Module 01
Data Literacy
Lecture 3

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Agenda

- Design with Analytics
  - Analytical Thinking vs. Creative Intuition
  - Common Patterns of Design + Analytics

"*In this world of big data, basic data literacy—the ability to analyze, interpret, and even question data—is an increasingly valuable skill*," says Harvard Business School Professor Janice Hammond

- The Importance of Context
  - 6 basic problem types
  - Who, What, and How
  - Questions to ask
  - In-Class Exercise

Design with Analytics

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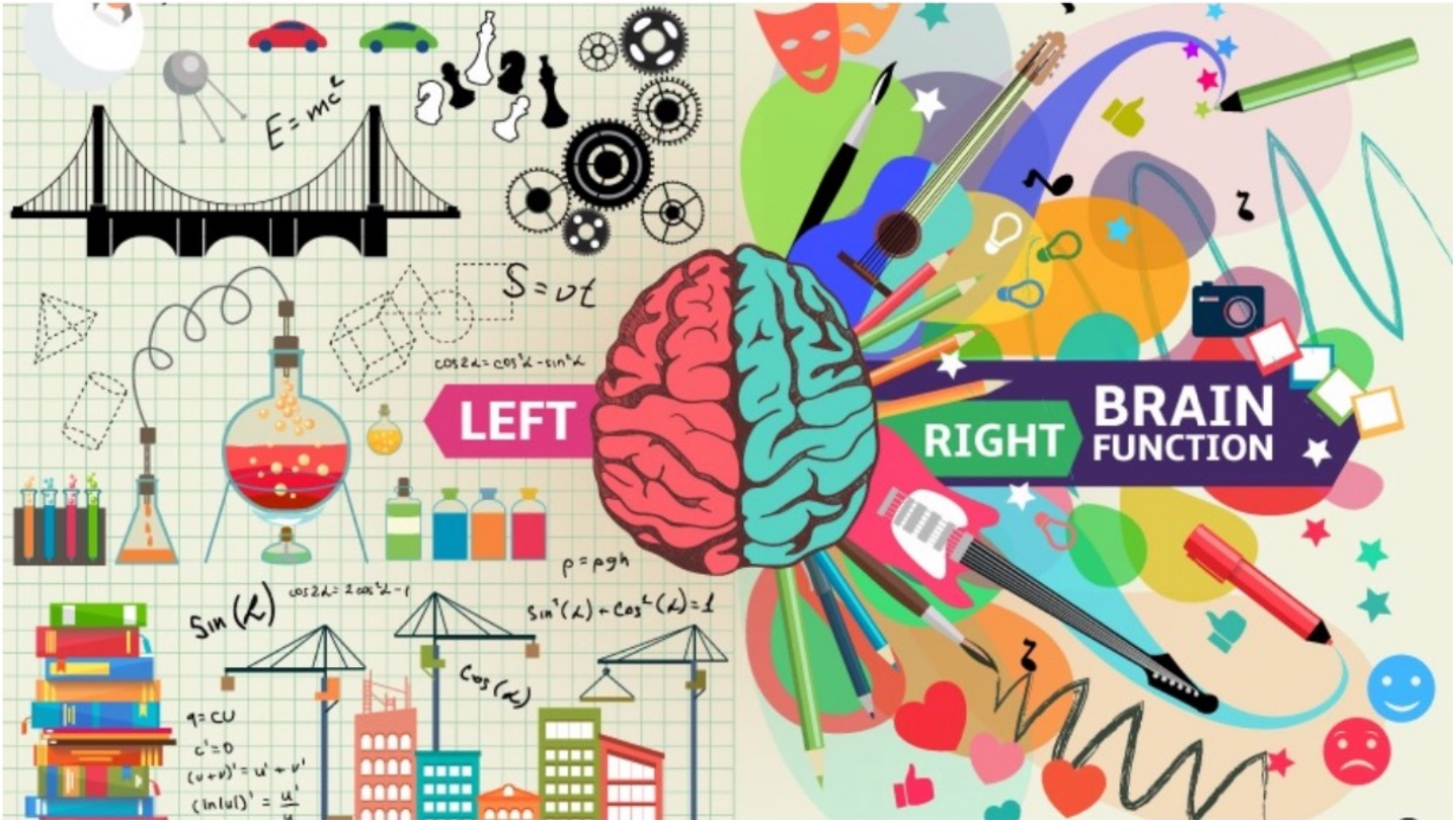
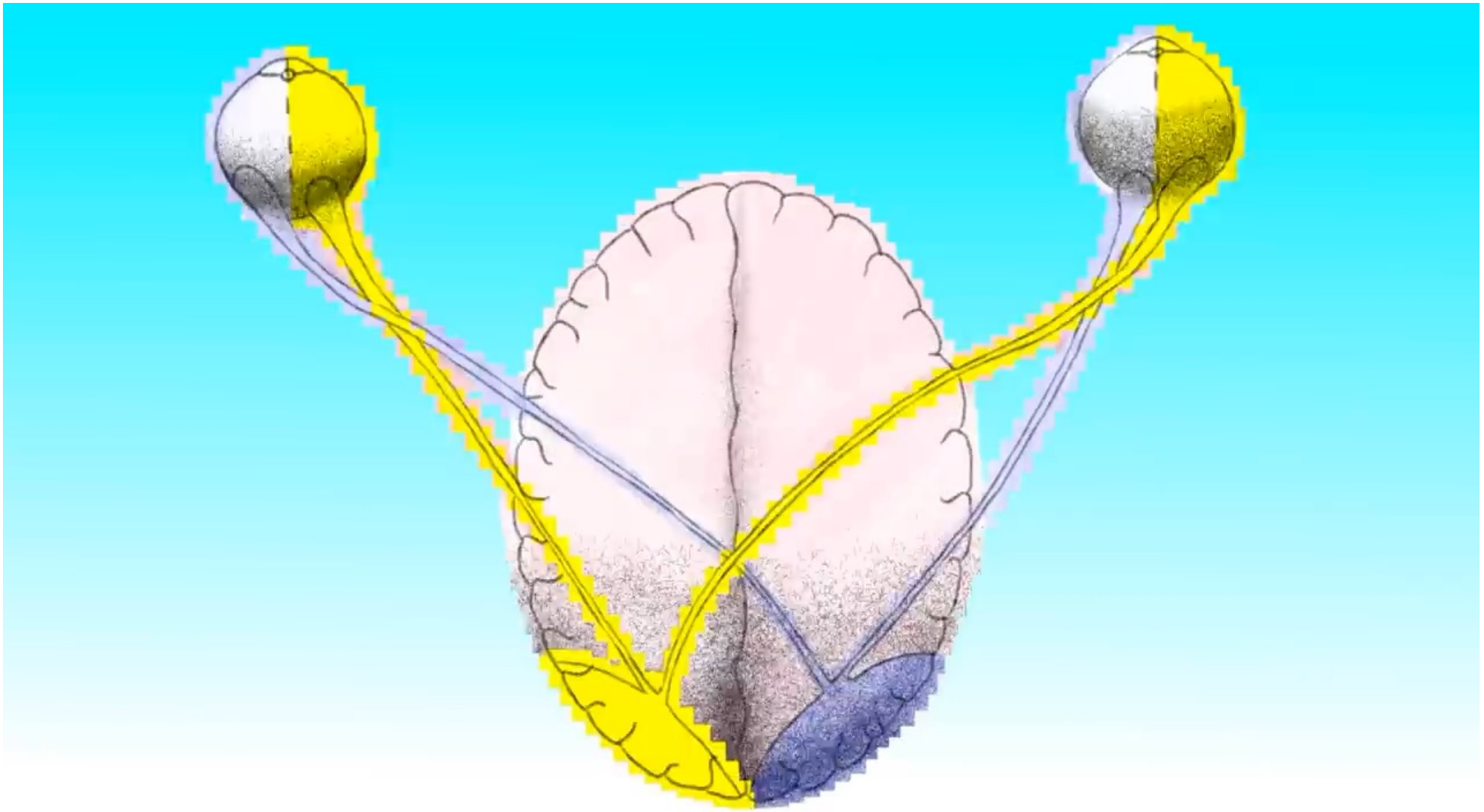
[Adapted from Data Analytics for Designers by Tak Yeon Lee]

