

Course Learning Outcomes for Unit VII



Upon completion of this unit, you should be able to:

4. Determine the access controls for data visualizations.
 - 4.1 Determine types of access control for dashboards.
5. Design data visualizations for functional areas.
 - 5.1 Explain the principles of effective data dashboards.
 - 5.2 Summarize the principles of data dashboard design and development.

Required Unit Resources

Chapter 8: Data Dashboards

It is not required to read the Glossary and Problems sections at the end of the chapter.

In order to access the following resources, click the links below.

Power BI Data Access

The resource linked below provides starter options for restricting data access to the dashboards in Power BI.

Microsoft. (2022, March 9). [Restrict data access with row-level security \(RLS\) for Power BI Desktop](https://docs.microsoft.com/en-us/power-bi/create-reports/desktop-rls).
<https://docs.microsoft.com/en-us/power-bi/create-reports/desktop-rls>

Power BI Data Connections

The resource linked below will provide additional content on connecting data with Power BI.

Microsoft. (2022, September 13). [Data sources in Power BI Desktop](https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-data-sources). <https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-data-sources>

Unit Lesson

In this unit, we will explore data dashboards and how we can design them effectively. First, let's get a standard definition of the concept itself. A *data dashboard* is a data visualization tool that displays key performance indicators. Ideally, the data is updated in real time, providing up-to-date information to decision makers to help them run their operations effectively. Because data from multiple sources is centralized into a single visualization, current and future conditions that are important to the decision makers can be accurately determined in a single glance. This sounds ideal, but there are some drawbacks; for example, connecting multiple databases and feeds can be time-consuming and experience small disruptions each month.

When a concept with so much emphasis on conveying quick, accurate, and easily understood information is described, we should know that creating a compelling data dashboard is highly dependent on the inclusion of only the most relevant key performance indicators, and these should be displayed in a highly customized visualization. Our textbook offers a variety of examples of data dashboards that have been customized for particular fields in this unit's readings. These examples include fields as disparate as investment, manufacturing, marketing, human resources, technical support, and school performance. From these examples, we begin to understand that widely varying key performance indicators are relevant to discrete fields. Thinking through what information is most beneficial to the area of your audience is, therefore, a crucial first step in developing a data dashboard visualization.

Dashboard Classifications

How Often Is the Data Updated?

One classification of data dashboards is based on how often the data is updated. Earlier, we stated that ideally, the dashboard would be updated in real-time. While this is true because the most current information should be displayed at all times, there may be circumstances where the data does not change often enough to justify the higher costs of revenue and time needed to develop and maintain this type of ever-updating dashboard.

In these instances, a static dashboard may suffice. Static dashboards are a bit of a misnomer because they are updated as new information becomes available and, therefore, are not wholly unchanging. Still, the process is manual and happens with much less frequency than with a dynamic dashboard.

Think about the difference between uploading an Excel spreadsheet into a business intelligence (BI) application compared to having it automatically flowing from a database. Dynamic dashboards automatically incorporate new and revised data into the display. However, take into consideration the pressure real-time analytics can put on a database and the gateway connections to the BI application. If updates are continuous throughout the day, this can possibly impact the functional area operations.

For some data dashboards, the outputs and complexity of the data on the dashboard would require a live database connection to refresh every minute, hour, or day. Everyone always says they want real-time updates, but that would be likely to change once they reviewed the complexity and potential cost involved.

Can Displays Be Customized?

A second feature differentiating classes of dashboards is whether displays may be customized. As we just discussed concerning the update rate, there are circumstances in which data does not change often. In these instances, the feature of customizability may be rendered a luxury that does not justify its cost. However, where data is fast-flowing and the most up-to-date information is necessary for effective decision-making, interactive dashboards allow the user to accomplish tasks such as drilling down, filtering hierarchically, or utilizing time interval widgets. Such interactivity allows a user to quickly explore and analyze data, screen data to include only the most relevant pieces, and find solutions to problems that may be discovered.

In the business environment, we have seen this flexibility offered to executives and managers. This gives them the ability to make the custom layouts and views that they want for decision-making and presentations. However, there needs to be additional training with this approach, so users must be fully equipped to customize the dashboards.

