Excelling with Data Visualization

Sample workshop agendas from Ann K. Emery of Emery Analytics, LLC

This document outlines the topics we might cover during a data visualization workshop together. I also included sample workshop agendas for three optional modules: page layouts (skills needed to design reports and infographics); dashboards (the most popular module!); and time-saving spreadsheet strategies.

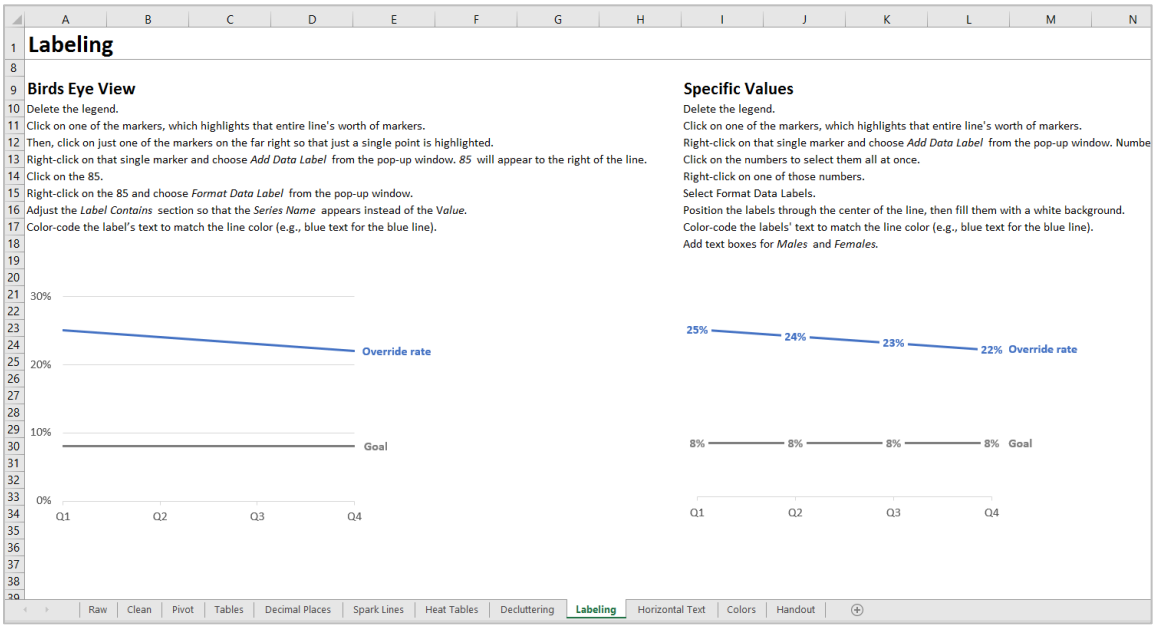
All workshops are:

✓ Customized.

I review your reports, slideshows, handouts, and dashboards. Then, we determine which skills will be most valuable for attendees. We might find that we should spend significant time on *x* from this agenda and skip *y* altogether. I incorporate examples from your projects throughout the workshop and include before/after remakes so that attendees can think about how to apply these best practices to their real work.

✓ Interactive.

I introduce a topic and then give participants an opportunity to immediately practice that skill. I offer both low-tech and high-tech workshops. In low-tech workshops, we remake graphs through group discussions and sketches. In high-tech workshops, I bring Excel files—inspired by your real-life projects—so that everyone's working from the same examples. Here's a screenshot from one workshop's activity file in which attendees created two graph styles, one providing a birds eye view and the other including specific values.



Data Visualization

The core content: 0.5 to 2 days

During my data storytelling workshops, I walk attendees through the step-by-step data visualization design process. First, attendees learn planning considerations so that they can customize graphs for their unique audiences. Then, we cover formatting considerations, like how to minimize the graph's clutter and then intentionally draw attention to important sections of the graph with color and text.

What I Talk About	What You Practice
Who's My Audience? We often begin by discussing the graph's audience. Who, in particular, will ultimately be using this data? Their interests and information needs drive every aspect of the data visualization's design.	✓ Thought-starter questions with a partner followed by group discussion ✓ One-click Excel strategies for automatically rounding numbers with decimal places to whole numbers
How Will I Share My Charts? The next phase of data visualization planning involves narrowing down how the completed chart will ultimately be shared with your audience. Will your graph go inside of a longer report? Will your graph become the star of a one-page handout? Common dissemination modes include reports, in-person presentations, handouts, executive summaries, dashboards, and infographics. We talk about which mix of formats is the strongest fit for each of your audiences.	✓ Thought-starter questions with a partner followed by group discussion. ✓ Complete an Audience Crosswalk to map which audiences should receive which publications. ✓ Complete a Communications Plan to describe the desired contents and tone of each publication.
Which Chart Matches My Message? Once you've narrowed down your audience and dissemination format, it's time to think about which chart you'll use: a pie chart, a bar chart, a line chart, or something else altogether.	✓ Create spark lines, data bars, and heat tables inside Excel to explore attendees' own spreadsheets and spot interesting patterns that might warrant a graph.

What I Talk About	What You Practice
	✓ Solve common problems like 3D exploding pie charts, cluttered bar charts, and spaghetti line graphs with more effective alternatives. ✓ Sketch options on paper prior to building visualizations on the computer.
Decluttering I teach attendees a three-step storytelling process: declutter, sharpen the message with text, and sharpen the message with color. During the decluttering segment, I discuss research-based best practices for removing unnecessary ink and focusing viewers' attention on the data.	✓ Critique *before* examples shown on screen. ✓ Build a graph(s) from scratch and declutter the visualization by removing or lightening borders, grid lines, tick marks, and other unnecessary ink in order to draw attention to the data. ✓ Remove legends and label data directly.
Emphasizing the Message with Text Staff learn to write titles and subtitles that state the graph's takeaway message; to add contextual clues with call-out boxes; and to label their graph with techniques that are legible for viewers with colorblindness.	✓ Write titles and subtitles. ✓ Annotate with call-out boxes. ✓ Ensure that all text is horizontal. ✓ Match the graph's fonts to your organization's color palette. ✓ Establish a font hierarchy.