The Left Brain vs. Right Brain Myth

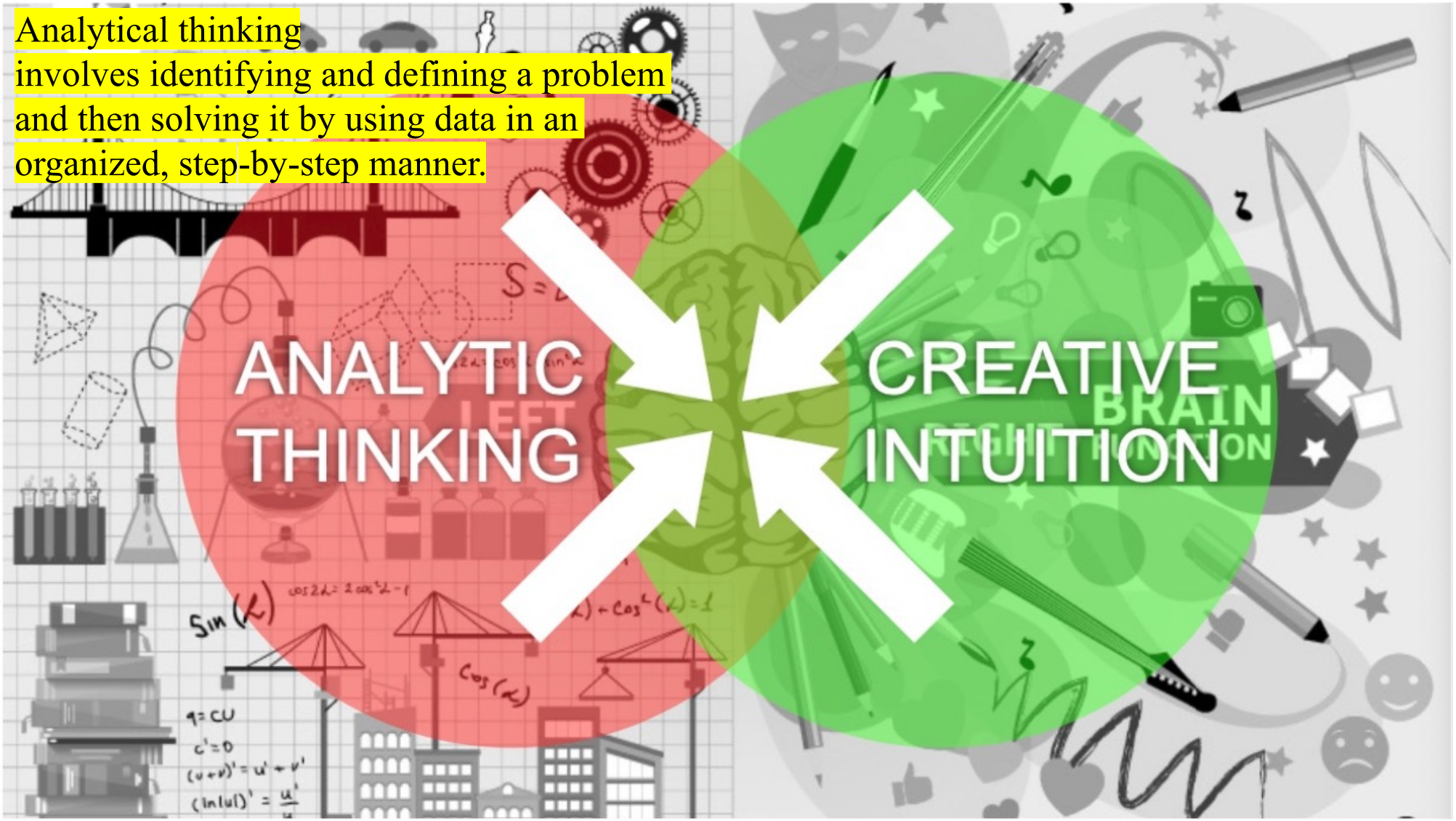


The Left Brain vs. Right Brain Myth



Both sides of the brain are needed!

Analytical thinking involves identifying and defining a problem and then solving it by using data in an organized, step-by-step manner.



Five essential aspects of analytical skills

- **Curiosity:** a desire to know more about something, asking the right questions
- **Understanding context:** understanding where information fits into the "big picture"
- **Having a technical mindset:** breaking big things into smaller steps
- **Data design:** thinking about how to organize data and information
- **Data strategy:** thinking about the people, processes, and tools used in data analysis

Why Analytic Thinking is important for designers?

- Analytic thinking gives designers new business opportunities
  - Digital Transformation has created a lot data-centric businesses.
  - Analytic Thinking is a good way for designers to find new opportunities.
    - For instance, designers equipped with AT skills can design and build their own conversational agents, recommendation systems, and other AI-powered services.
  - In addition, data literacy (a basic AT skill) is the key to communicate with engineers and business experts

- Analytic thinking help designers improve creative intuition
  - While being a strong asset of designers, creative intuition could be biased or fixated based on prior knowledge.
  - Analytic thinking is one of the best ways to test and fix biases in designer's creative intuition.

