



Chapter 2

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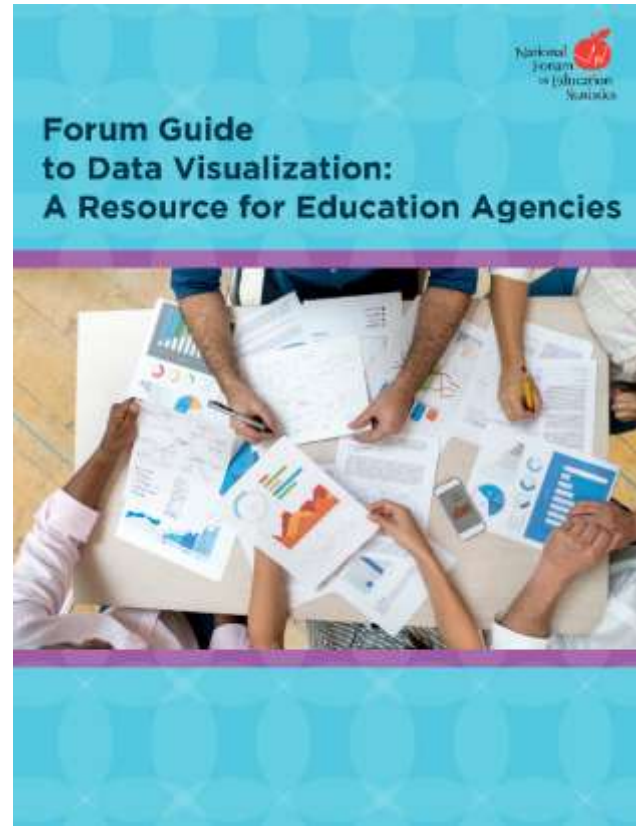
Visualizing Your Data



Data Visualization

- Is a critical part of dissemination.
- Helps to tell the story of your evaluation by displaying the data in readily understandable forms.
 - Graphs, diagrams, icons, and other visual representations.
- Aids in interpretation of the data, such as seeing trends and outliers.

The Forum Guide to Data Visualization: A Resource for Education Agencies¹



REL Central at Marzano Research

COLORADO KANSAS MISSOURI NEBRASKA NORTH DAKOTA SOUTH DAKOTA WYOMING

Additional Resources

- *Forum Guide to Data Visualization: A Resource for Education Agencies*



Considerations

- Audience
 - Consider the audience and their needs.
- Message
 - Consider the message you want to communicate. What findings do you want to emphasize?
- Approach
 - Consider the appropriate type of data visualization for communicating your message.
- Timing
 - Consider timing as part of your overall dissemination plan.

Audience

- When designing a data visualization, it is critical to think about the audience you want to reach.
- Consider the expectations, capabilities, and needs of your intended audience.

