Academic Slide Design

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Northwest-Shoals Community College
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Agenda

Cognitive Load Theory — **5 min.**

Organization — **10 min.**

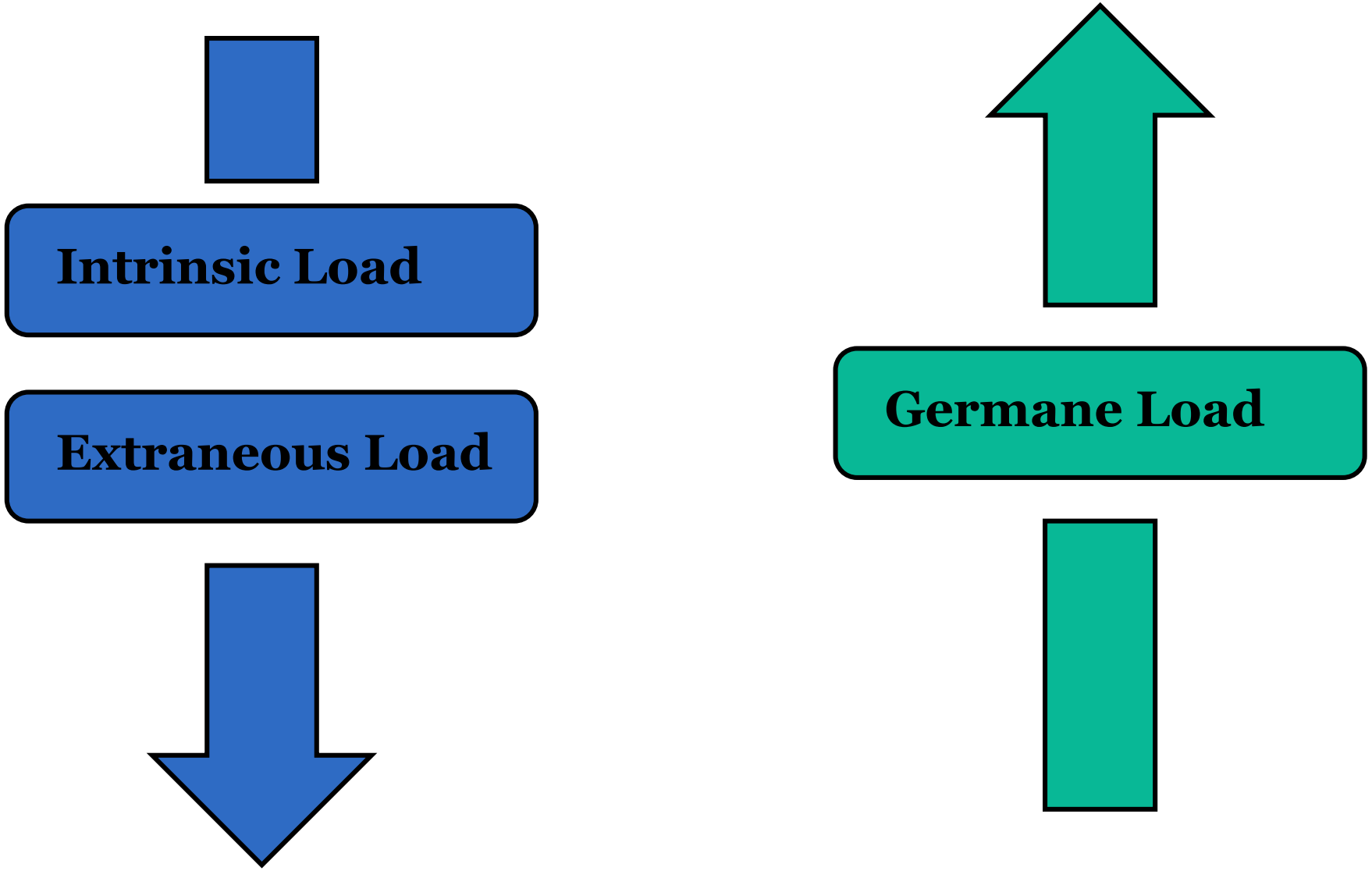
Preparation — **15 min.**

Academic Slide Design — **60 min.**

Cognitive Load Theory Overview

Cognitive load theory revolves around the ways in which humans **receive**, **process**, and **store** information.

