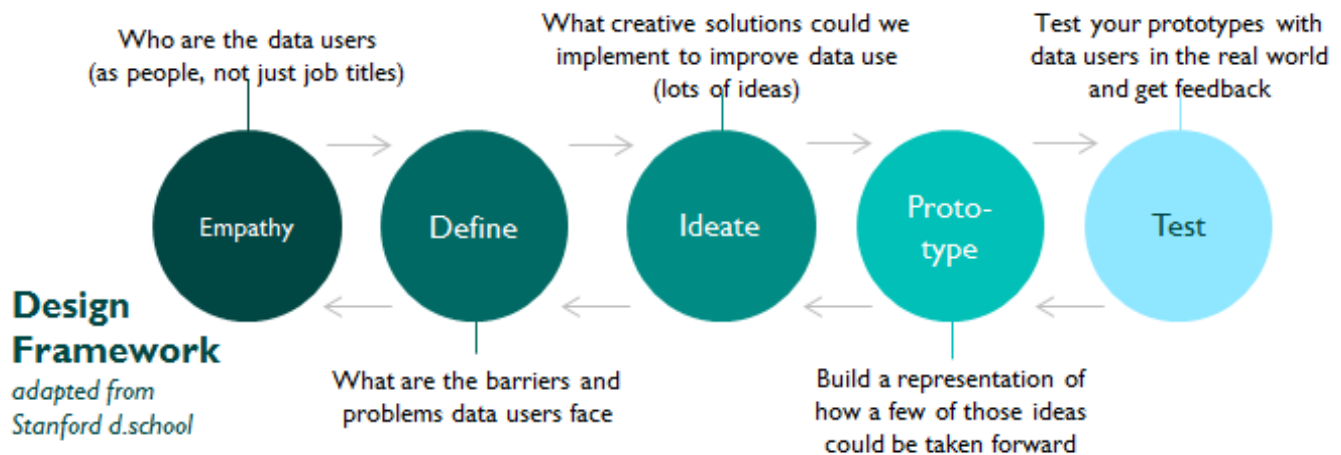
The stages outlined in this guide include:

- Identifying and understanding the users
- Identifying and cleaning the data
- Selecting a software for the dashboard
- Designing mock-ups and creating a prototype
- Developing the dashboard
- Pitfalls to avoid



Part 1: Identifying and Understanding the Users

Designed for who? Success often starts with considering the needs of your decision-maker (the “user” of your dashboard), and letting those needs anchor your other design decisions. At a health center, consider who on the clinical team will be reviewing it, clinicians, social workers, care coordinators? Who else may be looking at the data such as board members? A user-centered process for designing a dashboard means you start with **who** will be using this new tool, and then consider the **data available** to answer their questions and design an approach to develop the dashboard that meets their needs.



Identifying the Users

When you design a dashboard, first identify who the users are and who the user groups could be, so you can start to create summary requirements for the most important groups. Use the following questions to help identify the dashboard users. *Feel free to use space below to take notes as you facilitate these discussions.*

Who are the intended users?

Can we place the users into groups/types of users? Which users are the priority groups, and who are the secondary users?

Part 1: Identifying and Understanding the Users

Now that I have identified my users, how can I design a dashboard for users with specific needs? To design a dashboard with specific users in mind, it is important to invest time in interviewing users to understand their personas and requirements. The questions below are deliberately broad to facilitate discussions around understanding their key questions, their workflow, their computer skills, and their data savviness. *Feel free to use space below to take notes as you facilitate these discussions.*

Understanding the Users Key Questions

What is the users' role? What would the user like out of the dashboard? How might it assist the user in their day to day duties?

What key decisions does the user make?

What key questions does the user need answered?

What information helps the user make these decisions and answer these questions?

Part 1: Identifying and Understanding the Users

Understanding the Users Key Questions Continued

How often does the user need to review this information to support decision making?

Which key questions and key decisions are prioritized?

Are there disaggregation's or groupings of this information that are helpful?