Message

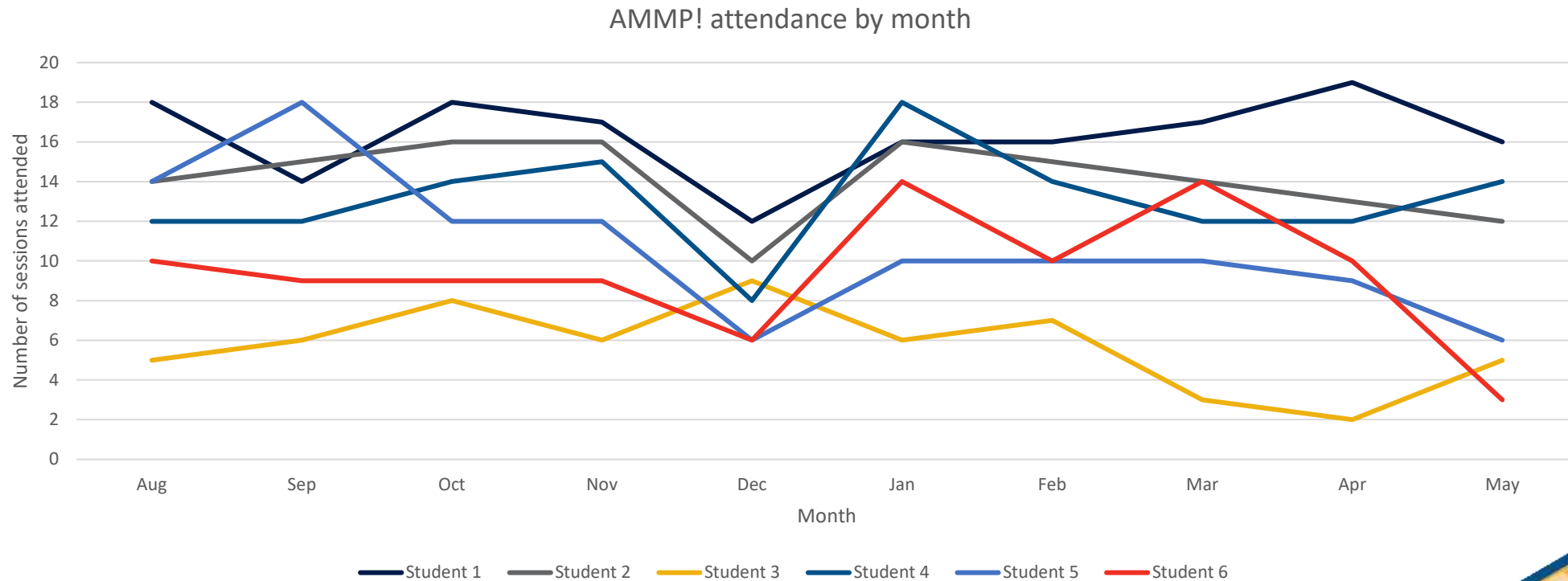
- Determine the data you want to share and the message you want your audience to take away.
- Design the data visualization to highlight the data that lead to the message you want to communicate.
- Make sure the message is supported by the data.

Approach

- What type of data visualization is most appropriate for sharing the data and communicating the message?
 - Line graphs
 - Bar charts
 - Scatter plots
 - Pie charts
 - Tables

Line Graphs

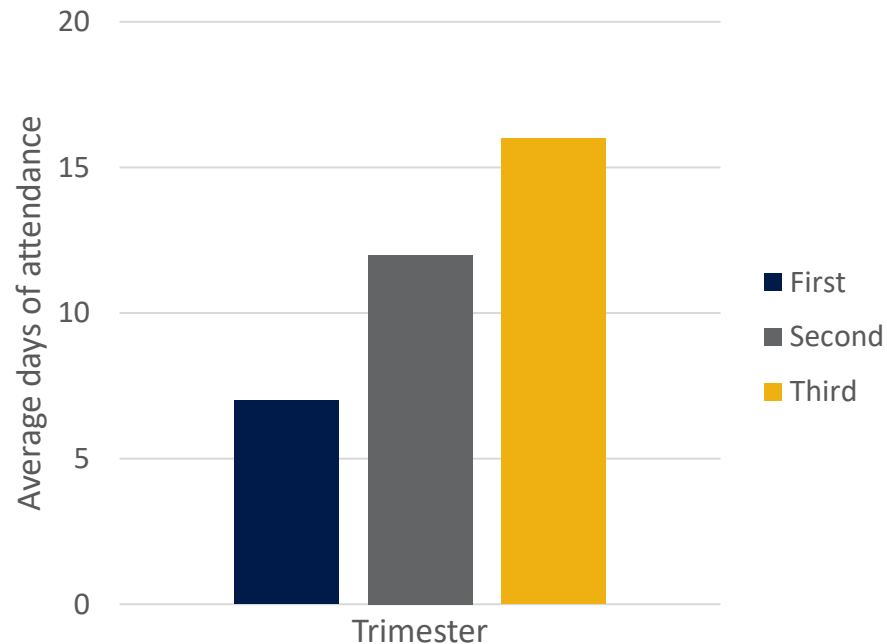
- Used to compare values over time. Can highlight small differences.