Types of Cognitive Load



Processing Channels

Phonological Loop

Visio-Spatial Sketchpad

Processing Channels

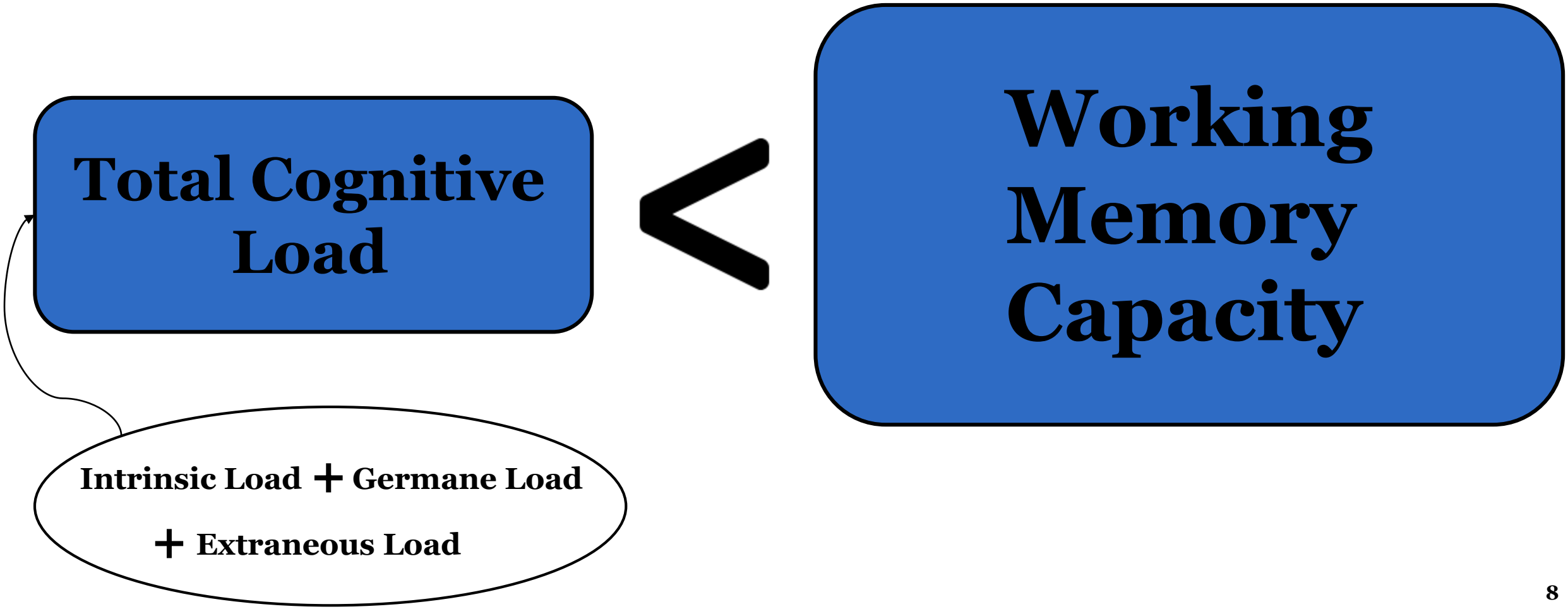
+

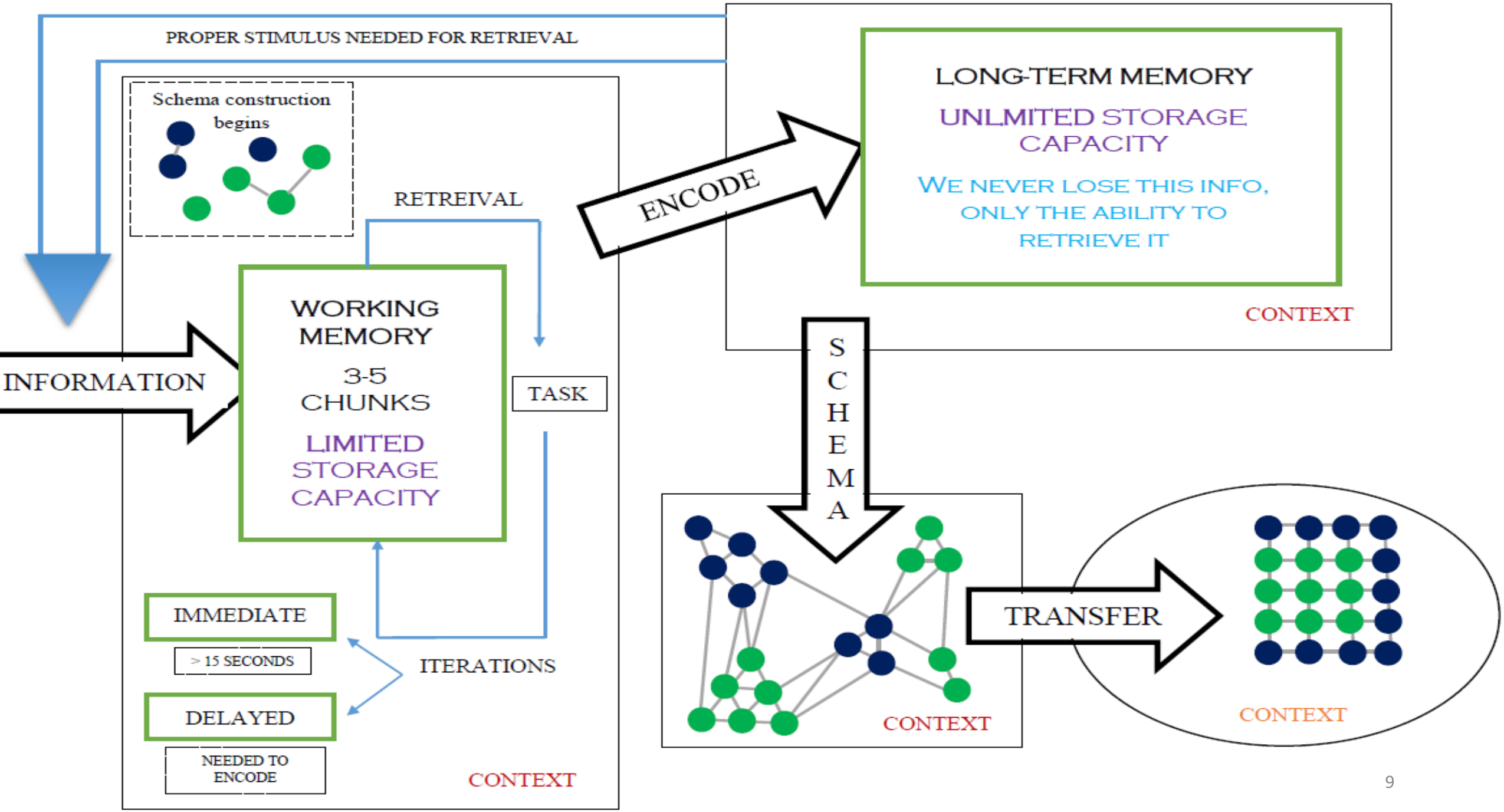
=

Working Memory

Limited capacity in storage and duration

Processing Channels

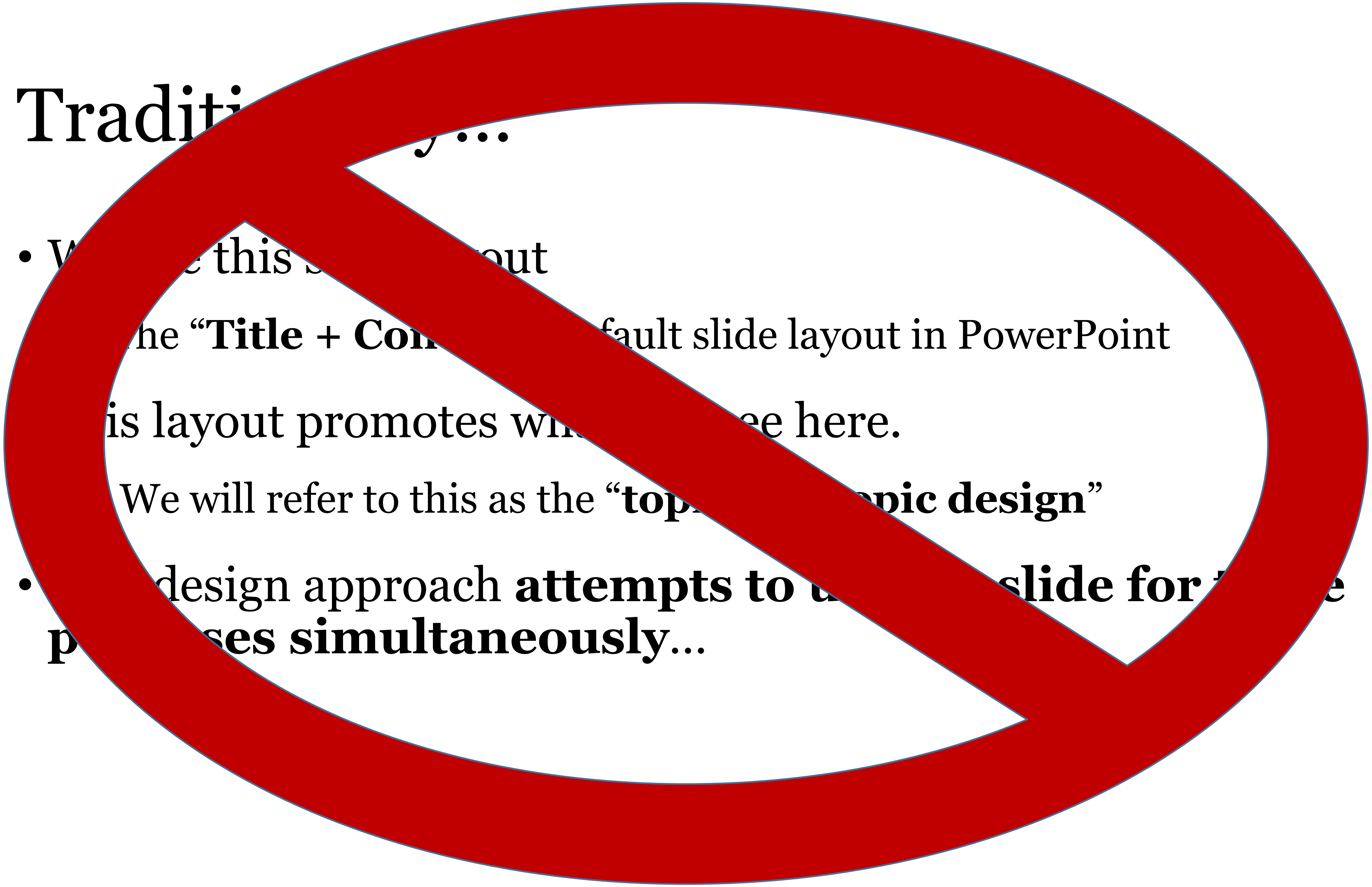



PROPER STIMULUS NEEDED FOR RETRIEVAL
Schema construction begins
RETREIVAL
ENCODE
LONG-TERM MEMORY
UNLMITED STORAGE CAPACITY
WE NEVER LOSE THIS INFO, ONLY THE ABILITY TO RETRIEVE IT
CONTEXT
INFORMATION
WORKING MEMORY
3-5 CHUNKS
LIMITED STORAGE CAPACITY
TASK
SCHEMA
IMMEDIATE
> 15 SECONDS
ITERATIONS
DELAYED
NEEDED TO ENCODE
CONTEXT
CONTEXT
TRANSFER
CONTEXT

Organization

If you want **different results** than what you're currently getting, you must try a **different approach**.