Is it useful to view results/interact with data by country or program area (some other way)?

When making these decisions is it helpful to look backwards at trends, see a snapshot of the performance at a single point in time, or monitor activity in real-time?

What level of detail is most helpful (high level of detail, or drillable)?

Part 1: Identifying and Understanding the Users

Understanding the Users Workflow

In what context will the user primarily be reviewing the dashboard? This can include how frequently, instances (use cases) they might be using the dashboard, or any other contextual information.

Does the dashboard need to be offline or online?

Will you be reviewing the dashboard on your phone, or on a computer screen, or both?

Will the dashboard be presented in meetings on large screens? Will the dashboard be printed?

Will you be sharing the dashboard, if so through what medium (email, presentation, pdf)?

Part 1: Identifying and Understanding the Users

Understanding the Users Computer Skills

How comfortable is the user exploring and analyzing information in visual formats?

Has the user interacted with a web-based dashboard before? If so, what did you like or dislike about using that dashboard?

How comfortable is the user interacting with computers?

Understanding Visual Design Preferences

How important is the “look and feel” of the dashboard? Is it important that the dashboard be very “flashy”.

Are there color preferences or color templates we should be using?

Part 2: Identifying and Cleaning the Data

Underpinning every great dashboard is a beautiful data set. Not beautiful in the sense that there are tables elegantly formatted to facilitate quick skimming with endless conditional formatting, but beautiful in the sense that it's well organized and contains the necessary data elements to answer your user's questions.

Identifying the Data

Data is the foundation of a dashboard. Effective dashboards are built using clean and structured data that supports the key questions posed by users. To ensure your team is aligned in what data you'll be using for the dashboard consider the following questions. *Feel free to use space below to take notes as you facilitate these discussions.*

Is your data quantitative, qualitative, or a mix?

Where is your data being captured and stored? (e.g. Excel file, Google sheets, Salesforce, SQL database, etc.) .This will impact what visual analytics tools you can use to connect with your data.

How is the data structured? Is it currently structured in a database format (e.g. top row has an indicator name for each column, and the data is displayed in rows)

Will the data change or be updated? This will impact how you structure your data and the data management processes you need to put in place for the updates. What is the periodicity of the data?

Part 2: Identifying and Cleaning the Data

Identifying the Data Continued

What stage are you in reviewing to ensure data quality?

How sensitive is the data? Do some users have different levels of access to certain data?

Do useful groupings exist in the data? How does the data compare by country/project? What is the finest level of disaggregation?



Part 2: Identifying and Cleaning the Data

For most dashboards, whether you're designing with Pivot Tables or Tableau, you'll need your data tables to have the top row labeled with an indicator/measure for each column, and then each data instance represented as a row of data. If you're using a more sophisticated database for data management, you can run SQL queries to extract tables. If you're like most health centers, using Excel and other manual tools for data management, make sure to structure your data so that a *computer* can read it - not just a human.

Cleaning the Data

Here's an example of what that means for one year of quarterly data across four sites in two regions.

Before: Data tables are structured to prioritize readability by a human, rather than a machine.

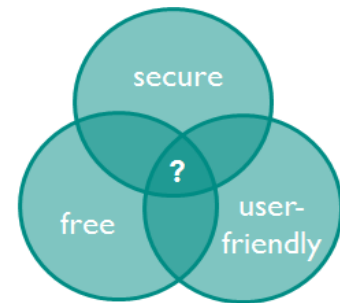
	B	C	D	E
1				
2	Region 1		Region 2	
3	Site 1	Site 2	Site 3	Site 4
4	39	20	38	49
5	50	39	40	52
6	61	41	52	60
7	63	61	55	52
8				

After: Data table has been restructured to contain the same exact information, but structured in such a way that an analytics program can understand that site, region, and quarter are all fields that could be used as filters.