Source: AMMP! evaluation, 2021

Bar Charts

Average AMMP! attendance for grade 8 students by trimester, 2020/21 school year

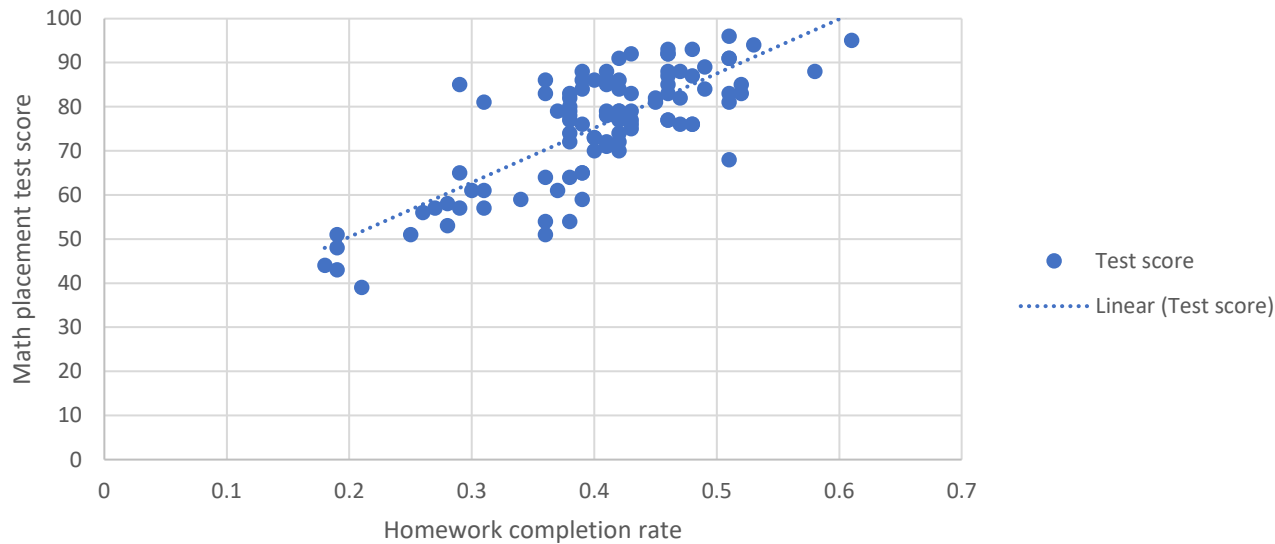


Source: AMMP! evaluation, 2021

- A bar chart, also called a column chart, is used to compare quantities from different categories.
- Bar charts can be used to highlight differences if an appropriate scale is used. Generally, it is difficult to distinguish small differences in height.

Scatter Plots

When homework completion rates increase, math placement test scores go up

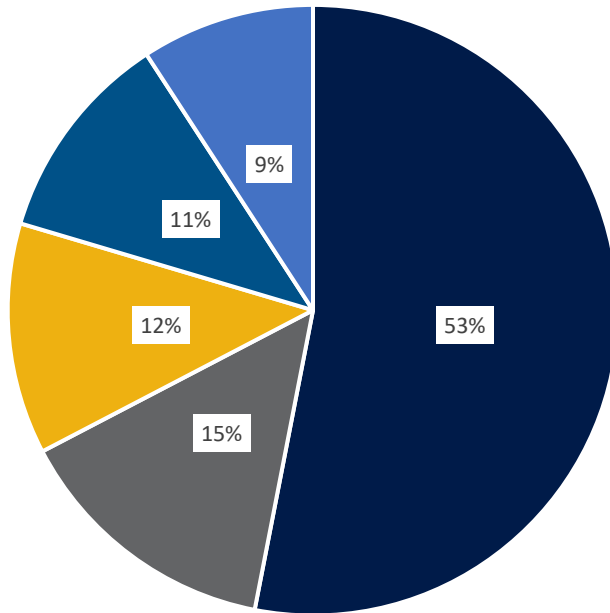


- Demonstrates a relationship between the values for two variables.