Traditi… y…



- W… e this s… out
  - …he “**Title + Con**… fault slide layout in PowerPoint
- …is layout promotes wh… ee here.
  - We will refer to this as the “**top**… **pic design**”
- … design approach **attempts to u**… **slide for t**… **e p**… **ses simultaneously**…

Topic sub-topic design uses slides as…

Visual Aids

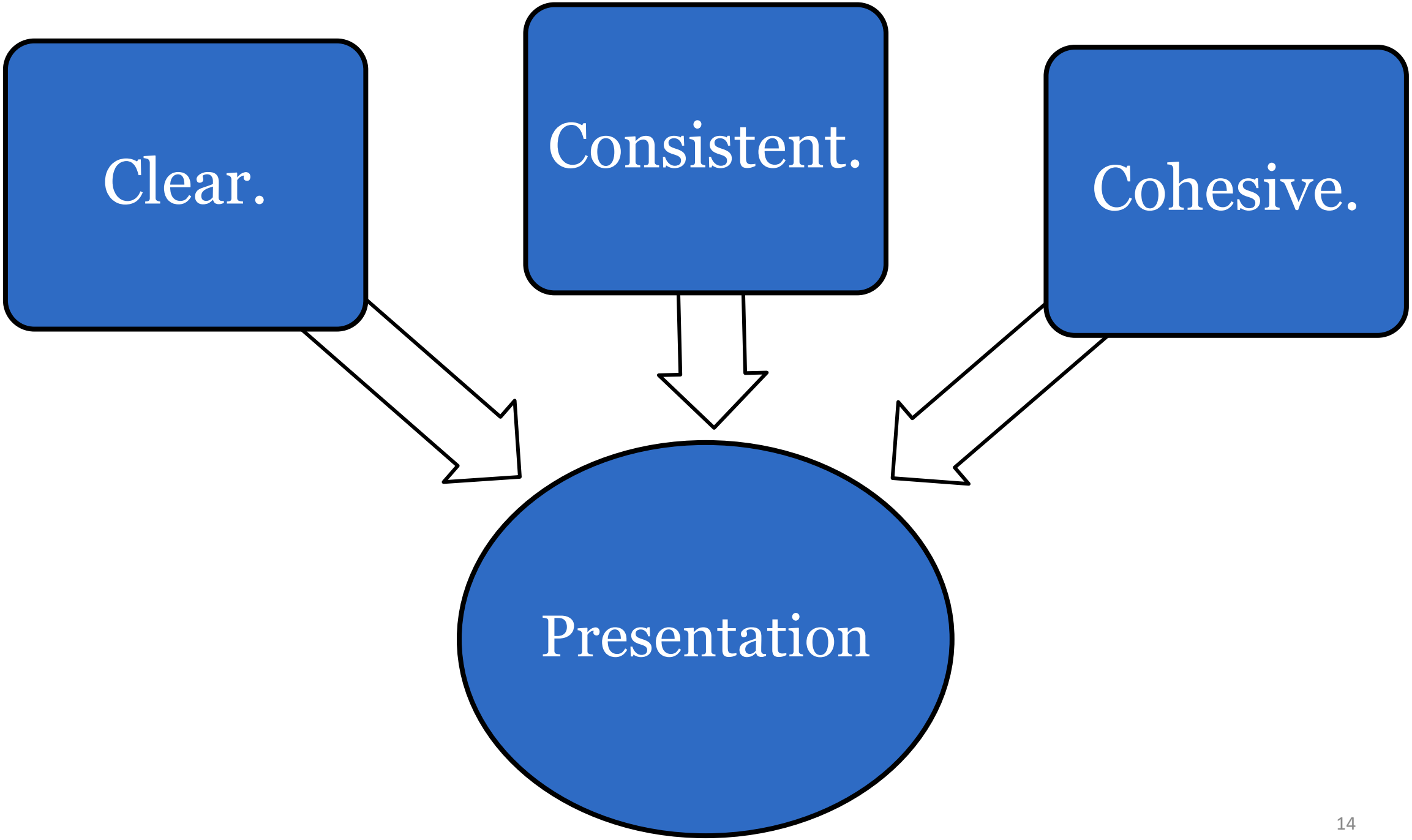
1

Speaker Notes

2

Handout

3

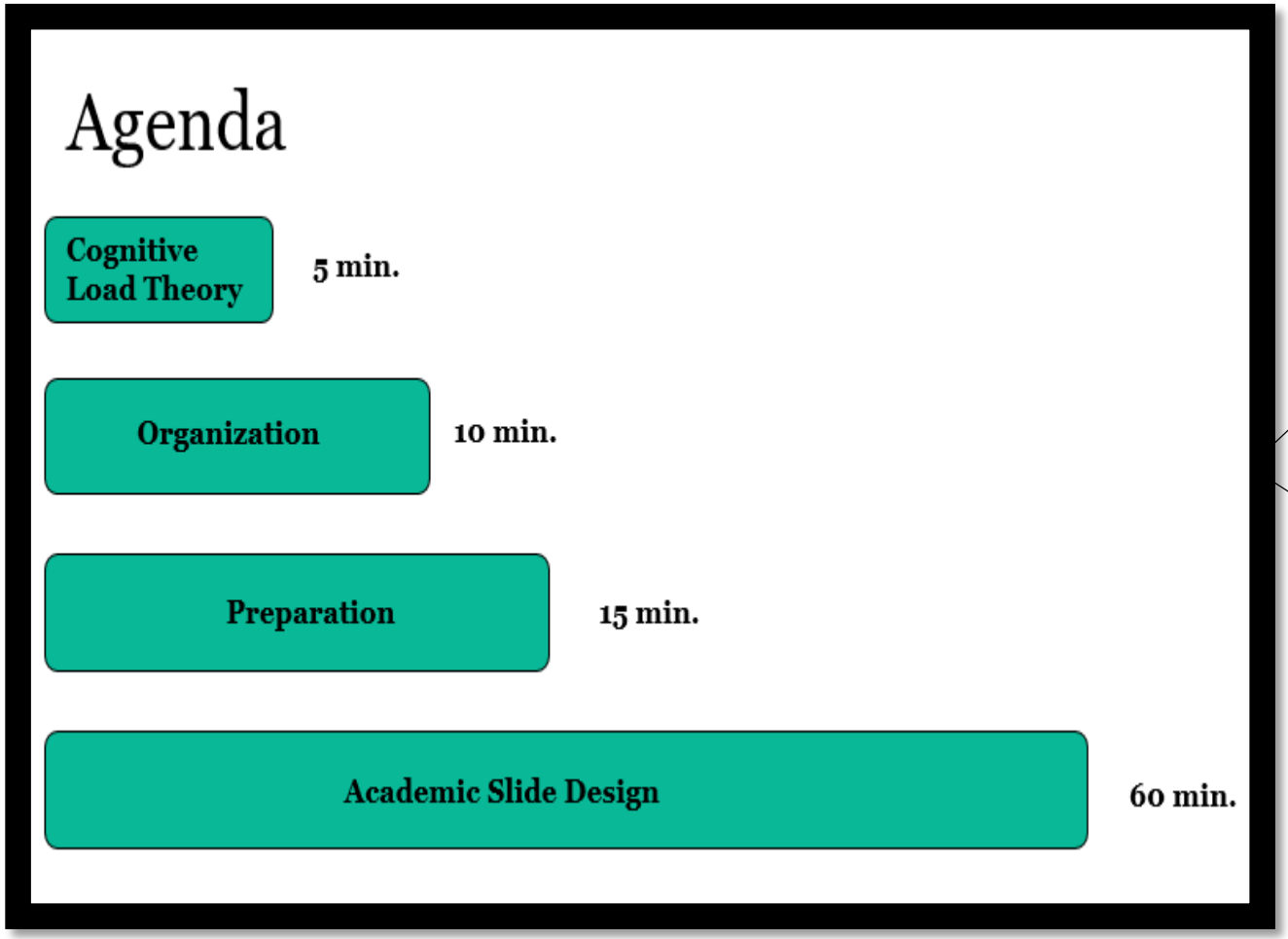

Clear.
Consistent.
Cohesive.
Presentation

Do you need a slide?

Fandrey (2018) suggests a slide is needed when it:

1. Provides a **visual means of organization** for forthcoming information
2. Helps students **locate where they are in the lecture** (**wayfinding**)
3. Shows a **concept**, **process**, **relationship**, or **idea** via a graph, chart, diagram, image, or other visuospatial treatment;
4. Maps **directly to the learning objectives** or outcomes of your talk—that is, you're showing something that really does **deserve to be powerfully pointed at**
5. Contributes to a climate of good **digital citizenry**