Why Creative Intuition is important for data analytics

- Knowing what the data is telling / not telling us
- Knowing where the look next
- Knowing when to stop looking and take action
- Knowing who needs to hear and how to get through to them
- Knowing why any of it matters in the first place

While analytic thinking is hands-on tactical skills,
Intuition helps us make **high-level strategic decisions**

Common Patterns of Design + Analytics

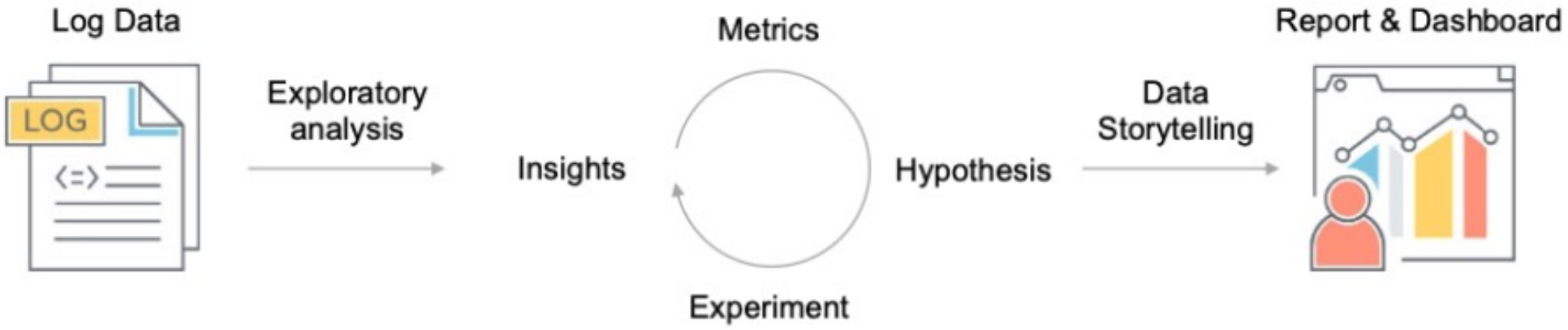
- Log Analysis beyond off-the-shelf tools
- Designing the entire data pipeline
- Before and After AI Modeling

Log Analysis beyond off-the-shelf tools

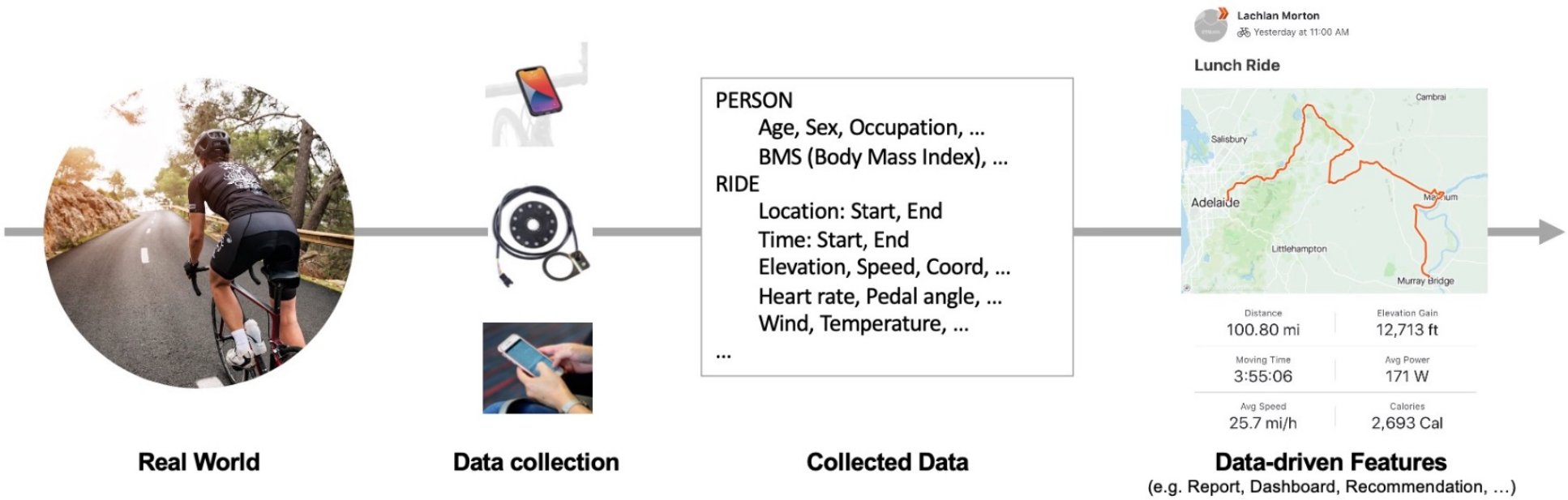
- Log analysis is a common method to understand user behavior from.