What I Talk About

What You Practice

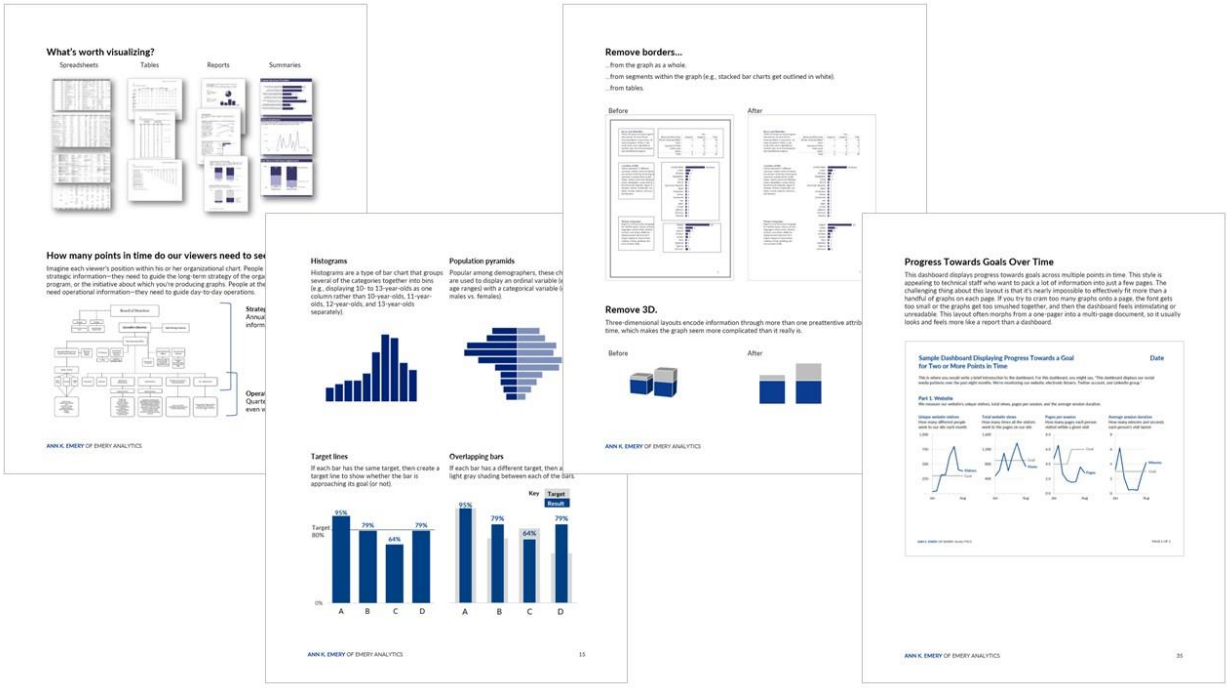
Emphasizing the Message with Color

Finally, I show attendees how to reinforce branding by using your color palette and to guide viewers' eyes towards the most important pieces of the graph's story with saturation.

- ✓ Apply custom red:green:blue codes from your style guide with eyedropper tools to enhance branding.
- ✓ Highlight key findings with action colors.
- ✓ Upload drafts into color blindness simulation tools to ensure that the colors are accessible.

View Illustrated Examples

For more information, skim the 37-page guidebook that all attendees receive as part of the training.



Page Layouts

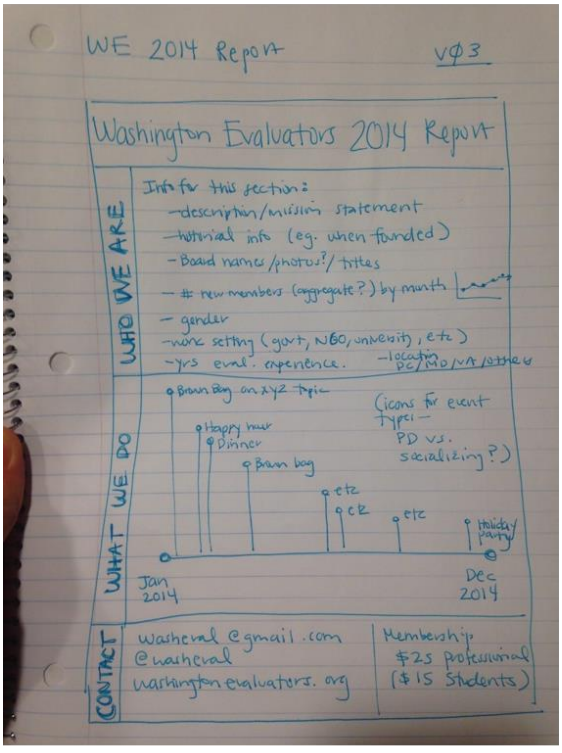
Optional module: 30 to 90 minutes

Once your staff members have designed a single graph, it's time to learn tips for combining multiple graphs onto a single page for their reports, slideshows, and handouts.

During this optional module, we discuss the techniques used to create these sample documents, such as:

- ✓ designing page layouts within a grid system,
- ✓ sketching layouts on paper,
- ✓ ensuring that there is adequate white space between chunks of content, and
- ✓ establishing a visual hierarchy within individual graphs and for the publication as a whole.

I share a variety of real-life examples so that staff can watch how grids, white space, and visual hierarchies are applied in each setting. In this example, I needed to produce a one-page summary of a longer annual report. I began by sketching drafts on paper before I sat down to the computer. Information is grouped into chunks—Who We Are, What We Do, and Join Us. Finally, I used a five-level font hierarchy to guide viewers through each section. The fonts and colors matched the organization's logo for enhanced branding.