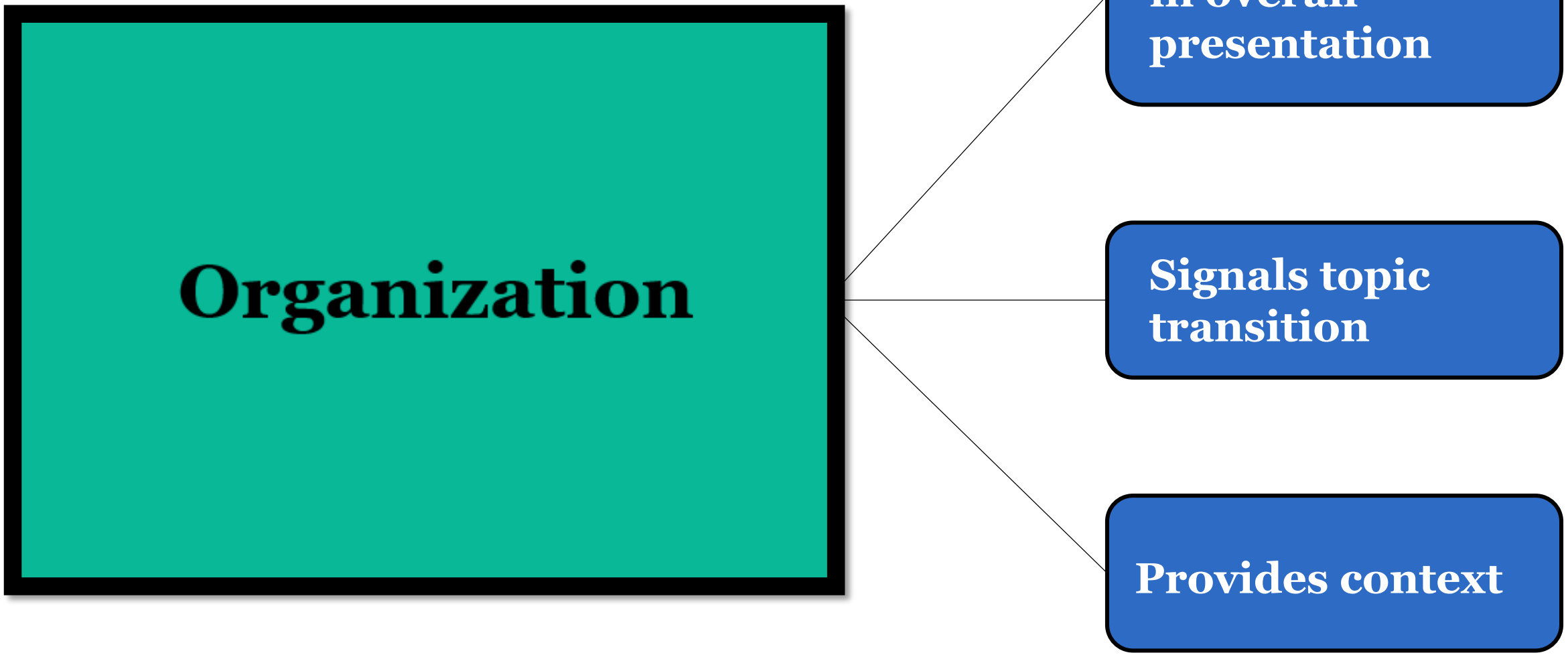
Preview Slide



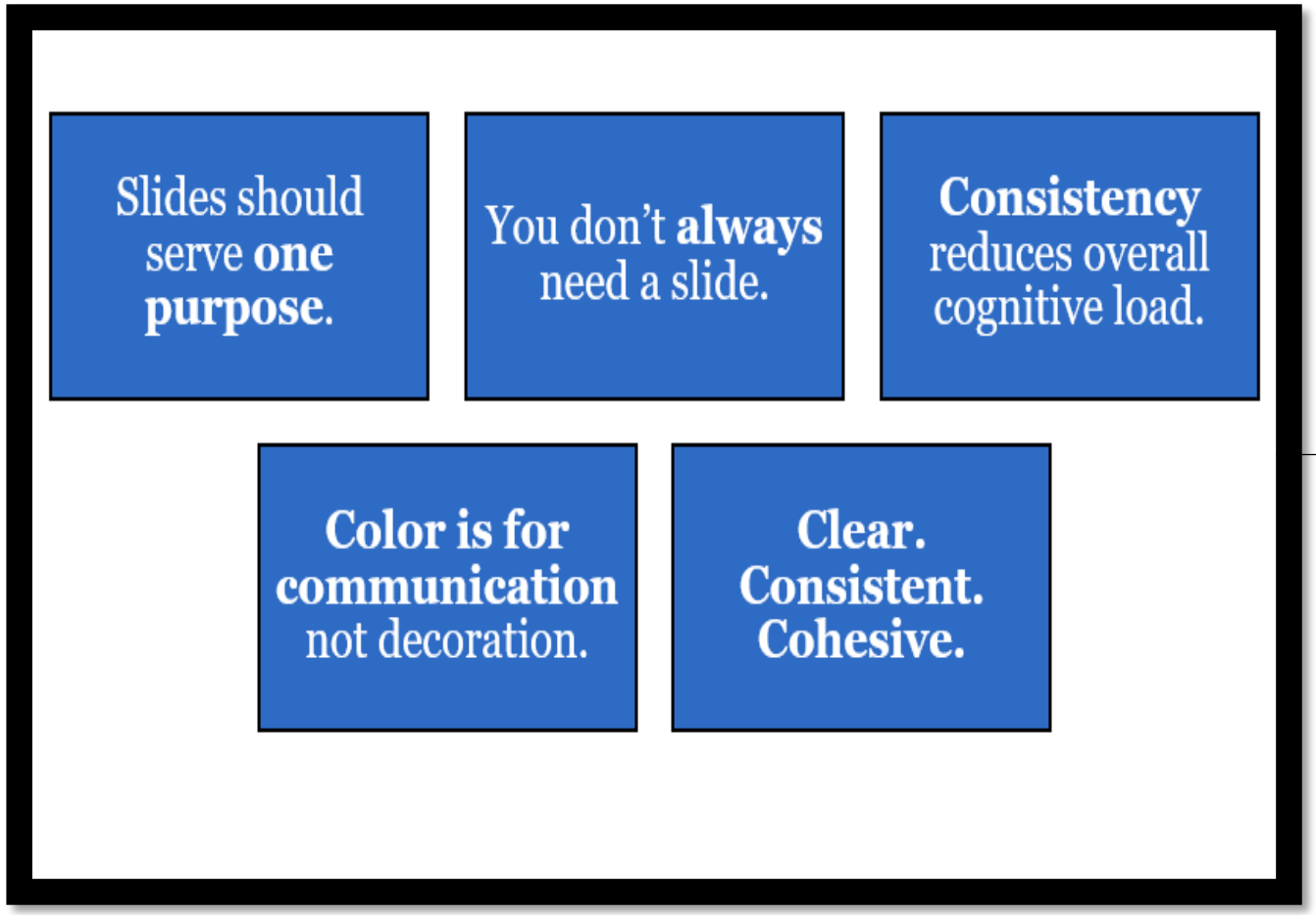
Provides snapshot of what's to come

Activates prior knowledge

Guidepost Slide



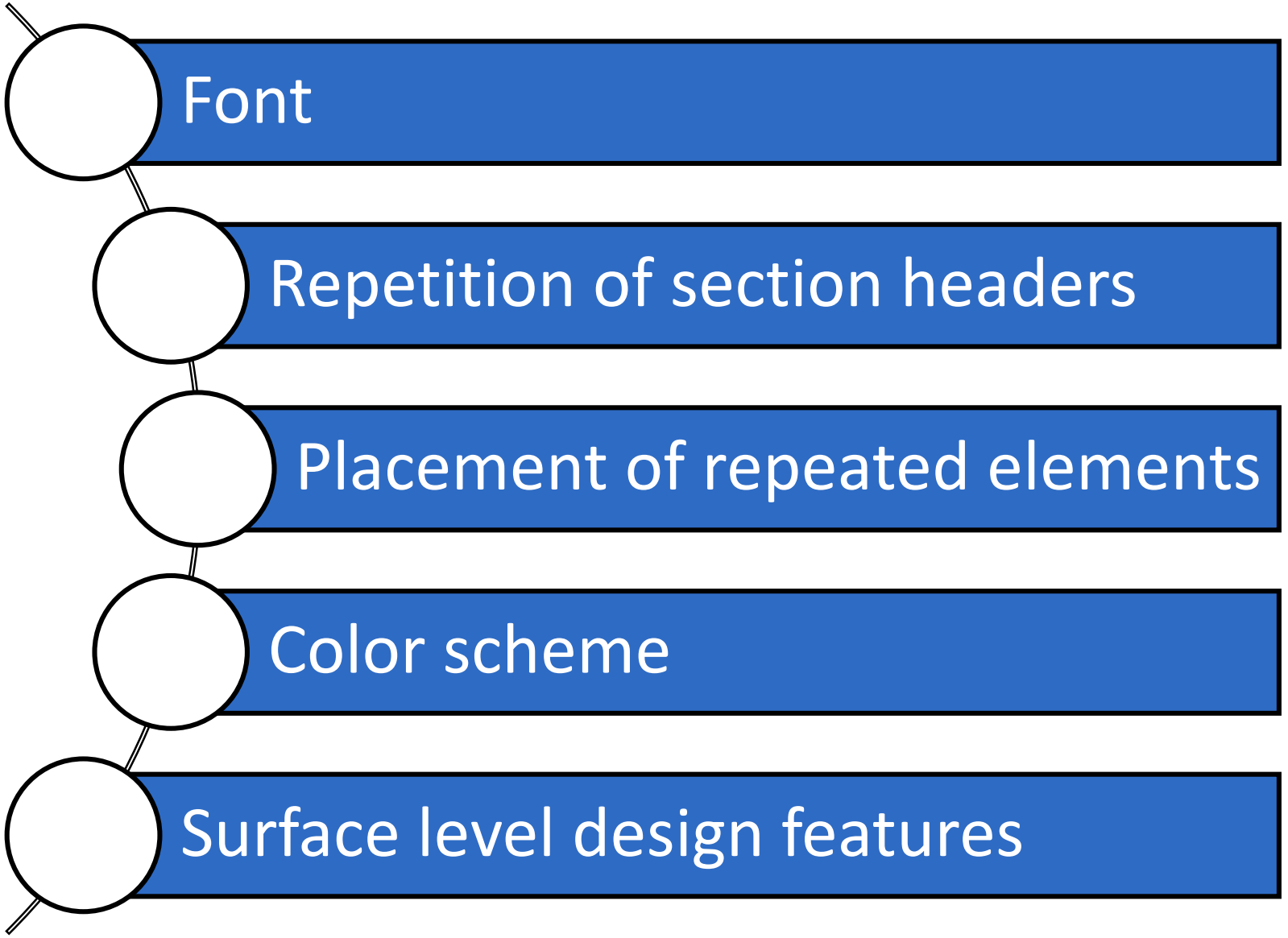
Recap Slide



Summarize and/or repeat main ideas

Consistency throughout the slide deck **makes wayfinding easier** for students and **reduces** the overall **cognitive load**.