Source: AMMP! evaluation, 2021

Pie Charts

AMMP! participants by race/ethnicity



■ White ■ Hispanic ■ Black ■ American Indian/Alaska Native ■ Asian

- Displays the parts of a whole, such as percentages.

Source: AMMP! evaluation, 2021

Tables

AMMP! attendance by month						
	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6
Aug	18	14	5	12	14	10
Sep	14	15	6	12	18	9
Oct	18	16	8	14	12	9
Nov	17	16	6	15	12	9
Dec	12	10	9	8	6	6
Jan	16	16	6	18	10	14
Feb	16	15	7	14	10	10
Mar	17	14	3	12	10	14
Apr	19	13	2	12	9	10
May	16	12	5	14	6	3

- Displays exact values.

Source: AMMP! evaluation, 2021



Four Principles of Data Visualization

1. Show the data.
2. Reduce the clutter.
3. Integrate text and visualizations.
4. Portray the meaning of data accurately and ethically.

Data Visualization Checklist

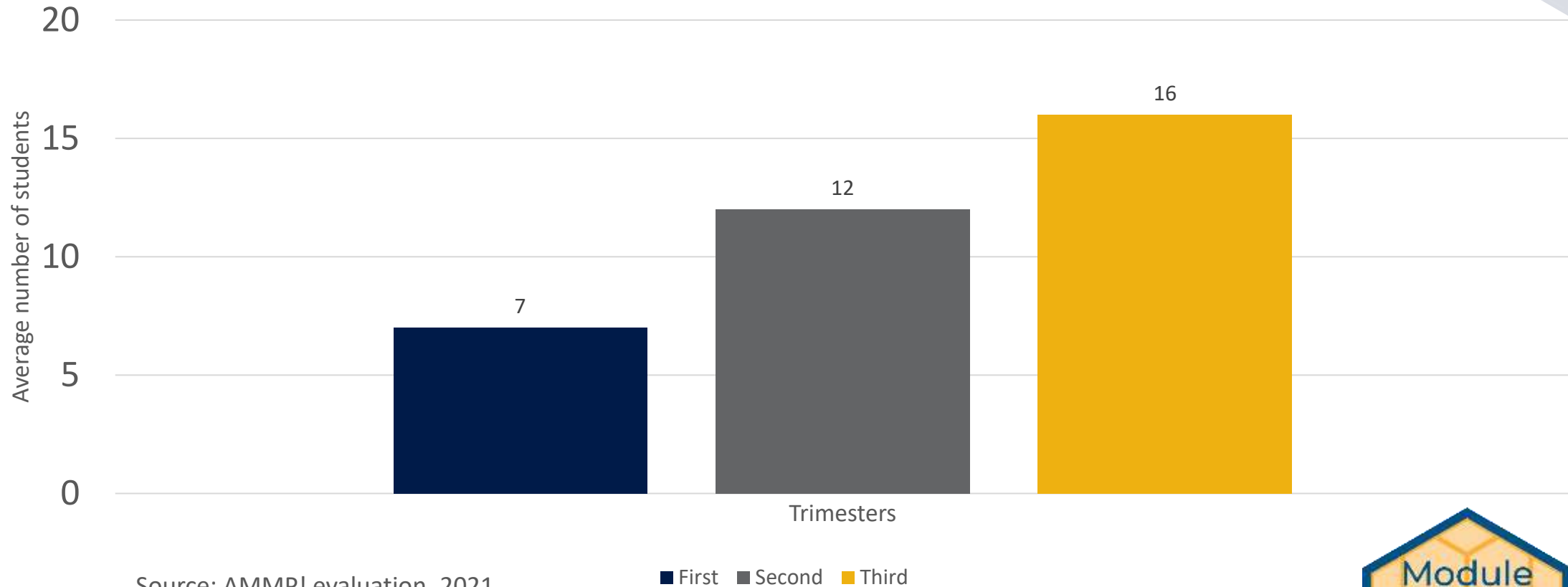
Principles	Y/N/NA
Show the data	
Include data labels.	
Integrate a legend or key into the chart.	
Include the data source and metadata if appropriate.	
Use appropriately scaled axes.	
Reduce the clutter	
Show only essential data.	
Remove unnecessary chart elements.	
Use the accompanying text.	
Integrate text and visualizations	
Be strategic about the text used in the visualization.	
Use descriptive titles.	
Use arrows or callout boxes to emphasize critical information and provide additional information.	
Use color to emphasize the data you want to show.	
Use heavier line weights or larger font sizes for emphasis.	