Dashboard Design

Optional module: 30 minutes to 3 hours

My dashboard module is quickly becoming the most popular, and for good reason—why wait until the end of the year to hand your audience a lengthy report when you share data early and often with dashboards?

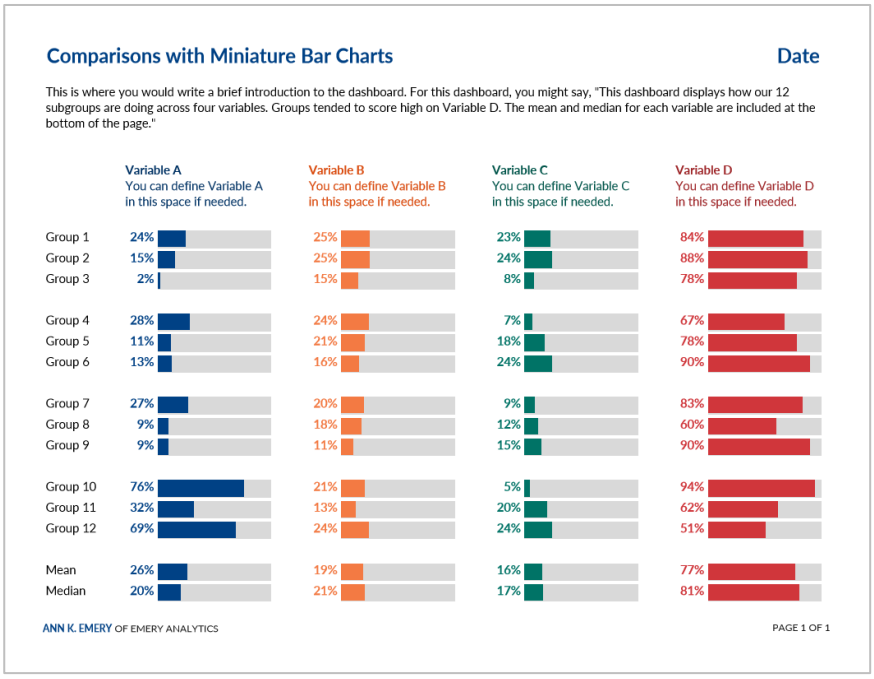
Dashboards often fall into one of these types:

- comparing categories;
- comparing categories over time;
- tracking progress towards goals;
- tracking progress towards goals over time;
- a series of matching dashboards; or
- a combination of any of these types.

I begin by explaining each of these dashboard types in more detail. Then, we create one, two, or three dashboards from scratch together in Excel using visual strategies like spark lines and data bars.

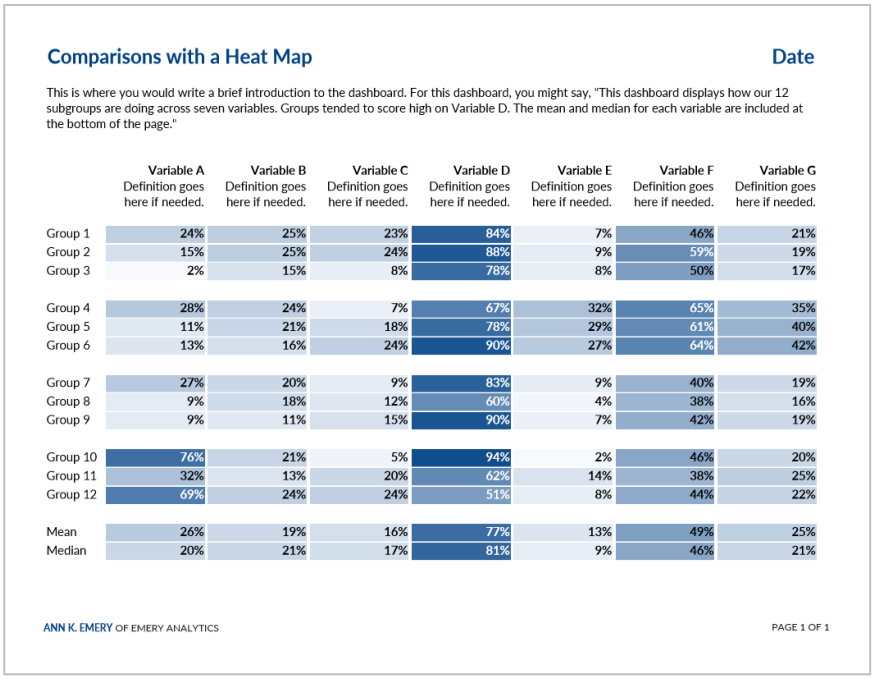
Comparisons with Miniature Bar Charts

I designed this layout while partnering with a grantmaker that wanted a one-page snapshot of her grantees' outcomes. The information had previously been scattered across multiple spreadsheets so we pulled the important numbers into a central location.



Comparisons with a Heat Map

The previous style compared subgroups with miniature bar charts. This style compares subgroups with heat maps. Thanks to Excel's *conditional formatting* features, the larger numbers are automatically darker and the smaller numbers are automatically lighter.



Comparisons with a Heat Map — Date

This is where you would write a brief introduction to the dashboard. For this dashboard, you might say, "This dashboard displays how our 12 subgroups are doing across seven variables. Groups tended to score high on Variable D. The mean and median for each variable are included at the bottom of the page."