Consistency

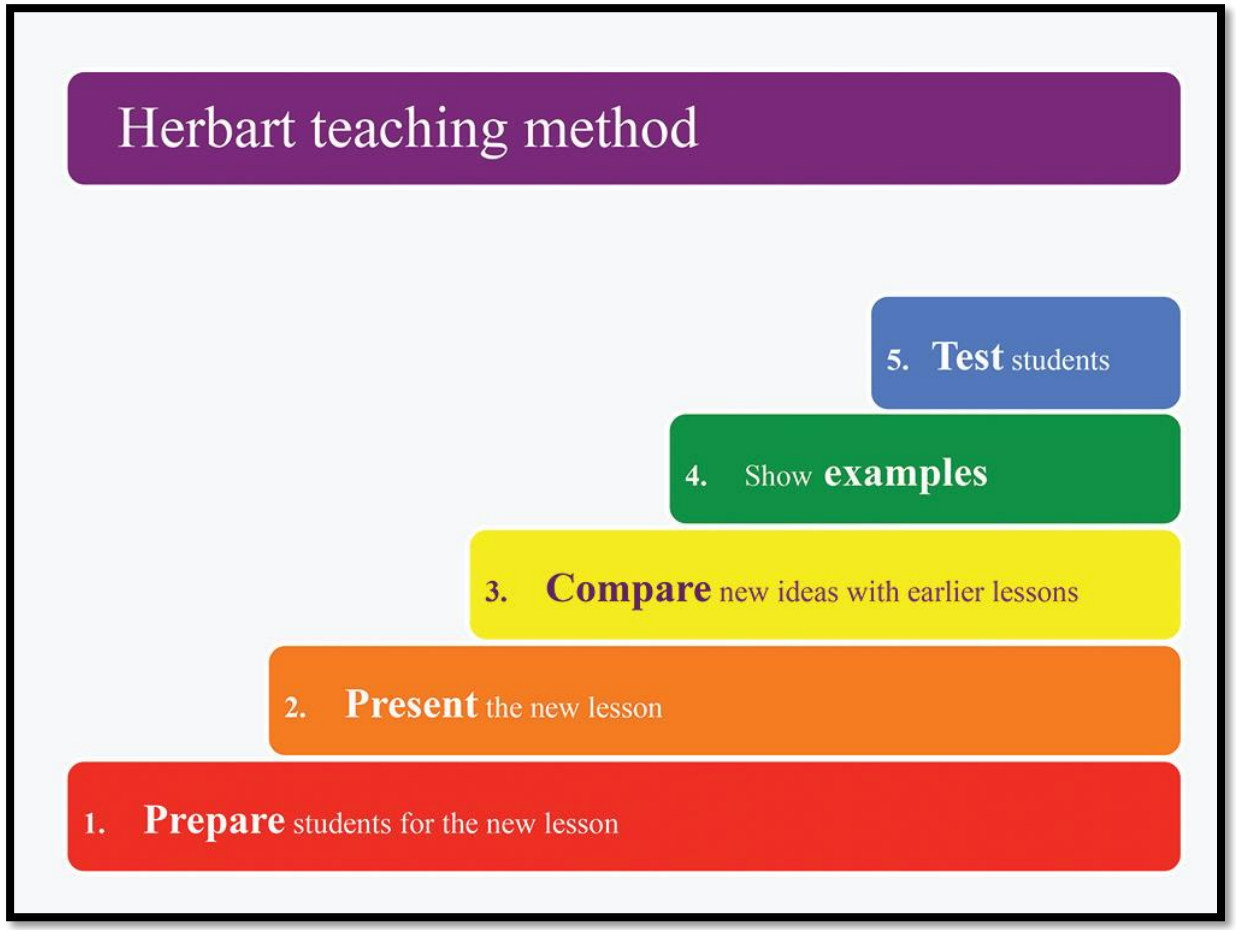


Using Color

Select **four colors** for a slide deck:

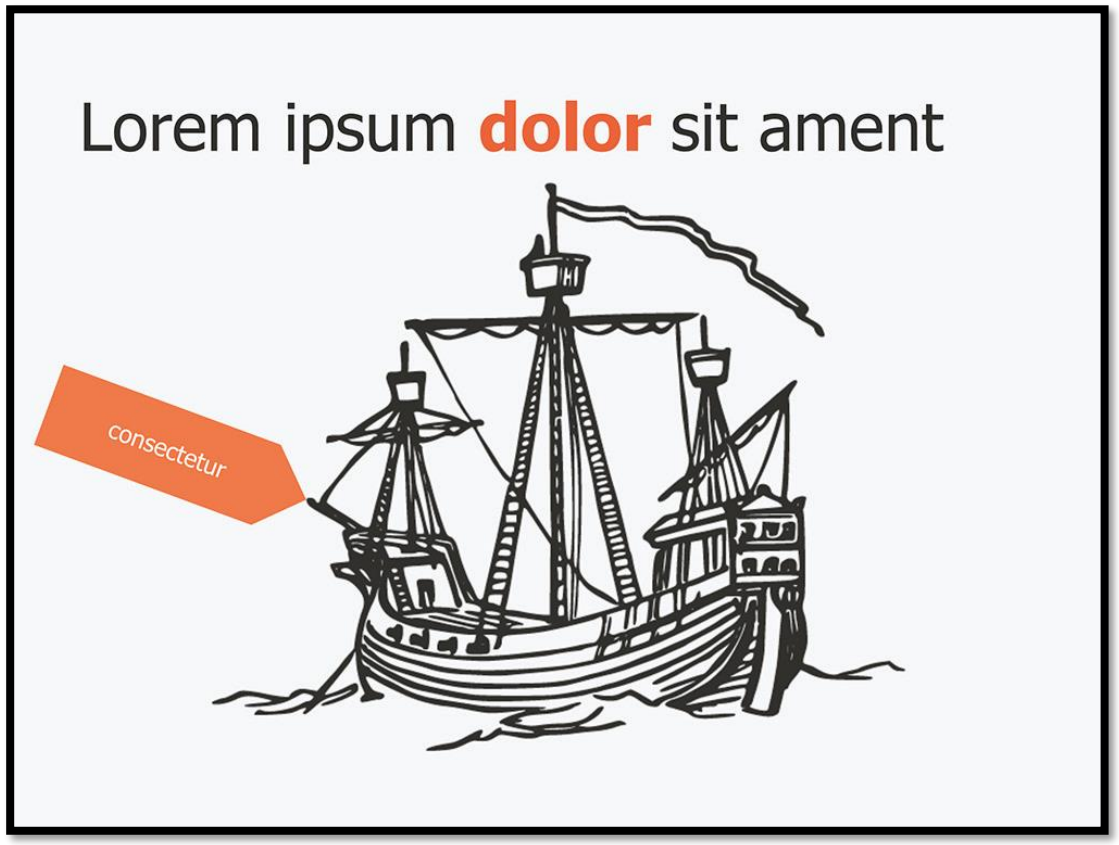
1. Background
2. Text
3. Emphasis color #1
4. Emphasis color #2

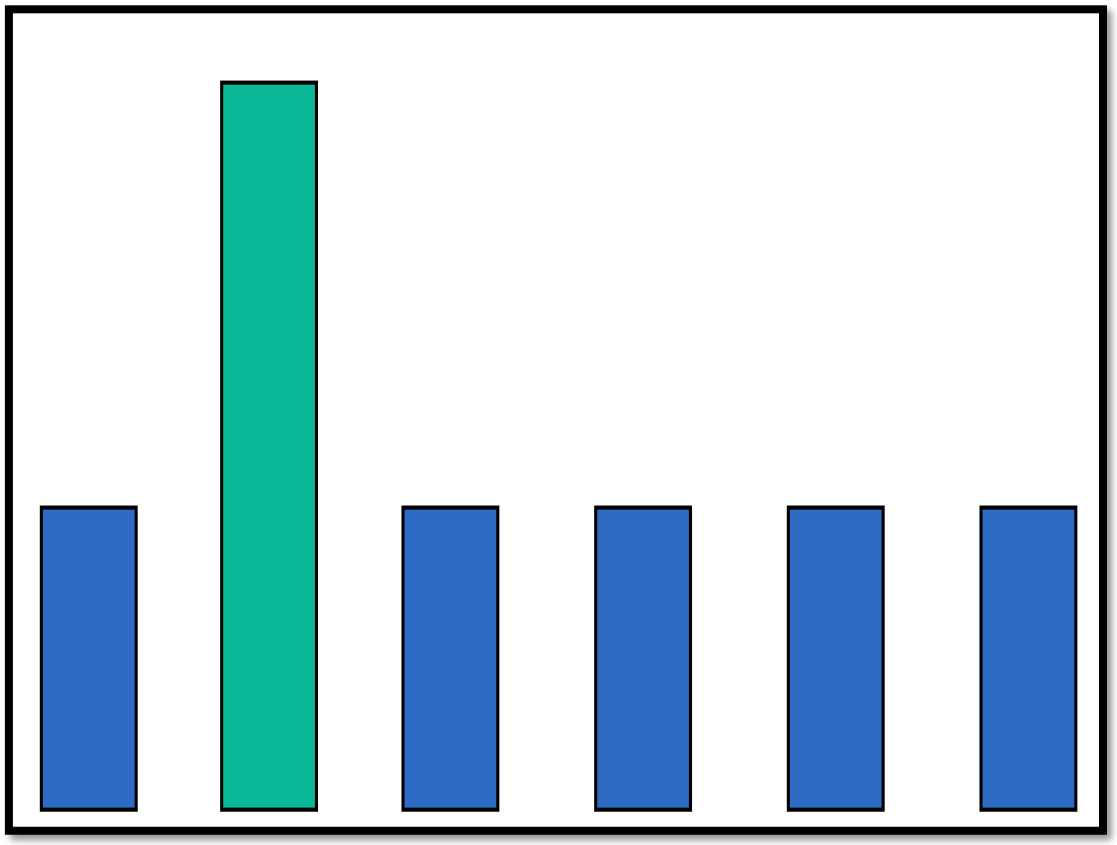
Color should be used as a **means of communication** and not decoration.