Show the Data

- Show the data and provide enough information for the audience to fully understand both the data and the message.
 - Include data labels.
 - Integrate a legend or key into the chart.
 - Include the data source and metadata if appropriate.
 - Use appropriately scaled axes.

Show the Data: AMMP! Example

Average AMMP! attendance for grade 8 students by trimester, 2020/21 school year

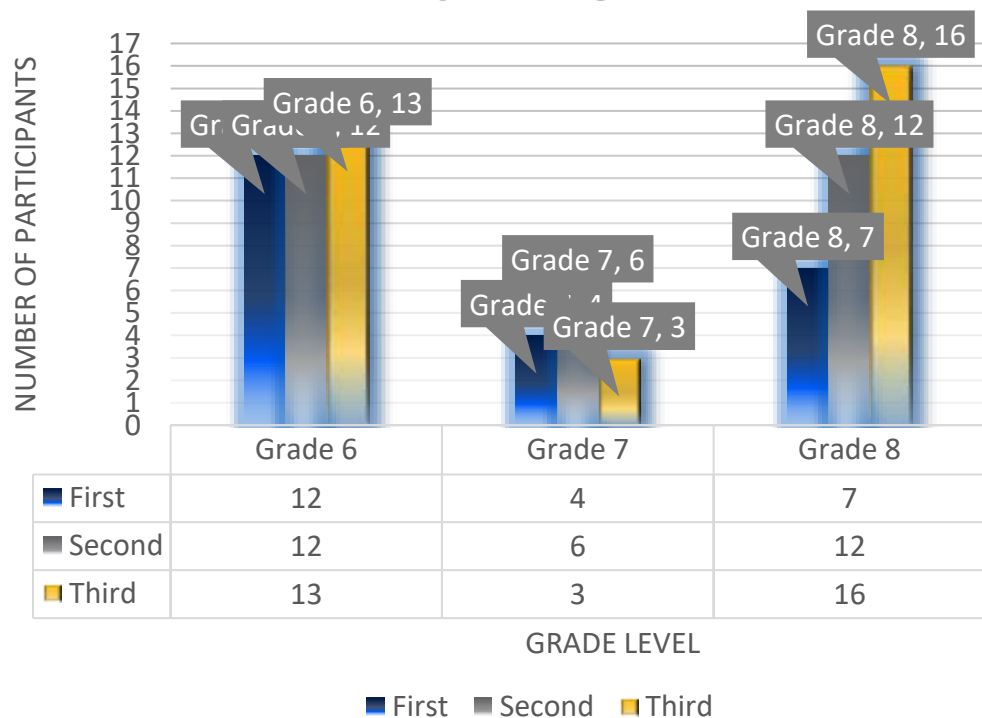


Reduce the Clutter¹

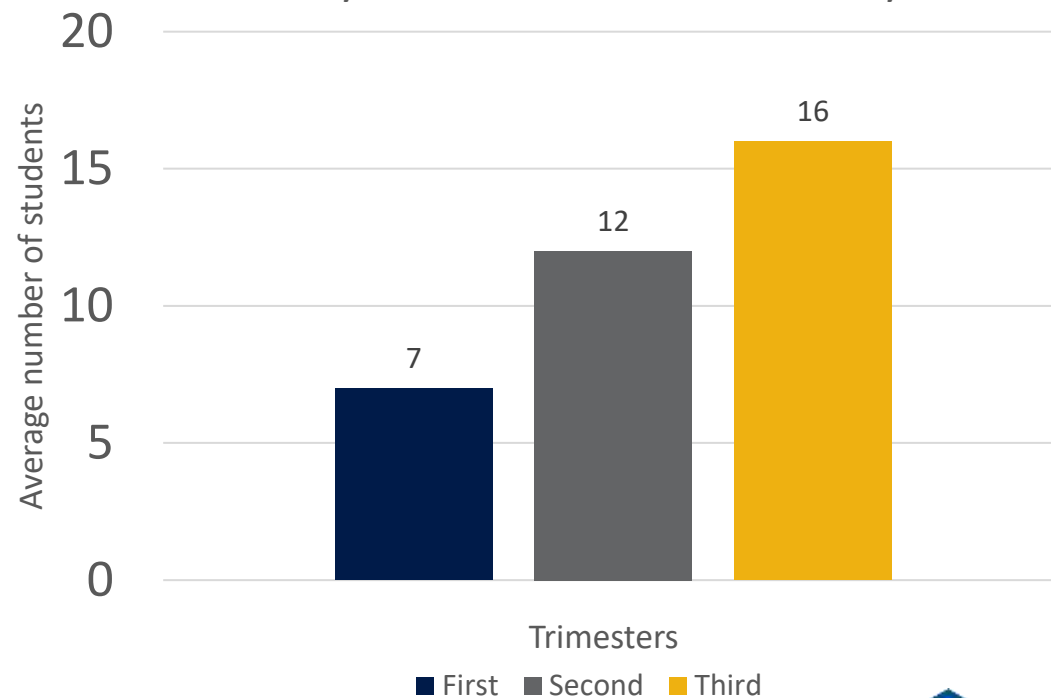
- Reduce the clutter on the display to make it easier to read.
 - Show only essential data.
 - Remove unnecessary graph elements.
 - Use the accompanying text.