	Variable A Definition goes here if needed.	Variable B Definition goes here if needed.	Variable C Definition goes here if needed.	Variable D Definition goes here if needed.	Variable E Definition goes here if needed.	Variable F Definition goes here if needed.	Variable G Definition goes here if needed.
Group 1	24%	25%	23%	84%	7%	46%	21%
Group 2	15%	25%	24%	88%	9%	59%	19%
Group 3	2%	15%	8%	78%	8%	50%	17%
Group 4	28%	24%	7%	67%	32%	65%	35%
Group 5	11%	21%	18%	78%	29%	61%	40%
Group 6	13%	16%	24%	90%	27%	64%	42%
Group 7	27%	20%	9%	83%	9%	40%	19%
Group 8	9%	18%	12%	60%	4%	38%	16%
Group 9	9%	11%	15%	90%	7%	42%	19%
Group 10	76%	21%	5%	94%	2%	46%	20%
Group 11	32%	13%	20%	62%	14%	38%	25%
Group 12	69%	24%	24%	51%	8%	44%	22%
Mean	26%	19%	16%	77%	13%	49%	25%
Median	20%	21%	17%	81%	9%	46%	21%

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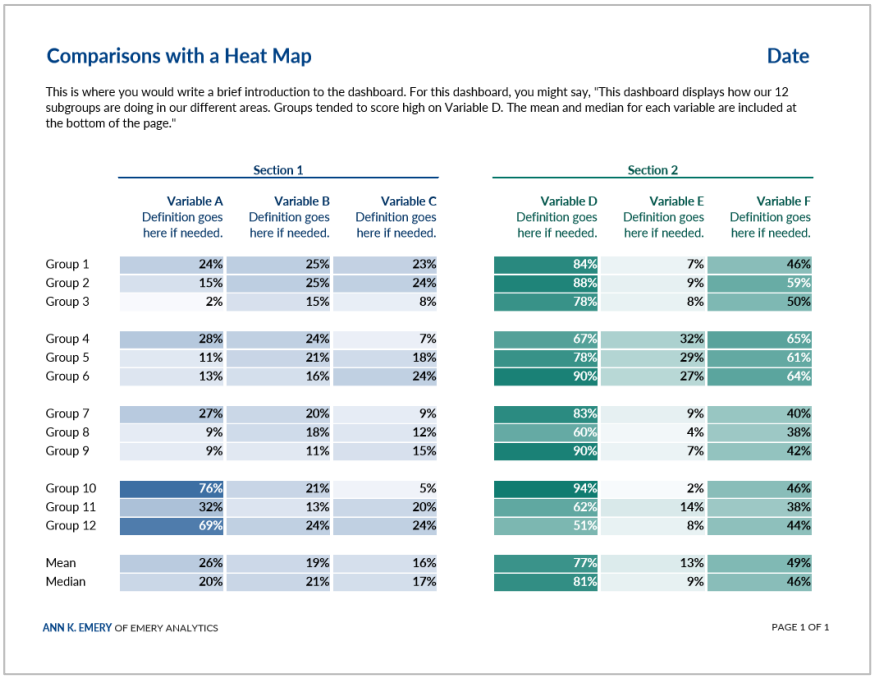
The customizations are limitless. This fictional heat map compares subgroups on a few blue variables and on a few green variables.



Comparisons with a Heat Map — Date

This is where you would write a brief introduction to the dashboard. For this dashboard, you might say, "This dashboard displays how our 12 subgroups are doing in our different areas. Groups tended to score high on Variable D. The mean and median for each variable are included at the bottom of the page."

	Section 1			Section 2		
	Variable A Definition goes here if needed.	Variable B Definition goes here if needed.	Variable C Definition goes here if needed.	Variable D Definition goes here if needed.	Variable E Definition goes here if needed.	Variable F Definition goes here if needed.
Group 1	24%	25%	23%	84%	7%	46%
Group 2	15%	25%	24%	88%	9%	59%
Group 3	2%	15%	8%	78%	8%	50%
Group 4	28%	24%	7%	67%	32%	65%
Group 5	11%	21%	18%	78%	29%	61%
Group 6	13%	16%	24%	90%	27%	64%
Group 7	27%	20%	9%	83%	9%	40%
Group 8	9%	18%	12%	60%	4%	38%
Group 9	9%	11%	15%	90%	7%	42%
Group 10	76%	21%	5%	94%	2%	46%
Group 11	32%	13%	20%	62%	14%	38%
Group 12	69%	24%	24%	51%	8%	44%
Mean	26%	19%	16%	77%	13%	49%
Median	20%	21%	17%	81%	9%	46%

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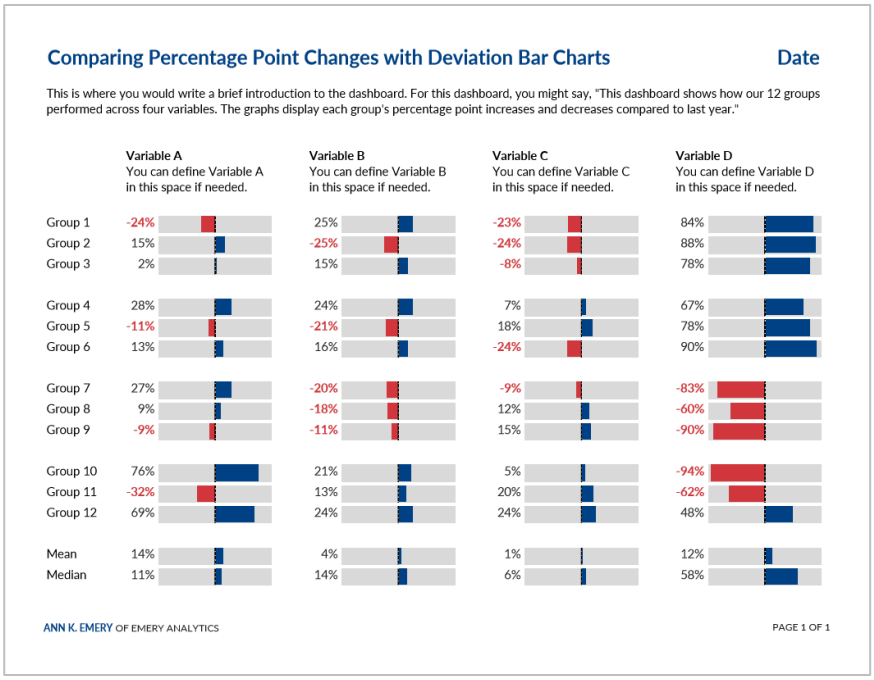
Comparing Percentage Point Changes with Deviation Bar Charts

I was working with a grantmaker that wanted to learn about her 29 grantees' progress during the first year of their grant. Rather than making apples-to-oranges comparisons across grantees, we compared each grantee to itself by calculating the percentage point increases or decreases the grantee had made.



