



# Fondamenti di Analisi dei Dati

from **data analysis** to **predictive techniques**

Prof. Antonino Furnari ([antonino.furnari@unict.it](mailto:antonino.furnari@unict.it))

Corso di Studi in Informatica

Dip. di Matematica e Informatica

Università di Catania



Università  
di Catania

## Guide to Final Presentations

Principles derived from "Storytelling with Data" by Cole Nussbaumer Knaflic and "Made to Stick" by Chip Heath & Dan Heath

# The Rules of the Game: Time Management Matters

Time management is not just a logistical concern—it's a core component of your evaluation. Respecting the allocated time demonstrates professionalism, preparation, and respect for your audience. Each format requires a different strategic approach to content delivery.

## Trios (3 People)

**15 min** presentation + **10 min** Q&A

**Focus:** Seamless coordination and smooth transitions between speakers

## Duos (2 People)

**12 min** presentation + **5 min** Q&A

**Focus:** Maintaining rhythm and balanced contribution from both members

## Solos (1 Person)

**8 min** presentation + **5 min** Q&A

**Focus:** Extreme synthesis and lightning-fast delivery of core insights

# Why Time Limits Exist

## Professional Reality

In the real world, data scientists must communicate complex findings to busy stakeholders who have limited attention spans. Your ability to distill months of work into minutes is a critical professional skill.

Executives don't have time for 45-minute deep dives. They need the insight, the evidence, and the recommendation—fast.

## Cognitive Load Management

Research shows that audience attention peaks in the first 8-10 minutes of a presentation. After that, engagement drops significantly. By enforcing tight time constraints, we're training you to maximize impact during the window of peak attention.

Every minute must earn its place in your narrative.



## The Philosophy: "Made to Stick"

Don't present a dry list of procedures and methodologies. Instead, tell the story of a **discovery**. Your audience won't remember your preprocessing steps or your hyperparameter tuning process. They will remember the moment you revealed an unexpected insight that changes how they think about the problem.

Great presentations stick in the mind long after the slides disappear. To achieve this, we adapt the SUCCES framework from "Made to Stick" specifically for data science presentations.

# The SUCCES Framework for Data Storytelling



## Simple

One central, powerful idea. Not five. Not three. One. What is the single most important thing your audience should remember?



## Unexpected

Begin with data that breaks expectations. Don't start with "Hi, I'm Alex and I'm in the Marketing team." Start with "Did you know 87% of our customers churn for a reason we never suspected?"



## Concrete

Use real examples, not abstractions. Instead of "improved model performance," say "we can now predict equipment failure 48 hours in advance, potentially saving \$2.3M annually."



## Credible

Support your claims with specific metrics. Cite your error rates (RMSE, F1-score, AUC). Reference your data sources. Show why your findings should be trusted.



## Emotional

Data isn't just numbers—it represents real people, real problems, real opportunities. Connect your findings to human impact whenever possible.



## Story

Structure your presentation as a narrative journey: what we expected to find, what we actually discovered, and what it means going forward.

# The Universal Template: 4-Step Structure

Every effective data science presentation—regardless of topic—follows this proven narrative arc. This structure has been battle-tested across thousands of presentations in industry and academia.



## The Hook

A provocative question or shocking statistic. Never a boring agenda slide listing team members.



## The Context

What's the problem? Why do these data matter? Maximum 1-2 slides.



## The Analysis

The heart of your presentation. Only show visualizations that directly support your thesis.



## The Resolution

Conclusions, actionable recommendations, and clear next steps.



# Step 1: The Hook—Grab Attention Immediately

## Examples of Strong Hooks:

- **The Provocative Question:** "What if I told you our best customers are actually our least profitable?"
- **The Shocking Number:** "We analyzed 2.3 million transactions and found one pattern that explains 76% of customer churn."
- **The Contradiction:** "Everyone assumed price was the main factor. We proved it's the least important variable."
- **The Personal Story:** "Three months ago, I couldn't explain why our model kept failing. Then I discovered something hidden in the data..."

