Data Visualization, Part 1

How to tell your story with AI

Grade Level: Suitable for 6-12

Suggested Time: 1 Hour

Overview

In Part 1 of this lesson, students are introduced to data storytelling and data visualization as tools for communicating effectively and persuading an audience. Students explore real-world examples of data dashboards, identify data relevant to their own AI projects, and then create an original data visualization using Datawrapper.

AI Learning Priorities

Humans and AI: Students explore how humans use data visualization tools to communicate insights and support AI-informed decisions.

Representation and Reasoning: Students work with real datasets and consider how visual formats shape how information is understood and interpreted.

Machine Learning: Students examine how data collected and visualized by people can serve as inputs for training and evaluating AI systems.

Ethical AI: Students practice responsible data practices, including crediting sources, protecting privacy, and avoiding bias.

Societal Impacts of AI: Students consider how data storytelling shapes public understanding and influences decisions in communities and society.

Knowledge and Skills Topics

- What data storytelling is and why it matters for communication.
- What data visualization is and the types of charts/graphs used.
- Ethical considerations when collecting and using data.
- Navigating and analyzing real-world data dashboards (PowerBI examples).
- Using Datawrapper to input data and create a visualization.
- Downloading and integrating a data visualization into a presentation.

Materials and Resources Needed

- ☐ Student devices with a web browser and internet access. This works best on a laptop rather than a phone or tablet.
- ☐ Whitelisted items
  - ☐ Microsoft PowerBI Examples
    - ☐ Arts and Entertainment
    - ☐ Business and Entrepreneurship
    - ☐ Computer Science
    - ☐ Ecology and Food Security
    - ☐ Healthcare
    - ☐ Sports Science
  - ☐ Datawrapper
  - ☐ Datasets CDC, census.gov, Google Dataset Search, or Kaggle

Curriculum Standards

- **ISTE 1.3.c Knowledge Constructor:** Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
- **ISTE 1.3.d Knowledge Constructor:** Students build knowledge by exploring real-world issues and gain experience in applying their learning in authentic settings.
- **ISTE 1.6.c Creative Communicator:** Students use digital tools to visually communicate complex ideas to others.
- **CSTA 2-DA-07:** Represent data using multiple encoding schemes.
- **CSTA 2-DA-09:** Refine computational models based on the data they have generated.
- **CSTA 3A-DA-10:** Evaluate the tradeoffs in how data elements are organized and where data is stored.
- **AI4K12 Big Idea 5 Societal Impact:** The way data is visualized and shared can shape opinions, decisions, and outcomes.

Differentiation Suggestions

- For students who need support
    - Pre-load a sample dataset into Datawrapper for students to practice with before using their own data.
    - Pair students who are uncertain about chart types with a peer who has some data experience.
- For students who are ready to go further
    - Encourage students to create two versions of their visualization with different chart types and compare which tells a clearer story.
    - Ask advanced students to find a second dataset that challenges or adds nuance to their first visualization.

Evidence of Understanding

- Can students articulate what story they want to tell with their data?
- Are students selecting appropriate chart types and labeling them clearly?
- Completed data visualization saved and ready to embed
- Visualization meets quality criteria: clear title, labeled axes, readable colors, and appropriate chart type for the data.

Key Concepts

- Data Storytelling - Communicating complex information in a way that is easy to understand and memorable, to help audiences make better decisions and take action.
- Data Visualization - Graphical organization of information (such as charts, graphs, and maps) to make it easier for people to see patterns, trends, and outliers.
- Market Research - Researching background information to understand the context around a product, service, or audience.
- Ethical Data Use - Protecting people's privacy, crediting original sources, anonymizing survey responses, and drawing from a variety of sources to avoid bias.

Activity Overviews

Activity #1: PowerBI

Purpose: Review data visualization examples to begin seeing data as a storytelling device.

Task: Students will have 10 minutes to review examples and discuss. Students will individually review the real PowerBI examples. They should notice features and the storytelling.