- While off-the-shelf analytic tools allows to get basic insights, designers want much more:
  - (1) Exploratory analysis,
  - (2) Gain insights via custom metrics and experiments at scale, and
  - (3) Data storytelling.

- As results of log analysis, designers usually create reports or dashboard to be shared within the organizations.
  - Going further, insights gained from log analysis can guide designers toward intelligent data-driven services and features.

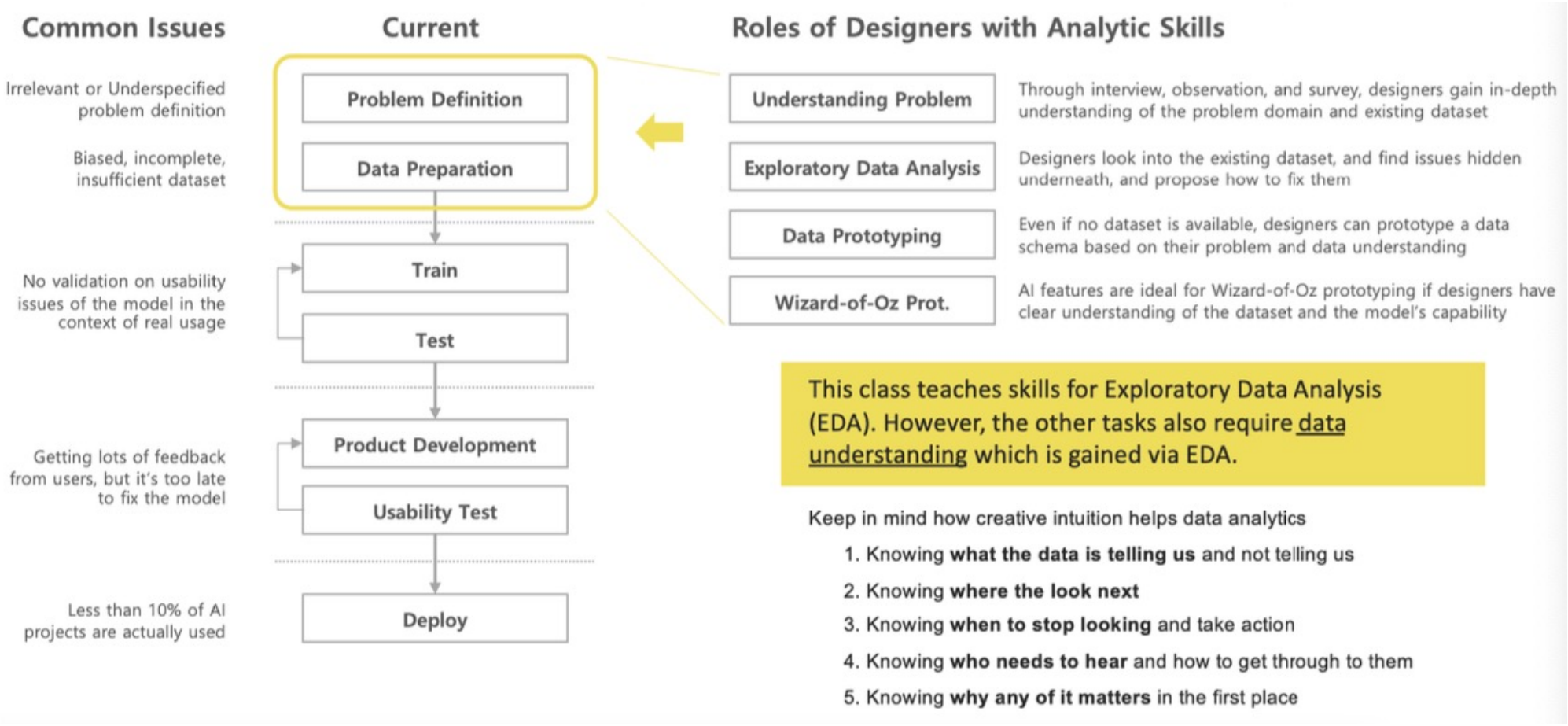


Designing the entire data pipeline

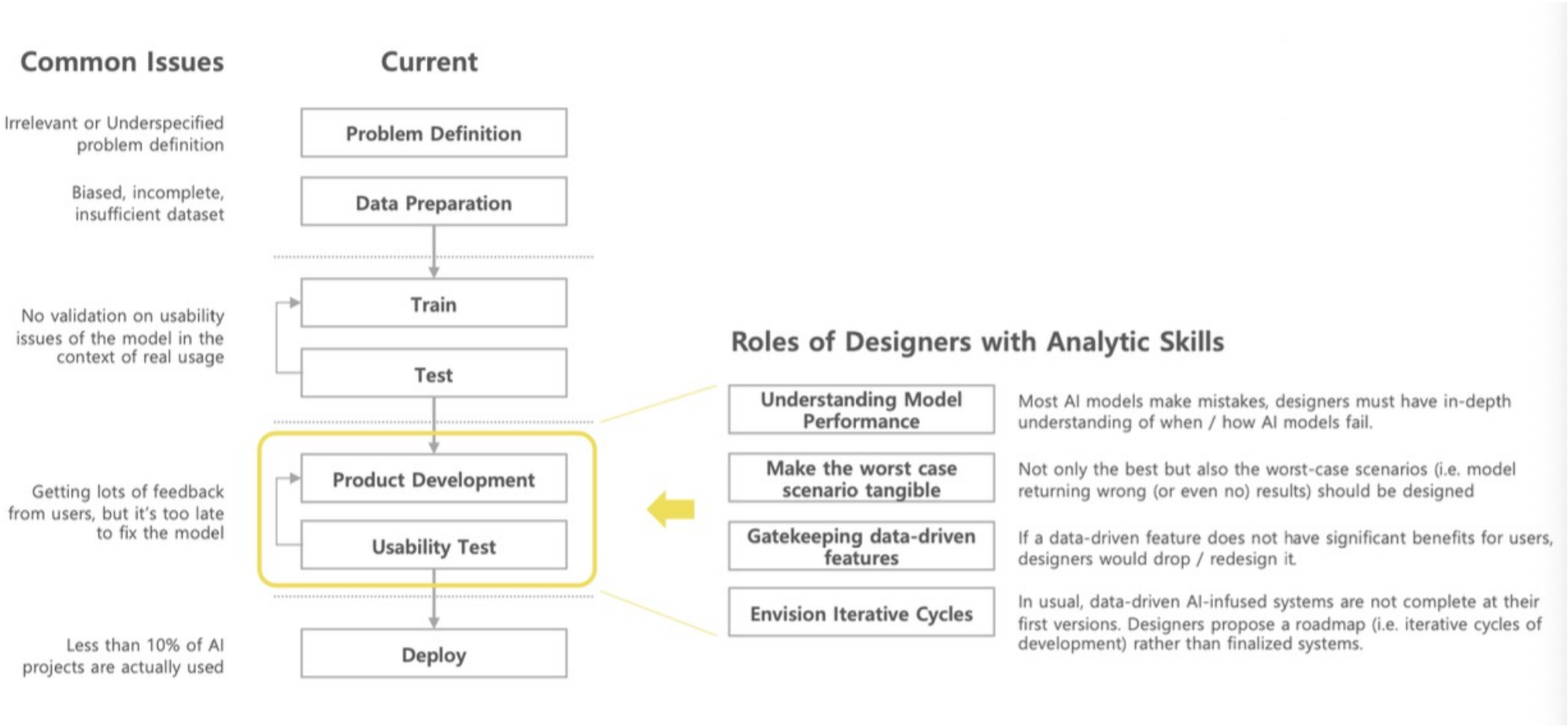


- Notice that the entire pipeline can be designed.
  - CASE 1. If the activity does not exist, designers must envision every step from scratch.
  - CASE 2. If there's a collected dataset, analysts would first examine collected data to develop data-driven features. If the dataset is not satisfactory, they would try different collection methods. If cyclists' behavior does not have signal of interest, they can even redesign cycling.
- Both cases require analytic thinking and creative intuition at the same time.

Before ~~and After~~ AI Modeling



~~Before and~~ After AI Modeling



The Importance of Context

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[Adapted from Storytelling with Data by Cole Nussbaumer Knaflic]

6 basic problem types

- Making predictions
- Categorizing things
- Spotting something unusual
- Identifying themes
- Discovering connections
- Finding patterns

Who, What, and How

- ***To whom are you communicating?***
  - It is important to have a good understanding of who your audience is and how they perceive you. This can help you to **identify common ground** that will help you ensure they hear your message.

- ***What do you want your audience to know or do?***
  - You should be clear how you want your audience to act and take into account how you will communicate to them and the overall tone that you want to set for your communication.

- ***How can you use data to help make your point?***
  - It's **only after** you can concisely answer these first two questions that you're ready to move forward with the third.