Dashboard Functions Within an Organization

A third way that data dashboards may be classified is based on their function within the organization. Fast-moving information relevant to on-the-ground critical business conditions, which is generally utilized by low-level managers, is usually reflected on *operational dashboards*. These dashboards need to update frequently. You may see this in a manufacturing plant where a TV monitor automatically refreshes a dashboard to let the production workers know how they are doing with jobs and shipments.

Tactical dashboards refer to dashboards issued to understand where an organization is strong or weak on a more general level and, therefore, what strategies should be employed to increase performance. These dashboards are generally updated more infrequently and are commonly utilized by mid-level managers.

On an even higher operational level, executives monitor key performance indicators relevant to organizational objectives on what are known as *strategic dashboards*. These dashboards update somewhere between fast-moving operational dashboards and slow-moving tactical dashboards.

Large volumes of data required to investigate trends and predict outcomes are reflected in *analytical dashboards*. These dashboards are not mutually exclusive, and each feature of each one can be combined as needed by the organization's requirements.

Considerations When Designing a Dashboard

As stated earlier, designing a data dashboard is highly dependent on the audience's needs. The data dashboard designer must consider several factors to be successful:

- What is the purpose of the dashboard?
- What valuable information will the dashboard provide, and what is the most effective way for that information to be presented?
- Who will be utilizing this information, and what aspects of the data are most pertinent to their responsibilities within the organization?
- What information do these users need, and what information would only get in their way and create a “noisy” dashboard that distracts from relevant data?

Once these questions have been answered and the design process initiated, the designer must incorporate all of the chart-making lessons we learned in our previous units. To wit, the appropriate chart must be selected for the type of information being presented, preattentive attributes should be utilized, color must be used appropriately, and information should be laid out in a way that can easily be understood and analyzed with minimal levels of eye travel and cognitive load. The data delivery system should be factored into these considerations as well, such as whether the information will be relayed on a PC, tablet, television screen, or another method. The delivery system can factor heavily into the proper size, space, and data movement.

Further, data systems can be expensive to develop, update, and redesign. Therefore, it is essential to think of all of the potential uses the organization may have in the future when designing data dashboards, not just those of the present moment. For instance, just because data may not frequently change for a smaller company just making its start, this does not mean that a more dynamic dashboard will not be needed in the future as the company grows and its needs change. It is always best to design with future growth in mind rather than allowing those needs to become apparent only when the system's insufficiency becomes apparent operationally.

We also need to consider protection and access control for the dashboards during the planning stages. It is essential for us to give access only to users who truly need the outputs and visualizations. This does require additional work, but it is essential that we create groups and access control policies for this type of data. Also, we need to ensure that we protect the data connections to our business intelligence solutions. Not doing this can often open up a vulnerability since the data is traveling from the database to the BI solution.

Creating Workspaces

Organizations can also create workspaces with Power BI using the online version. This will allow users to create specified workstations and share them with team members and employees who have been given the designated access.

The textbook gives excellent information on using PivotTables, PivotCharts, and slicers to build data dashboards in Excel. Take some time to experiment with these problems and develop data dashboards of your own to customize the best experience for a hypothetical audience. You can then expand your skills using Power BI.

References

Killiam, G. [GarryKillian]. (n.d.). *Vector abstract colorful financial big data graph visualization* [Image]. Freepik. https://www.freepik.com/free-vector/market-research-isometric-illustration_17714187.htm#query=data%20analytics%20business%20intelligence&position=15&from_view=search&track=ais

macrovector. (n.d.). *Market research isometric illustration* [Image]. Freepik. https://www.freepik.com/free-vector/market-research-isometric-illustration_17714187.htm#query=data%20analytics%20business%20intelligence&position=15&from_view=search&track=ais

Learning Activities (Nongraded)

Nongraded Learning Activities are provided to aid students in their course of study. You do not have to submit them. If you have questions, contact your instructor for further guidance and information.

It is highly recommended that you complete the problems at the end of Chapter 8. Doing so will help you gain a better understanding of the topics taught in the unit.