Arts and Entertainment Business and Entrepreneurship Computer Science
Ecology and Food Security
Healthcare
Sports Science

Activity #2: Build Your Visualization

Purpose: Tell a story about your data, visually, that helps people understand.
Task: IMPORTANT! Students will need data at this point to do this activity. Students can use the following datasets CDC, census.gov, Google Dataset Search, or Kaggle.
Students will have 30 minutes to build the visualization with datawrapper.de. Students will enter their data then customize their chart, considering what story they are trying to tell. Students must download their chart as a PNG to be used in the next lesson.

Sequence, Session Flow, and Facilitation Prompts

Sequence

1. Opening
2. Data Storytelling
3. Activity #1 - PowerBI
4. Data
5. Activity #2 - Build Your Visualization
6. Debrief - Activity #2
7. Wrap-Up

Session Flow

1-Hour Class Period

Opening	0:00 - 0:01	Slide1; Low stakes
Data Storytelling	0:01 - 0:11	Slide 2-4; Direct instruction
Activity #1	0:11 - 0:21	Slide 5
Data		Handout
Activity #2	0:21 - 0:51	Slides 6-8
Debrief - Activity #2	0:51 - 1:00	Slide 9

45-Minute Class Period

STOP		Give Pre-Reading the night before
Opening	0:00 - 0:01	Slide1; Low stakes
STOP		SKIP to Activity #1
Activity #1	0:01 - 0:11	Slide 5
Data		Handout
Activity #2	0:11 - 0:41	Slides 6-8
Debrief - Activity #2	0:41 - 0:45	Slide 9

Facilitation Prompts

IMPORTANT NOTE: Students will need data to do this lesson. Students can use the following datasets: CDC, census.gov, Google Dataset Search, or Kaggle.

SLIDE DECK

SLIDE 1 - Title Slide

> Say "Today we are focused on data storytelling and data visualization - specifically, how to turn numbers and research into a chart that makes people stop, look, and believe in your idea.

SLIDE 2 - What is data storytelling

> Say "First question: What is data storytelling?
>
> Communicating complex information in a way that is easy to understand and memorable, to help audiences make better decisions and take action.
>
> There are three parts - and I want you to actually remember these three words.
>
> The first is DATA. Data is your numbers, your facts, your evidence. It is the raw material. On its own, data just sits there - a spreadsheet, a table, a list of percentages. Data alone does not convince anyone of anything.
>
> The second is STORY. Story is the meaning - the "so what." It is the sentence you can say about the data. Not just "teen mental health issues are rising," but "teen mental

health issues have increased 47% in three years and our city is above the national average." That is a story. It has direction. It has stakes.

The third is ACTION. Action is what you want your audience to do or believe after they see your data. For you, in your pitch, the action is: believe that this problem is real, believe that it is serious, and believe that your team is the right team to solve it.

SLIDE 3 - What is data visualization?

Say "What is data visualization? The graphical organization of information - using charts, graphs, and maps - to make it easier to see patterns, trends, and outliers.

In plain language: instead of putting your data in a table that nobody reads, you turn it into a picture. And the right picture makes your data impossible to ignore.

You have four major chart types to know.

BAR or COLUMN CHARTS - use these when you are comparing categories side by side. If you want to show that your city has higher diabetes rates than three neighboring cities, that is a bar chart.

LINE CHARTS - use these when you are showing change over time. If you want to show that food insecurity in your zip code has increased every year for five years, that is a line chart.

PIE or DONUT CHARTS - use these when you are showing parts of a whole. What percentage of survey respondents said they could not afford medication? A pie chart can show that. One warning: only use a pie chart if you have fewer than five slices. More than that, and it becomes impossible to read.

TABLES and MAPS - tables are great for detailed data where you want to show multiple data points at once. Maps are powerful when geography is the point - if your problem is concentrated in a specific neighborhood or region, a map makes that visible instantly.

Think about your own project. Raise your hand if you already know what kind of data you want to show.

Great. Keep that in mind. You are going to need to choose a chart type during Activity 2, so it helps to be thinking about it now.