**Pro Tip:** Your hook should create a knowledge gap—a puzzle that your presentation will solve. This gap creates curiosity and keeps your audience engaged throughout.

# Step 2: The Context—Frame the Problem

## What to Include:

- **The Business Problem:** What real-world challenge does this project address?
- **Why It Matters:** What's at stake? Revenue loss? Customer satisfaction? Operational efficiency?
- **Data Overview:** Brief mention of your dataset size, sources, and timeframe
- **Your Approach:** One sentence summarizing your methodology

## What to Skip:

- Lengthy literature reviews
- Detailed data collection procedures
- Team member introductions
- Generic statements about "the importance of data science"



**Remember:** Context should take no more than 2 slides. Get to your insights quickly—that's what your audience cares about.



# Step 3: The Analysis—Show Only What Matters

## The Golden Rule of Data Visualization

Every chart must answer a specific question or prove a specific point. If you can't articulate why a visualization is essential to your narrative, cut it. Your audience doesn't need to see every exploratory plot you created—they need to see the evidence that supports your conclusion.

### Strategic Selection Criteria:

#### **Does this chart reveal an unexpected pattern?**

Surprise creates memorability. Show what challenged your assumptions.

#### **Does this visualization support your main thesis?**

If it's interesting but tangential, save it for the appendix.

#### **Can a non-expert understand it in 5 seconds?**

If not, either simplify the chart or provide more context.

# Step 4: The Resolution—Land the Plane

1

## **Restate Your Core Finding**

Circle back to your hook. Answer the question you posed at the beginning. Close the loop on your narrative.

2

## **Provide Actionable Recommendations**

Don't just say "our model works." Tell your audience what to **do** with this information. Specific, concrete actions.

3

## **Acknowledge Limitations**

Every analysis has constraints. Briefly mention them to demonstrate intellectual honesty and forestall obvious questions.

4

## **Outline Next Steps**

What would you do if you had another month? What additional data would you want? What's the logical extension of this work?

# Visual Design: The Art of Decluttering

Visual clutter is the enemy of comprehension. Every unnecessary element on your slide competes for cognitive resources, making it harder for your audience to grasp your point. Cole Nussbaumer Knaflic's principle is simple: **remove everything that doesn't add value.**

Your job isn't to show how much work you did. Your job is to make your insights impossible to miss.



Before

After

# Decluttering Principles: Before & After

## ✗ Avoid: Chart Clutter

- 3D bar charts that distort perception
- Grid backgrounds that add visual noise
- External legends that force eye-jumping
- Multiple competing colors with no clear hierarchy
- Unnecessary decimal precision (2.847% vs 3%)
- Chart titles that just label ("Sales Over Time") instead of explaining ("Sales Dropped 40% in Q3")

## ✓ Prefer: Strategic Focus

- Direct labels on the chart itself
- One accent color to highlight the key data point (everything else in gray)
- Titles that tell the story: "Customer Churn Spiked After Price Increase"
- Removal of grid lines unless absolutely necessary
- White space to let the data breathe
- Annotations that guide the viewer's eye to the insight

# The Power of Preattentive Attributes

Your brain processes certain visual attributes—like color, size, and position—before conscious thought. This is called **preattentive processing**, and it happens in less than 500 milliseconds. Strategic designers use these attributes to guide attention instantly.



## Color for Emphasis

Use one bold color (like **red**) for the data point that matters most. Everything else should be muted gray.



## Size for Hierarchy

Make your key number or chart dramatically larger than supporting details. Size = importance.



## Position for Flow

Western audiences read left-to-right, top-to-bottom. Put your conclusion in the top-left where eyes naturally land first.



# Strategic Advice: Groups vs. Solos

The dynamics of group presentations differ fundamentally from solo performances. Each format has unique challenges and opportunities. Understanding these differences is crucial to maximizing your team's impact.

# For Groups: Appear as One Unified Entity

## Rehearse Transitions Obsessively

The handoff between speakers should be smooth and purposeful. Use bridging language: "Now that we've seen the problem, Maria will show you how we solved it." Avoid awkward silences or overlapping speech.