Who: Your audience

- **The more specific you can be about who your audience is, the better position you will be in for successful communication.**
  - *Avoid general audiences*, such as "internal and external stakeholders" or "anyone who might be interested"—by trying to communicate to too many different people with disparate needs at once, you put yourself in a position where you can't communicate to any one of them as effectively as you could if you narrowed your target audience.
  - Sometimes this means *creating different communications for different audiences*.
- **Identifying the decision maker** is one way of narrowing your audience.
  - The more you know about your audience, the better positioned you'll be to understand how to resonate with them and form a communication that will meet their needs and yours.

Who: You

- It's also helpful to **think about the relationship that you have with your audience** and **how you expect that they will perceive you**.
  - *Will you be encountering each other for the first time through this communication?*
  - *Do you have an established relationship?*
  - *Do they already trust you as an expert, or do you need to work to establish credibility?*

- These are important considerations when it comes to determining how to structure your communication and whether and when to use data, and may impact the order and flow of the overall story

What are your top tips for creating better visual presentations?

What: Action

- ***What do you need your audience to know or do?***
  - This is the point where you think through how to make what you communicate **relevant** for your audience and form a clear understanding of why they should care about what you say.
  - You should always want your audience to know or do something. If you can't concisely articulate that, you should revisit whether you need to communicate in the first place

~~The audience knows better than the presenter and therefore should choose whether and how to act on the information presented.~~

This assumption is false. If you are the one analyzing and communicating the data, you likely know it best—you are a subject matter expert.

When it really isn't appropriate to recommend an action explicitly, encourage discussion toward one.

Suggesting possible next steps can be a great way to get the conversation going because it gives your audience something to react to rather than starting with a blank slate.

Prompting action

Here are some action words to help act as thought starters as you determine what you are asking of your audience:

accept | agree | begin | believe | change | collaborate | commence | create | defend | desire | differentiate | do | empathize | empower | encourage | engage | establish | examine | facilitate | familiarize | form | implement | include | influence | invest | invigorate | know | learn | like | persuade | plan | promote | pursue | recommend | receive | remember | report | respond | secure | support | simplify | start | try | understand | validate

What: Mechanism

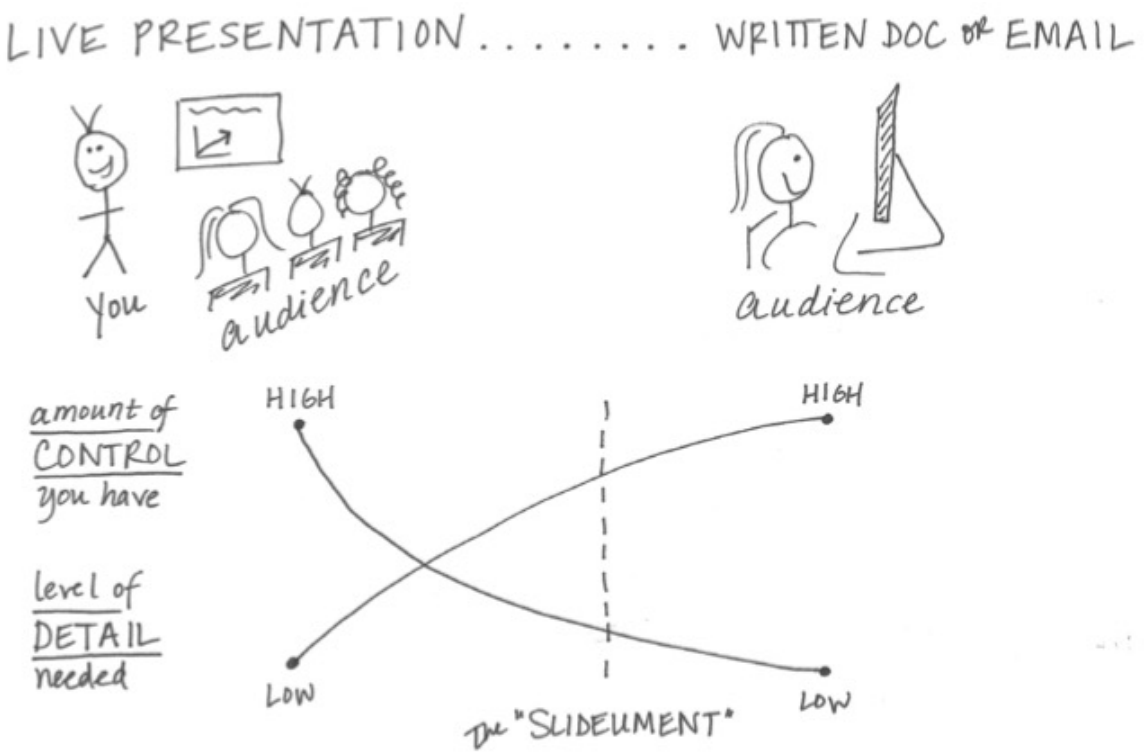
- ***How will you communicate to your audience?***
  - The method you will use to communicate to your audience has implications on a number of factors, including the amount of control you will have over how the audience takes in the information and the level of detail that needs to be explicit.
  - We can think of the communication mechanism along a continuum, with live presentation at the left and a written document or email at the right