Comparing Percentage Point Changes with Deviation Bar Charts

Date

This is where you would write a brief introduction to the dashboard. For this dashboard, you might say, "This dashboard shows how our 12 groups performed across four variables. The graphs display each group's percentage point increases and decreases compared to last year."

	Variable A You can define Variable A in this space if needed.	Variable B You can define Variable B in this space if needed.	Variable C You can define Variable C in this space if needed.	Variable D You can define Variable D in this space if needed.
Group 1	-24%	25%	-23%	84%
Group 2	15%	-25%	-24%	88%
Group 3	2%	15%	-8%	78%
Group 4	28%	24%	7%	67%
Group 5	-11%	-21%	18%	78%
Group 6	13%	16%	-24%	90%
Group 7	27%	-20%	-9%	-83%
Group 8	9%	-18%	12%	-60%
Group 9	-9%	-11%	15%	-90%
Group 10	76%	21%	5%	-94%
Group 11	-32%	13%	20%	-62%
Group 12	69%	24%	24%	48%
Mean	14%	4%	1%	12%
Median	11%	14%	6%	58%

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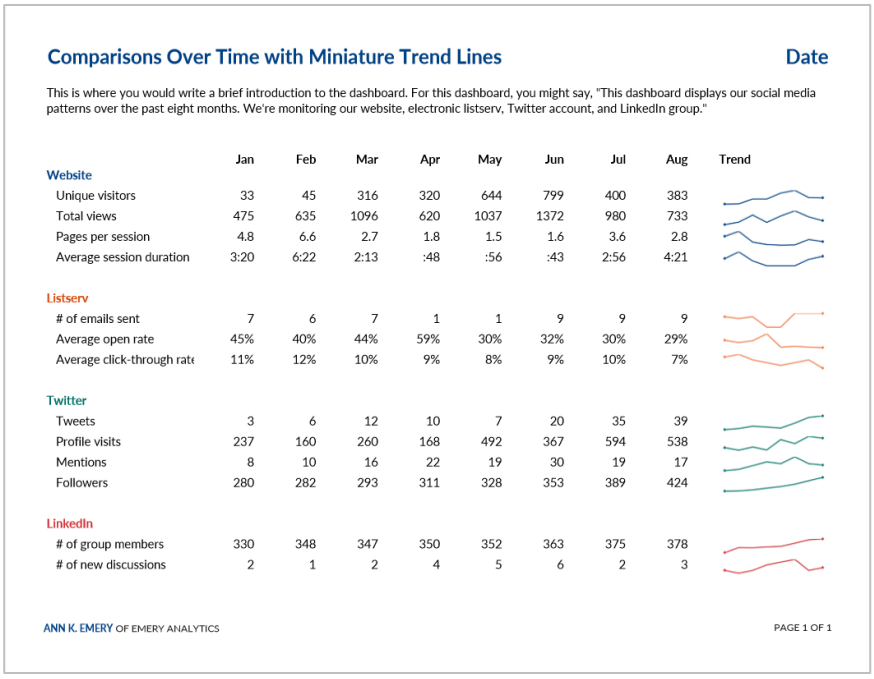
Comparisons Over Time with Miniature Trend Lines

I created this style while serving on the board of a professional society. During our meetings, we reviewed what we had accomplished in the past month and then set priorities for the coming month. Miniature trend lines showed us whether each item was going up, going down, or holding steady.



Comparisons Over Time with Miniature Trend Lines

Date

This is where you would write a brief introduction to the dashboard. For this dashboard, you might say, "This dashboard displays our social media patterns over the past eight months. We're monitoring our website, electronic listserv, Twitter account, and LinkedIn group."

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Trend
Website									
Unique visitors	33	45	316	320	644	799	400	383	
Total views	475	635	1096	620	1037	1372	980	733	
Pages per session	4.8	6.6	2.7	1.8	1.5	1.6	3.6	2.8	
Average session duration	3:20	6:22	2:13	:48	:56	:43	2:56	4:21	
Listserv									
# of emails sent	7	6	7	1	1	9	9	9	
Average open rate	45%	40%	44%	59%	30%	32%	30%	29%	
Average click-through rate	11%	12%	10%	9%	8%	9%	10%	7%	
Twitter									
Tweets	3	6	12	10	7	20	35	39	
Profile visits	237	160	260	168	492	367	594	538	
Mentions	8	10	16	22	19	30	19	17	
Followers	280	282	293	311	328	353	389	424	
LinkedIn									
# of group members	330	348	347	350	352	363	375	378	
# of new discussions	2	1	2	4	5	6	2	3	