H	I	J	K
Region	Site	Quarter	Indicator 1
1	1	1	39
1	2	1	20
2	3	1	38
2	4	1	49
1	1	2	50
1	2	2	39
2	3	2	40
2	4	2	52
1	1	3	61
1	2	3	41
2	3	3	52
2	4	3	60
1	1	4	63
1	2	4	61
2	3	4	55
2	4	4	52

Part 3: Selecting a Dashboard Platform

What tool to use? Once you've considered your audience, how your data is stored and managed, what analysis will be done with this dashboard, and who will be engaged in the design process (more on each of these shortly), you (may) have enough information to identify what tool to use. Often teams start with the tool decision, which can set you up for failure if your chosen tool doesn't work with the data structure you have, doesn't allow for the kind of sharing you need, or doesn't have the right design features.



Many teams (particularly in the social good space, where budgets are limited and teams are looking for software with some of the design capabilities built in, rather than developing something from scratch with code) ask for three things: “I want the program to be free!” “I want my data to stay private and secure!” “I want it to be beautiful and user-friendly!”

Realistically, most tools address two of these three needs, but seldom both. Tableau Public, for example, is very user-friendly and free to use and publish to, but your dashboard is hosted on a public server for anyone to see. Excel Pivot Table Dashboards are simple, free (in the sense that most people already have Excel on their computer) and the data can be kept private, but as a design tool it's not terribly user friendly without some heavy elbow grease by an Excel Ninja. And so forth.

If data privacy, web-based sharing, and having something user-friendly are all of high importance, you could take one of two approaches. Invest in a dedicated visual analytics platform, or invest some additional time and resources in customizing one of the tools you already have. Below are a few different platforms and their pros and cons.

Platform Options

Tool	Works well for...	But drawbacks include...	Where to get updated pricing info & other details
Excel	Basic dashboards shared among small teams or “printed” as PDF reports. Good option for having your data and dashboard all in one central file.	Sleek design aesthetic takes a heavier lift (more time + skill) than some dedicated dashboard software. Limited mapping capabilities.	
Power BI	Available through the Microsoft Office suite of products, with added functionality for Office365 subscribers. Provides a drag and drop interface to design interactive dashboards, including integration with ArcGIS for mapping.	Web-based sharing options are by paid subscription basis, and the terms and conditions have been evolving (at the time of this tip sheet being written - May 2017) making it unclear how future sharing models will be designed.	powerbi.microsoft.com/en-us/

Part 3: Selecting a Dashboard Platform

Platform Options Continued

Tool	Works well for...	But drawbacks include...	Where to get updated pricing info & other details
Tableau	Full service interactive dashboard design capabilities, including mapping, with visual best practices embedded in the tool and strong emphasis on user feedback to evolve features. Drag and drop functionality allows for more complex visual analytics without requiring learning to code. Connects to dozens of different databases (with Tableau Desktop Pro).	Cost of a desktop license (for authoring a dashboard) and server/online licenses to share with a dedicated group of users. Tableau Reader (free download to open Tableau workbooks) can save on costs but requires sharing files rather than access through the web.	Tableau
Tableau Public	All the design advantages of Tableau, with the advantage of allowing you to download the same Tableau Desktop platform for free, connect to Excel, Access, Google Sheets, an csv files, and publish dashboards to public websites. Works great for dashboards built with open / public data.	Any data connected to and saved with Tableau Public is saved on the company's public server and your dashboard is published to a public domain. As such, not a solution for any data that is sensitive or proprietary.	Tableau Public
Google Data Studio	Accessible with unlimited reports for Google users, and integrated with Google Sheets for data storage. Simple, clean templates for basic reports, and can be shared (or protected) with specific named users via email or domains (if using Google Apps for Business).	Design capabilities are more limited than the in-built features in Tableau and PowerBI. When working beyond the templates, chart options can be limited.	google.com/analytics/data-studio/
DHIS2	DHIS 2 lets you manage aggregate, routine data through a flexible meta-data model. Everything can be configured through the user interface: From setting up data elements, and indicators to generating advanced data visualizations.	This DHIS2 interface is not always the most accessible to end users. It also has limited capabilities for improving the "look and feel" of the dashboard.	https://www.dhis2.org/

**Note that these BRIEF recommendations are based on various experiences building and designing dashboards using different tools. Your preference for your project may vary based on the knowledge and expertise of the dashboard designer, data privacy requirements, and how the dashboard will be shared.*

Part 4: Designing Mock-Ups and Prototypes

Develop early prototypes of your dashboard - these can be sketches, or simple mockups on PowerPoint slides. What's important is that they give your user an opportunity to give you feedback before you do the heavier lift designing the final product in your chosen tool.