For live presentations, practice makes perfect

Do not use your slides as your teleprompter! If you find yourself reading each slide out loud during a presentation, you are using them as one. This creates a painful audience experience. You have to know your content to give a good presentation and this means practice, practice, and more practice! Keep your slides sparse, and only put things on them that help reinforce what you will say. Your slides can remind you of the next topic, but shouldn't act as your speaking notes.

Here are a few tips for getting comfortable with your material as you prepare for your presentation:

- Write out speaking notes with the important points you want to make with each slide.
- Practice what you want to say out loud to yourself: this ignites a different part of the brain to help you remember your talking points. It also forces you to articulate the transitions between slides that sometimes trip up presenters.
- Give a mock presentation to a friend or colleague.



What: Tone

- ***What tone do you want your communication to set?***
  - Another important consideration is the tone you want your communication to convey to your audience.
  - Are you celebrating a success? Trying to light a fire to drive action? Is the topic lighthearted or serious?
  - The tone you desire for your communication will have implications on the design choices.
  - For now, think about and specify the general tone that you want to establish when you set out on the data visualization path.

How

- … **only after** we can clearly articulate *who our audience is* and *what we need them to know or do*—we can turn to the data and ask the question

- *What data is available that will help make my point?*
  - Data becomes supporting evidence of the story you will build and tell.

Ignore the nonsupporting data?

You might assume that showing only the data that backs up your point and ignoring the rest will make for a stronger case. I do not recommend this. Beyond being misleading by painting a one-sided story, this is very risky. A discerning audience will poke holes in a story that doesn't hold up or data that shows one aspect but ignores the rest. The right amount of context and supporting and opposing data will vary depending on the situation, the level of trust you have with your audience, and other factors.

Let's consider a specific example

- **Imagine you are a fourth-grade science teacher.**
- You just wrapped up an experimental pilot summer learning program on science that was aimed at giving kids exposure to the unpopular subject.
- You surveyed the children at the onset and end of the program to understand whether and how perceptions toward science changed.
- You believe the data shows a great success story.
- You would like to continue to offer the summer learning program on science going forward.

Please identify the *Who*, *What*, and *How*

- *who we have identified as our audience,*
- *what we need them to know and do, and*
- *the data that will help us make our case*

Identify the *Who*, *What*, and *How*

- **Who**: The budget committee that can approve funding for continuation of the summer learning program.

- **What**: The summer learning program on science was a success; please approve budget of $X to continue.

- **How**: Illustrate success with data collected through the survey conducted before and after the pilot program.

The *Who*, *What*, and *How* identified

- *who we have identified as our audience,*
- *what we need them to know and do, and*
- *the data that will help us make our case*

Questions to ask [for context]

- *What background information is relevant or essential?*
- *Who is the audience or decision maker? What do we know about them?*
- *What biases does our audience have that might make them supportive of or resistant to our message?*
- *What data is available that would strengthen our case? Is our audience familiar with this data, or is it new?*
- *Where are the risks: what factors could weaken our case and do we need to proactively address them?*
- *What would a successful outcome look like?*

- ***If you only had a limited amount of time or a single sentence to tell your audience what they need to know, what would you say?***

In-Class Exercise

- Each student think of a question that you would like to know more about, and write it down on a piece of paper, in a single sentence

- Draw one from the question lists and analyze the following

- *Who we have identified as our audience,*
- *What we need them to know and do, and*
- *The data that will help us make our case*

Craft effective questions

- SMART methodology
  - Specific — does the question address the problem? Does it have a context?
  - Measurable — does it give the answer that can be measured?
  - Action-oriented — will the info that we get help us devise an action plan?
  - Relevant — is it about a particular problem we are trying to solve?
  - Time-bounded — are the answers relevant to the specific time being studied?

Example of SMART questions

- What features do people look for when buying a new car?
  - Specific: Does the question focus on a particular car feature?
  - Measurable: Does the question include a feature rating system?
  - Action-oriented: Does the question influence creation of different or new feature packages?
  - Relevant: Does the question identify which features make or break a potential car purchase?
  - Time-bound: Does the question validate data on the most popular features from the last three years?

Thank you~

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