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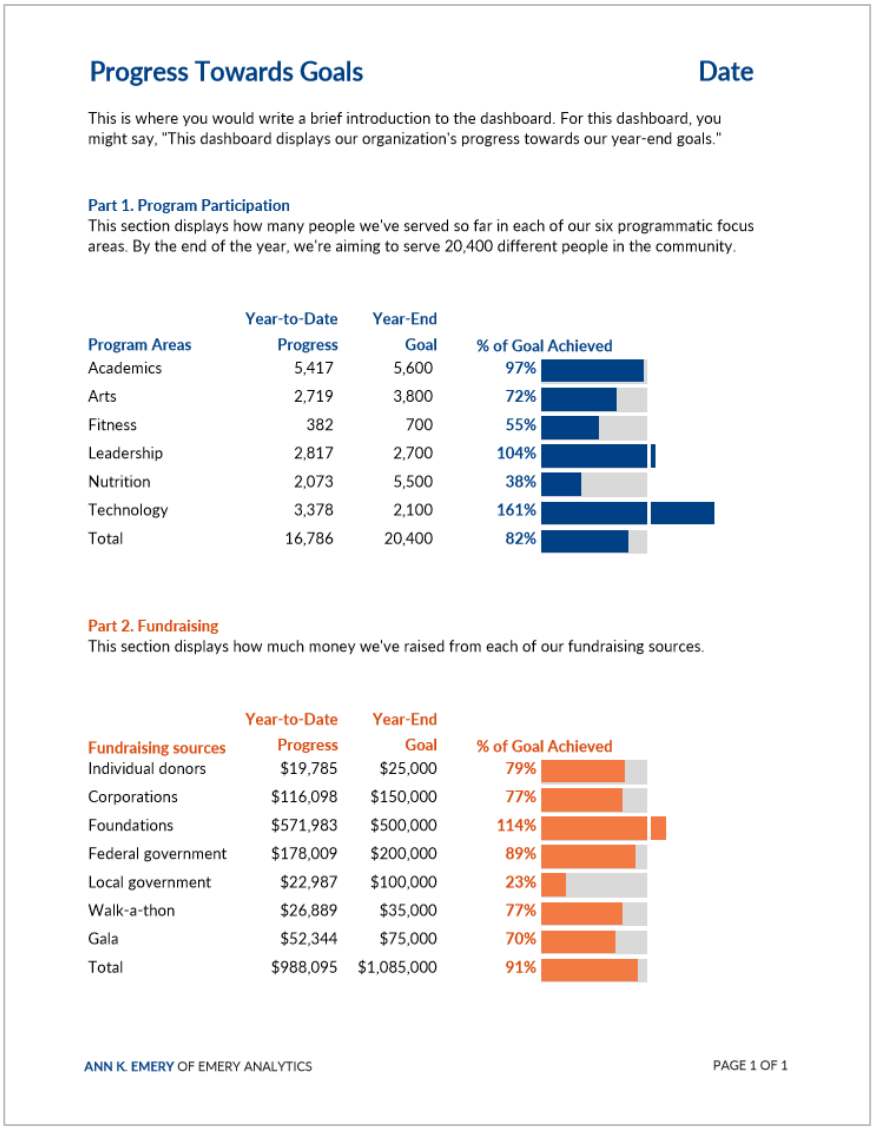
Progress Towards Goals

I developed this design when working with an organization that needed to track their progress towards goals in two areas: how many people they were serving and how much money they had raised. The light gray shading behind each bar helped them see whether they had met or exceeded each goal. The organization discussed this dashboard at their quarterly board meetings.



Progress Towards Goals

Date

This is where you would write a brief introduction to the dashboard. For this dashboard, you might say, "This dashboard displays our organization's progress towards our year-end goals."

Part 1. Program Participation

This section displays how many people we've served so far in each of our six programmatic focus areas. By the end of the year, we're aiming to serve 20,400 different people in the community.

Program Areas	Year-to-Date Progress	Year-End Goal	% of Goal Achieved
Academics	5,417	5,600	97%
Arts	2,719	3,800	72%
Fitness	382	700	55%
Leadership	2,817	2,700	104%
Nutrition	2,073	5,500	38%
Technology	3,378	2,100	161%
Total	16,786	20,400	82%

Part 2. Fundraising

This section displays how much money we've raised from each of our fundraising sources.

Fundraising sources	Year-to-Date Progress	Year-End Goal	% of Goal Achieved
Individual donors	$19,785	$25,000	79%
Corporations	$116,098	$150,000	77%
Foundations	$571,983	$500,000	114%
Federal government	$178,009	$200,000	89%
Local government	$22,987	$100,000	23%
Walk-a-thon	$26,889	$35,000	77%
Gala	$52,344	$75,000	70%
Total	$988,095	$1,085,000	91%

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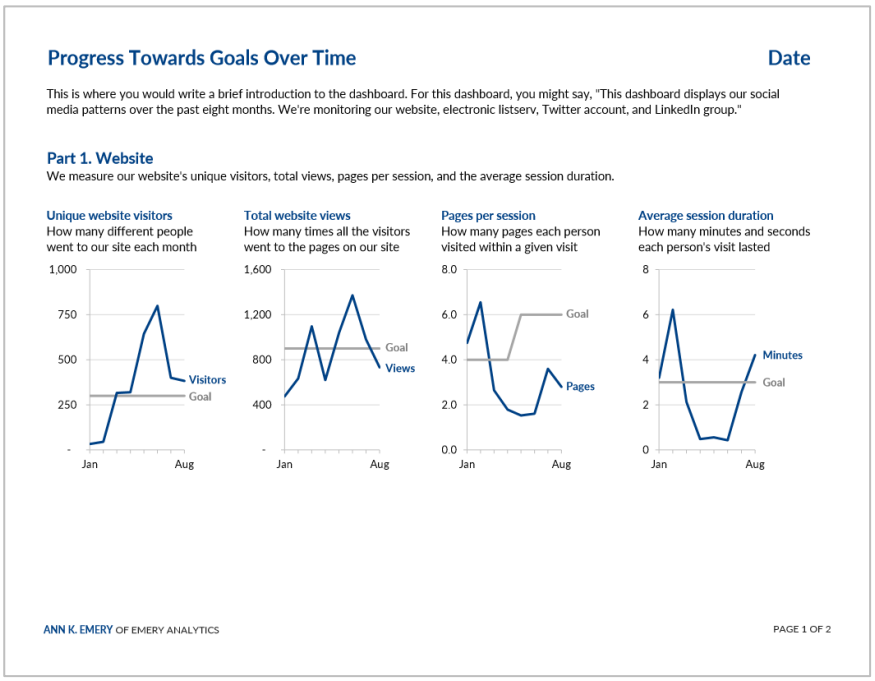
Progress Towards Goals Over Time