Some advance planning can set you up for success in designing a dashboard, from the prototyping stage onward. Walk through the questions below as you start designing your mock-ups and prototypes. *Feel free to use the space below to brainstorm ideas. There is a page at the end of this section to draw out ideas.*

What analysis will be facilitated by the dashboard?

What are the critical questions you are answering? (Hint: Go back to what your user wants to know from the dashboard.)

What kinds of data stories will you need to share? (e.g. change over time, comparison of actual to target, part-to-whole, etc.)

What kinds of charts or tables would best illustrate those different data stories?

How will data need to be analyzed (e.g. calculate a mean, median, count, etc.) in order to answer the questions?

How will your user filter or disaggregate data? This could be by location, gender, race, program area, or other category (but remember you're limited by the fields in your data set).

Part 4: Designing Mock-Ups and Prototypes

How will visual design principles be applied to maximize usability?

What is the most important question to answer? This should be positioned near the top of the dashboard.

Which questions will require more than one chart to answer the question? These charts should be positioned together, and perhaps colored to tie them to each other.

What colors will be used, and how will they be used thematically across the dashboard?

What filters will be available, and how will they be positioned and labeled to ensure users understand how to use them to further analyze the data?

Dashboard Inspiration



There are many resources online to brainstorm dashboard ideas and different ways to visualize your data.

- Information is Beautiful | informationisbeautiful.net
- Flowing Data | flowingdata.com
- Graphic Continuum | blog.visual.ly/graphic-continuum
- Chart Chooser | labs.juiceanalytics.com/chartchooser
- Tableau gallery | public.tableau.com/en-us/s/gallery
- Storytelling with Data | storytellingwithdata.com/gallery

Part 4: Designing Mock-Ups and Prototypes

Use the space below to brainstorm chart ideas and dashboard layouts.



Part 5: Developing the Dashboard

The development process for a dashboard can be complex. From the start, be clear and specific in who has responsibilities at different parts of the design process, who will be involved in testing, and how you'll handle requests for changes once you introduce the “final” tool to your user group. Below are some questions to help facilitate conversations around the dashboard development and review process.

Clarifying the Development and Review Process

Who is Responsible for making sure the dashboard design is completed? Pick one person.

Who is Accountable for contributing to the design process? Can be a larger team, but be mindful that the more people are deeply involved, the longer the process is likely to take.

Who will be Consulted? Here's where you map out your reviewers who need to be consulted intermittently, but aren't part of the core design team. These should include the users who will be part of the testing process to make sure the dashboard answers the necessary questions.

Who needs to be Informed? Who needs to know this is being developed and may help promote, but doesn't have a role in designing or reviewing.

Part 5: Developing the Dashboard

Clarifying the Development and Review Process Continued

What is the design and review timeline? Be realistic. Having a smart, realistic design and review timeline helps reviewers plan for time to give input when planned.

What's the firm deadline by which this needs to be completed and in use?

How will you document change requests and who will be responsible for prioritizing and attending to them?

Part 6: Pitfalls to Avoid

Taking a user-centered design approach to developing a dashboard can be a successful method for **preventing mishaps** in the dashboard's design, usability, deployment, and sustainability. Before you embark on designing your dashboard, scan over the pitfalls to avoid.

- (1) Not investing time in understanding your user.
- (2) Assuming your data is in “good enough” shape to connect to a visual analytics platform.
- (3) Skipping the prototyping stage.
- (4) Lack of clarity in the roles and responsibilities throughout the design, testing, and use phases.