SLIDE 4 - Why data storytelling matters

The headline is: clear data convinces audiences. Your audience, they all want evidence. They do not want enthusiasm. They want proof.

Think about any great pitch you have ever seen. Whether it is Shark Tank, or a TED Talk, or a news story about a startup - what do all of them have? Numbers. Visuals. Evidence. Not just someone saying "trust me, this problem is serious." They show you.

A good visualization also builds credibility. When you show a sourced, well-labeled chart, you signal that you did your research. You are not just guessing that the problem exists - you have evidence.

SLIDE 5 - Activity 1

Say "Go ahead and get in groups of 3-4. (Pause)

Okay, before we talk about HOW to build a visualization, I want you to look at one that already exists so you can see what good data storytelling looks like in practice.

PowerBI is a professional data visualization tool used by companies, researchers, and government agencies. You are going to explore it exactly the way a real analyst would - by clicking around, looking at the data, and figuring out what story it is telling.

[Share these links with students.]

Microsoft PowerBI Examples
Arts and Entertainment Business and Entrepreneurship Computer Science
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Here is what you are doing.

Step one: spend three to four minutes just clicking through the dashboard. Do not try to understand everything - just explore. Click filters, hover over data points, see what changes.

Step two: start noticing what works. What chart types do you see? What patterns jump out immediately? What is the "story" this dashboard is trying to tell?

Step three: after about five minutes of exploring, turn to your group and share your observations. What data storytelling techniques did the creator use? You have about five minutes for that group conversation.

Go ahead and get started.

SLIDE 6 - Tips for a great visualization

Say "Before you dive into our main activity I want to review these design tips - keep them in mind while you are building.

Tip one: CLEAR TITLE. Your chart title should state the insight, not just the topic. "Teen Mental Health Data" is a topic title. "Teen Depression Rates Have Doubled in Our City Since 2015" is an insight title. The insight title tells the audience what to think before they even look at the chart.

Tip two: LABEL EVERYTHING. Axis labels, data labels, legends. If someone has to guess what any element means, you have lost them. Datawrapper makes this easy - use every labeling option it offers.

Tip three: THE RIGHT CHART. Bar for comparisons. Line for trends over time. Pie only when you have fewer than five slices. If you choose the wrong chart type, your data gets distorted.

Tip four: SIMPLE COLORS. One to three colors maximum. High contrast - dark on light, or light on dark - is more accessible for everyone. Restraint is professionalism.

Tip five: CREDIT YOUR SOURCE. Add a small citation below the chart. One line: "Source: CDC, 2023" or "Source: Team Survey, February 2025." This builds credibility instantly.

Tip six: LESS IS MORE. Remove unnecessary gridlines, borders, background boxes. The data is the hero - everything else is decoration, and decoration gets in the way.

SLIDE 7 - Activity #2

Say "This is a screenshot of Datawrapper - the tool you'll be using today to build your visualization. It will walk you through everything you need to do.

SLIDE 8 - Activity #2

Say "This is it. This is the main event for today. You are going to open Datawrapper and build your actual data visualization.

Datawrapper is a free, professional-grade tool. Major news organizations like The New York Times and The Economist use it. You do not need to know how to code. You just need your data and a clear idea of the story you want to tell.

Step one: go to datawrapper.de. Open it in your browser right now.

Step two: sign in with your school login. Once you are in, click "Start Creating."

Step three: enter your data. You can type it directly into Datawrapper's table, or paste from a spreadsheet. Then choose a chart type - bar for comparisons, line for trends over time, pie only if you have fewer than five categories.

Step four: customize. Give your chart a title that states the insight, not just the topic. Add labels. Pick your colors. Keep it to one or two colors maximum.

Step five: when you are happy with it, download it as a PNG. That is the image file you will need for our next lesson. Make sure you actually download it before class ends today.

SLIDE 8 - Gallery Discussion

Say "Each group is going to show us their visualization and answer 2-3 of these questions.

Additional Resources

- Datawrapper River - gallery of published visualizations for inspiration.
- Datawrapper Academy - tutorials on chart types and best practices.

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