Fandrey (2018)

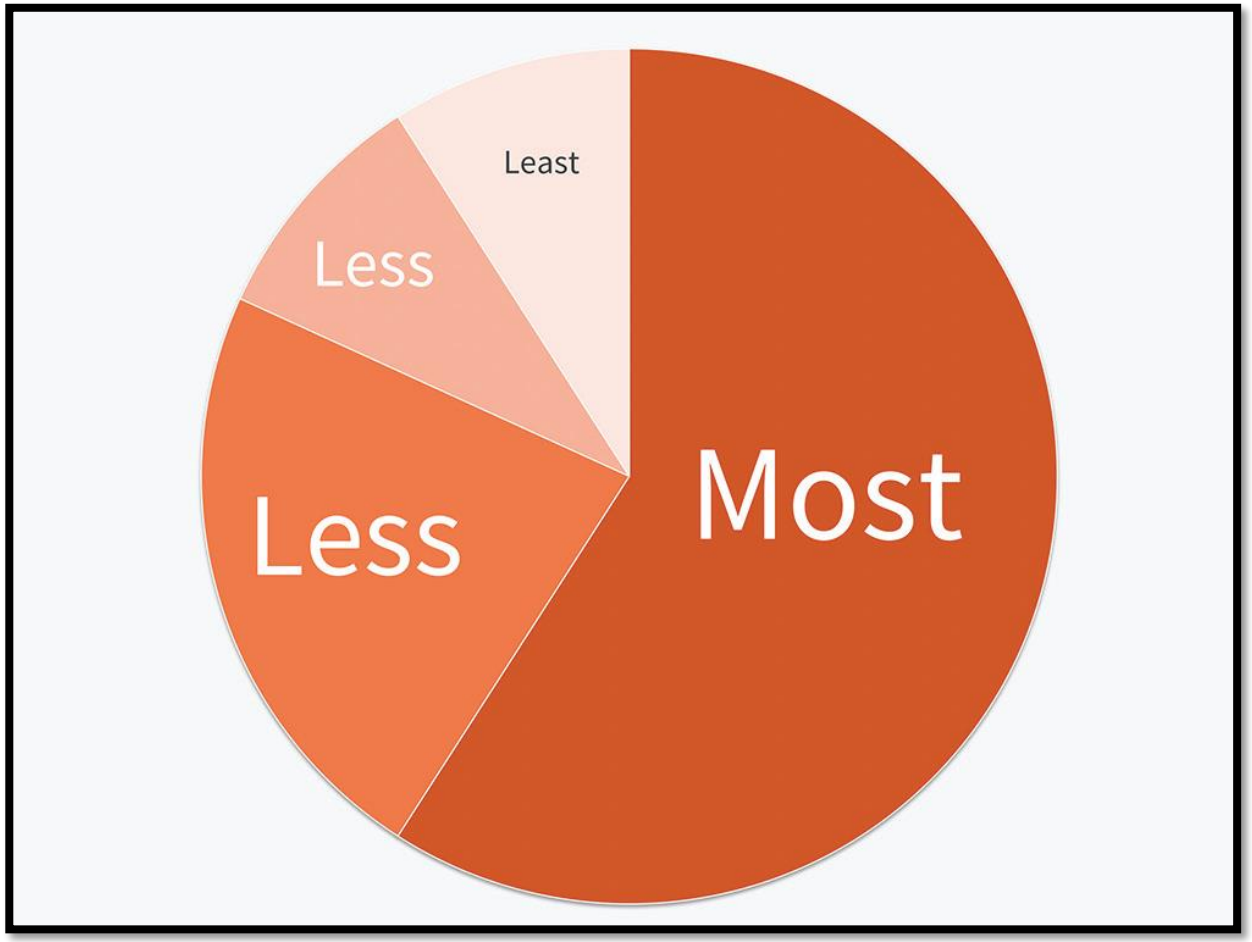
Use color to **call attention.**





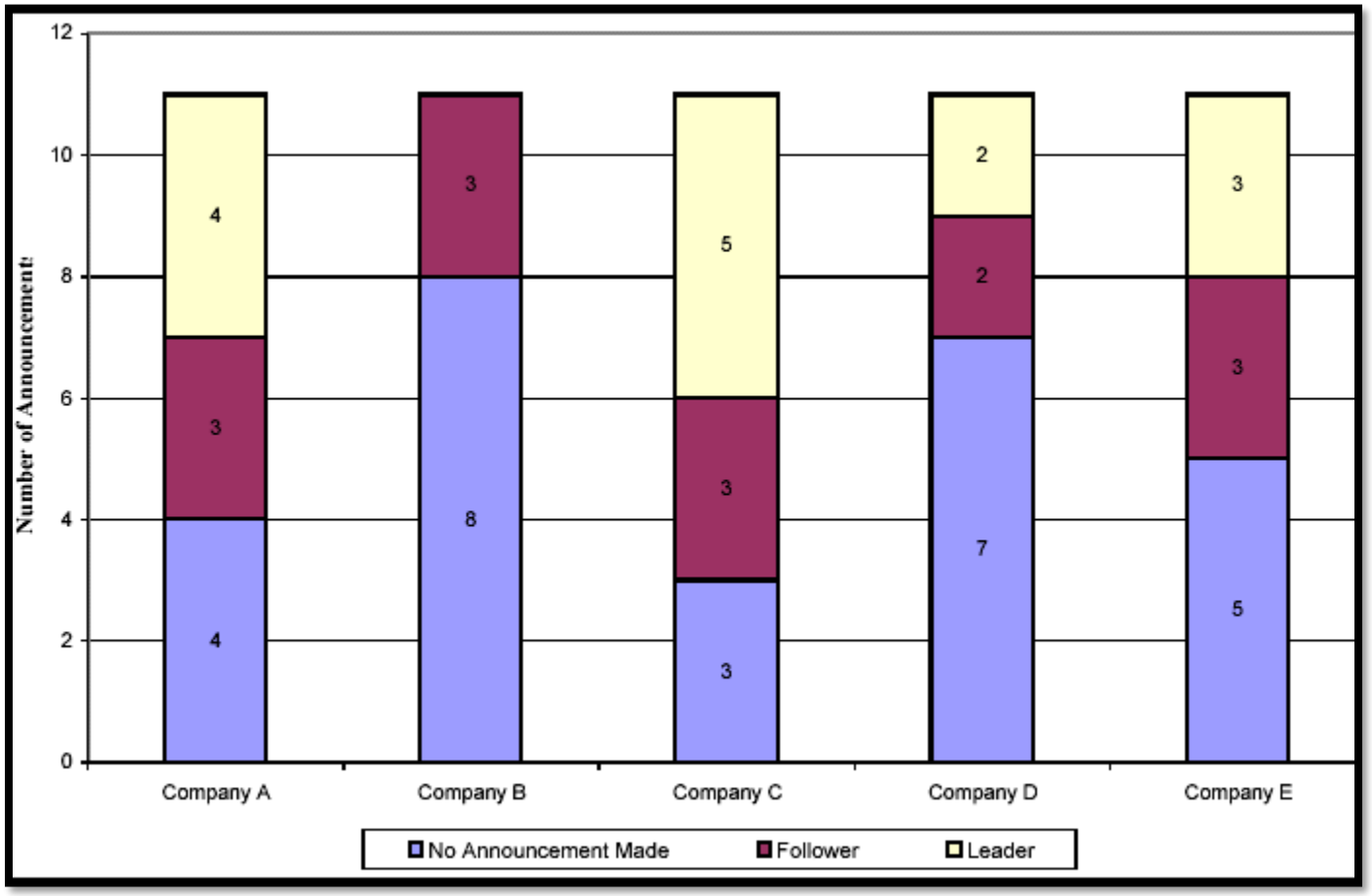
Fandrey (2018)

Use color to show **amount**, **quantity**, **severity**.