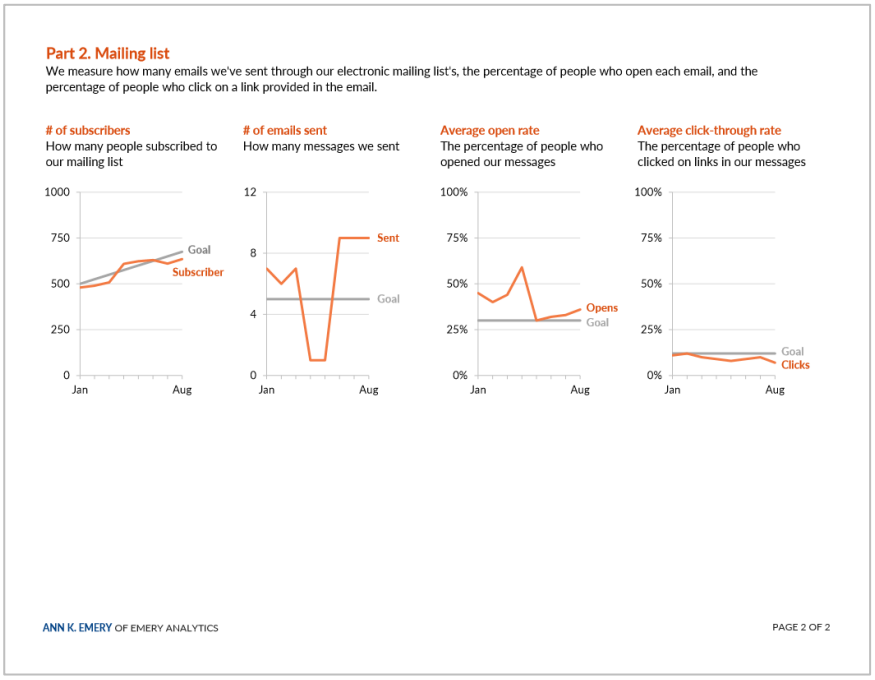
This dashboard displays progress towards goals across multiple points in time. The darker lines are the numbers achieved and the gray lines are the goals in each area.

This style often appeals to technical audiences because it packs a lot of detailed information into just a few pages, yet with plenty of open white space so that it doesn't feel overwhelming.

Front



Back



Time-Saving Spreadsheet Strategies

Optional module: 0.5 to 2 days

Do your team members feel like it takes forever to calculate the numbers that feed into the graphs? If so, the staff might benefit from learning a few time-saving spreadsheet strategies.

During this optional module, I walk attendees through the analytical process one step at a time. We begin by merging all of their disparate spreadsheets into one central location that can be used for further analyses. Then, we organize spreadsheets by freezing panes and inserting filters. We clean data by removing duplicate entries and addressing challenges with missing data. Finally, we analyze data with formulas and with pivot tables. These topics are outlined in more detail below.

I have a variety of sample datasets we could use for hands-on practice during this module, including demographic data, outcome data, expense logs, grants management data, and so on. Or, even better, we could also use data from one of your real-life projects to ensure that the skills are immediately applicable.

Skills I Demonstrate	What You Practice
Importing and Merging Datasets	
Datasets come in a variety of formats – from MS Access, from SPSS, or from CSV files. The first step in the data analysis process is to import, export, and merge multiple datasets together into a master dataset that you can use for further analyses.	✓ Combine two or more spreadsheets into a single spreadsheet (many to one): =vlookup() and =hlookup(). ✓ Parse data from a single cell into multiple cells (one to many): Text to columns.
Navigating Spreadsheets	
When you're staring at a spreadsheet for hours on end, a little organization can go a long way. To stay organized, I create new sheets, freeze panes, insert filters, and set up Excel Tables.	✓ Organize sheets: create, copy, move, re-name, color-code, and password-protect. ✓ Freeze panes so that the top row stays in view even as your scroll. ✓ Sort and filter your variables.
Cleaning Data	
Before you can analyze your data, you'll need to check for missing data and recode some variables.	✓ Highlight duplicate entries. ✓ Assess missing data with =counta(), =countblank(), and =sum(). ✓ Recode variables with =if() and =ifs().

Skills I Demonstrate	What You Practice
Exploring Preliminary Patterns	
Quickly explore your data and find initial patterns.	✓ Data bars. ✓ Color scales. ✓ Top/bottom rules. ✓ Spark lines and spark bars.
Calculating Descriptive Statistics with Formulas and with Pivot Tables	
Summarize your data by finding the mean, median, standard deviation, and other descriptive statistics. We'll cover one of my favorite features of Excel—pivot tables. Pivot tables are the fastest, most accurate way to summarize your data – and they're easier than you think. You can use pivot tables to summarize anything from demographic information to satisfaction survey responses.	✓ Generating summary statistics on ratio or interval data: =min(), =max(), =average(), =median(), =mode(), and =stdev() ✓ Generating summary statistics on nominal or ordinal data: Calculating frequencies with =countif(), countifs(), =sumif(), and =sumifs() ✓ Fast and easy number-crunching with pivot tables: Prerequisites for pivot tables, inserting pivot tables, dragging-and-dropping variables, refreshing data, exploring missing data, grouping, and using filters
Additional Time-Saving Strategies	
These extra time-saving techniques are the icing on the cake.	✓ Dealing with dates: =month(), =day(), =year() ✓ Dealing with text: =left(), =mid(), =right() ✓ Dealing with names: =lower(), =upper(), =proper() ✓ Transposing data

Watch Me Teach

To see my teaching style in action, watch a video at www.annkemery.com/excel.