## Divide Content by Expertise, Not Equality

Don't split slides 5-5-5 just to be fair. Person A might excel at context-setting, Person B at technical explanation, Person C at business implications. Play to strengths.

## Maintain Visual Consistency

Use the same slide template, color scheme, and font sizes throughout. The audience shouldn't be able to tell where one person's work ends and another's begins.

## Avoid the "Frankenstein Effect"

When each person designs their own slides in isolation, the presentation feels disjointed—like parts stitched together. Review the entire deck as a team and unify the narrative arc.

# For Solos: Master the Lightning Talk

## You Have 8 Minutes. Make Every Second Count.

Solo presenters must achieve what trios do in 15 minutes—but in nearly half the time. This isn't about speaking faster; it's about radical prioritization.

### What to Cut Immediately:

- Lengthy introductions about yourself or your background
- Theoretical frameworks or extensive literature review
- Step-by-step methodology walkthroughs
- Exploratory visualizations that don't support your main point
- Detailed discussions of limitations or future work

### What to Keep:

- The hook
- The problem
- Your key insight
- The implication
- One memorable visual that proves your point



**Remember:** In a lightning talk, synthesis beats quantity. One powerful insight, clearly explained, is worth more than five rushed findings.

# Common Presentation Mistakes to Avoid



## Text-Heavy Slides

If your slide requires the audience to read paragraphs of text, you've created a document, not a presentation. Slides should be visual anchors for your spoken words, not transcripts.



## Unexplained Jargon

Terms like "RMSE," "random forest," or "cross-validation" might be second nature to you, but not to everyone in your audience. Briefly explain technical terms the first time you use them.



## Overwhelming Visualizations

A scatter plot with 10,000 unlabeled points doesn't communicate anything. Aggregate, filter, or annotate your data to highlight the pattern you want viewers to see.



## Reading From Slides

If you're reading bullet points verbatim, why are you presenting? Your audience can read. Use slides as visual support while you tell the story in your own words.

# The Q&A Session: Preparation Strategies

The Q&A is not an afterthought—it's an opportunity to demonstrate deep understanding and handle challenges gracefully. Many presentations succeed or fail based on how well the presenter handles tough questions.

## Anticipate Questions

Before your presentation, brainstorm 10 questions your audience might ask. Prepare concise, confident responses. Have backup slides ready for technical details you cut from the main deck.

## Admit Uncertainty

If you don't know the answer, say so honestly: "That's a great question. I'd need to investigate further to give you a definitive answer." Never make up data or invent facts.

1

2

3

4

## Listen Fully

Don't interrupt or start formulating your answer while someone is still asking. Listen completely, then pause briefly to organize your thoughts before responding.

## Bridge to Strengths

If asked about a weakness in your approach, acknowledge it briefly, then pivot to what you *did* do well. "We didn't test for X, but we did validate Y extensively, which showed..."

# Final Checklist Before You Present

## Technical Readiness

- Test your presentation file on the actual equipment you'll use
- Have a backup copy on a USB drive and in the cloud
- Ensure all videos, animations, or embedded content work offline
- Check font compatibility (some custom fonts break on different computers)

## Content Clarity

- Can a friend who knows nothing about your project understand your main point after watching once?
- Does every slide serve a purpose, or are some just "filler"?
- Have you eliminated jargon where possible, and explained it where necessary?

## Timing Discipline

- Rehearse with a timer. Three times minimum.
- Build in 30-60 seconds of buffer for unexpected questions or technical issues
- Know which slides you can skip if you're running behind

## Visual Consistency

- Are all slides using the same template and color scheme?
- Are all fonts the same size and style across slides?
- Do all your charts have clear, descriptive titles?

# Questions?

"If your slide can only be understood by reading the text, it's wrong. If it can be understood by looking at the visual, it's perfect."

## Remember:

Your project represents weeks or months of hard work, complex analysis, and intellectual rigor. This presentation is your opportunity to distill that effort into a clear, compelling story that resonates with your audience.

Great data science isn't just about finding insights—it's about communicating them in ways that drive decisions and inspire action. This is your moment to demonstrate both technical excellence and communication mastery.