Reduce the Clutter: Two AMMP! Examples

AVERAGE AMMP! DAILY ATTENDANCE BY GRADE LEVEL



Average AMMP! attendance for grade 8 students by trimester, 2020/21 school year

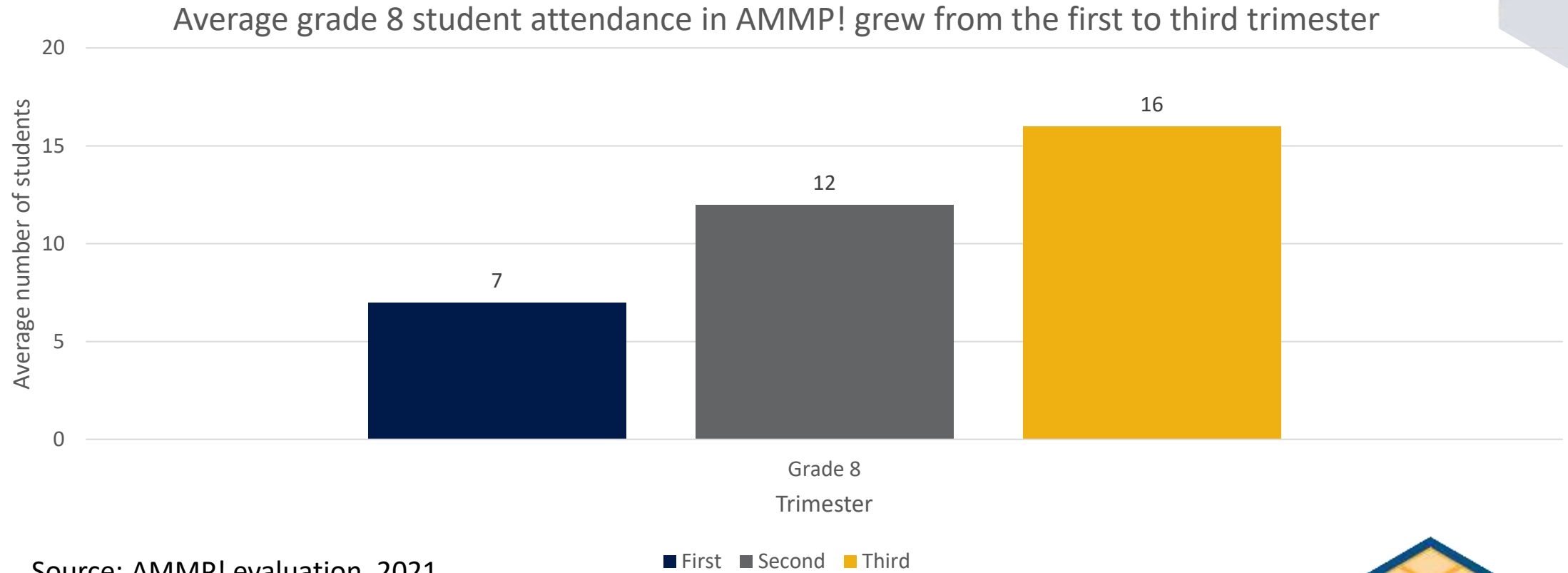


Source: AMMP! evaluation, 2021

Integrate Text and Visualizations

- The data display should stand on its own as a complete source of information.
 - Be strategic about the text used in the visualization.
 - Use descriptive titles.
 - Use arrows or callout boxes to emphasize critical information and provide additional information.
 - Use color to emphasize the data you want to show.
 - Use heavier line weights or larger font sizes for emphasis.

Integrate Text: AMMP! Example



Portray the Meaning of Data Accurately and Ethically¹

- You have a responsibility to portray the meaning of data accurately and ethically in a data visualization. You cannot intentionally or inadvertently introduce bias or mispresent data.
- Avoid:
 - Hiding negative data or cherry-picking data.
 - Manipulating how the data are visually displayed to change the meaning.
 - Using language that suggests a conclusion not supported by the data.

General Practices¹

- Use consistent data visualizations over time.
- Do not display data side by side if the data should not be compared.
- Think beyond the default data visualization.
- Focus on the message for the intended audience.
- Use plain language.
- Carefully choose fonts that display and reproduce well.
- Use color wisely.

Accessibility

- It is also important to ensure that your data visualizations can be understood by a wide audience.
- Include narrative descriptions, called *alternative text*, of any data visualizations in your dissemination materials.
- Doing so will ensure that your materials are accessible to your audience.



Chapter 2 Complete



Congratulations, you've completed the program evaluation toolkit!



Thank You

Please visit our website and follow us on Twitter
for information about our events, priorities, and research alliances,
and for access to our many free resources.

ies.ed.gov/ncee/edlabs/regions/central/index.asp

[@RELCentral](https://twitter.com/RELCentral)

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This presentation was prepared under Contract ED-IES-17-C-0005 by Regional Educational Laboratory Central, administered by Marzano Research. The content does not necessarily reflect the views or policies of IES or the U.S. of Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

References

1. National Forum on Education Statistics. (2016). *Forum guide to data visualization: A resource for education agencies* (NFES 2017-016). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. <https://nces.ed.gov/pubs2017/NFES2017016.pdf>