Recent Workshops

During the past year, I have led more than 60 in-person and virtual trainings for more than 2,800 attendees. Organizations have included grantmakers, grantees, government agencies, universities, and professional societies. I only accept projects with organizations that are working towards the greater social good.

What Clients Are Saying

“This was by far the best professional development opportunity I've had in the last three years. Thanks so much for the hands-on learning opportunities. I left this workshop feeling that I could immediately implement what I learned, which is rare!”

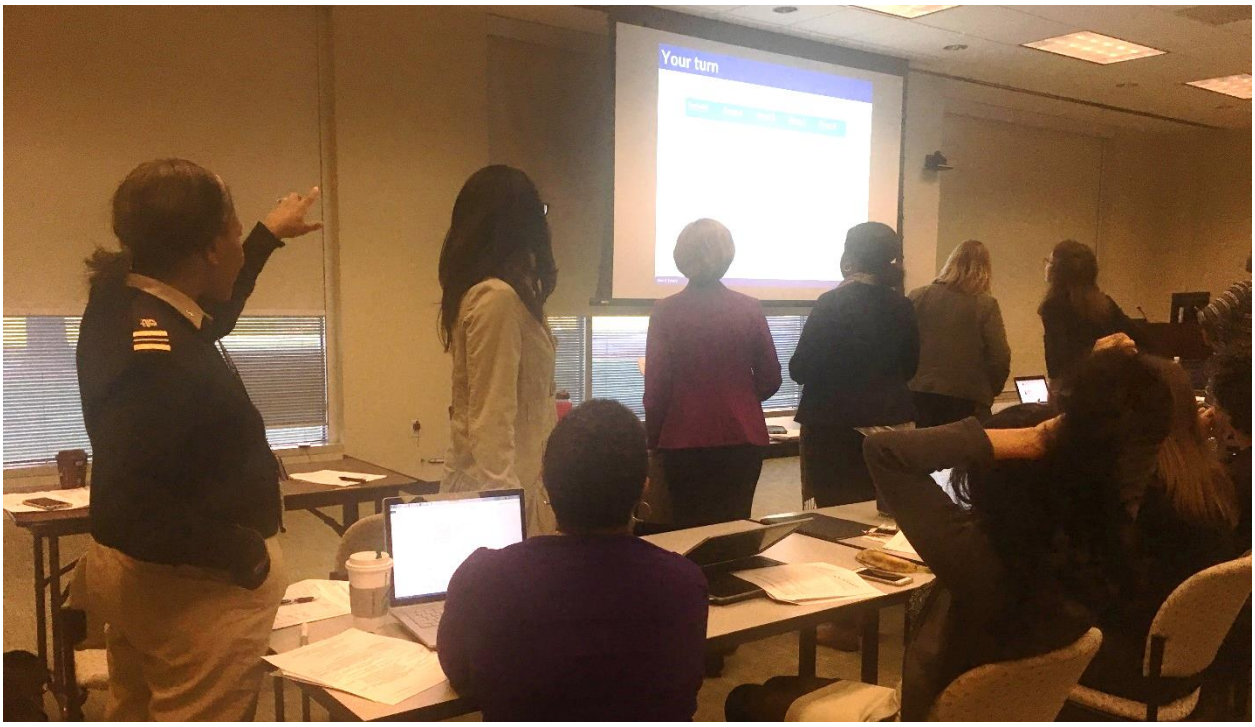
“Ann did an amazing job. She was engaging and an excellent facilitator. This workshop has inspired a lot of confidence in my ability to visualize data and I would be interested in seeing what Ann would have planned for an intermediate or more advanced workshop on this topic.”

“I really liked having everyone working from the same Excel doc prepared ahead of time so you have all the lessons there after the training. I've seen it done so poorly in other trainings where everyone is working from different sets of data and it makes learning anything tangible impossible.”

“Really excellent and a totally worthwhile investment of time. Ann's humor, adaptability to her audience, vast knowledge, creativity and hands-on approach made this one of the best workshops I've ever attended.”

“The pace of the workshop was exactly what I hoped for. You provided just the right amount of lecture-style content, great visuals, and then the hands-on practice that we all need to help us retain all the information you provided. Thank you!!”

“Ann is truly an expert, but there are lots of experts. What makes Ann spectacular is the simplicity of the strategy and tactics she uses in analyzing and visualizing data, the incredible impact that those strategies and techniques deliver, and the way in which she teaches and harnesses simple, everyday graphical tools and tricks to get the job done.”



Ann K. Emery of Emery Analytics, LLC

Ann K. Emery is a sought-after speaker, trainer, and information designer who equips organizations around the globe to visualize their data more effectively.

She also overhauls publications and dashboards with the goal of making technical information even easier to understand for non-technical audiences. Recent clients include the United Nations, Centers for Disease Control, and National Institutes of Health, as well as dozens of professional societies, foundations, and nonprofits throughout the United States, Europe, Canada, Africa, and Asia.

Prior to launching her own company, Ann evaluated the effectiveness of public policy initiatives at Innovation Network; managed an internal performance management system at the Latin American Youth Center; evaluated federally-funded programs at ICF International; and contributed to research-to-policy projects at the University of Virginia.

In addition to her client projects, Ann is the elected Chair of the American Evaluation Association's Data Visualization and Reporting interest group, serves on the Advisory Board of the Potent Presentations Initiative, and is the past Secretary and Communications Chair for the Washington Evaluators.

She holds a Bachelor's degree from the University of Virginia and a Master's degree from George Mason University. Learn more at www.annkemery.com/blog.