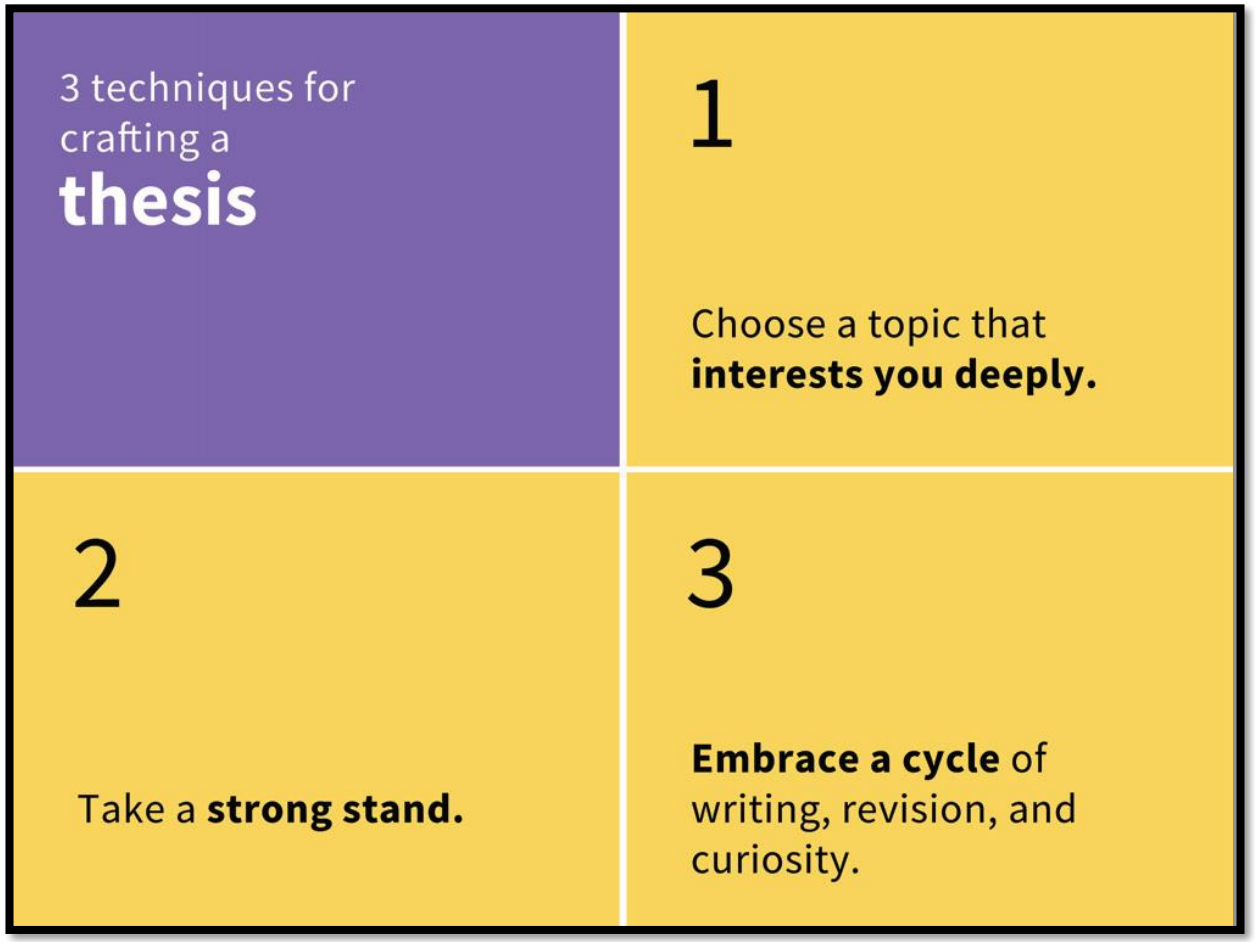


Fandrey (2018)

Use color to **differentiate sections** of a graph.



Use color to provide a **visual break**



Fandrey (2018)

Be **consistent** with surface level design features.

Fandrey (2018)

Slides should serve **one purpose**.

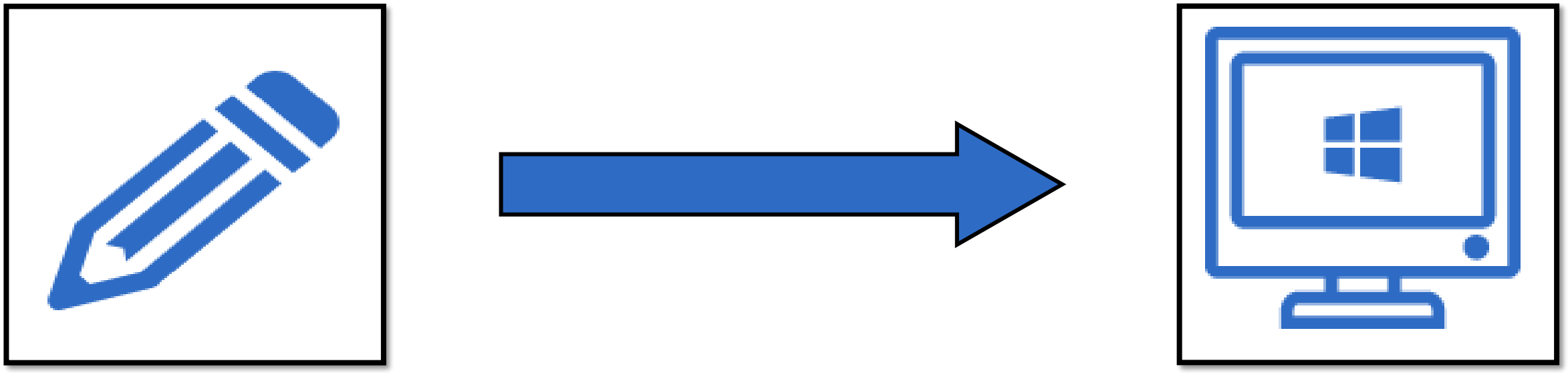
You don't **always** need a slide.

Consistency reduces overall cognitive load.

Color is for **communication** not decoration and you should **only have four**.

Clear.
Consistent.
Cohesive.

Preparation



Fandrey's (2018) Academic Slide Design Method

1. Write a script (I know)
2. Prepare a handout
3. Identify and sketch visuals
4. Create slides
5. Insert preview, guideposts, recap slides
6. Test and revise

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A **handout** is great tool for…

Offloading text-heavy portions of your presentation

1

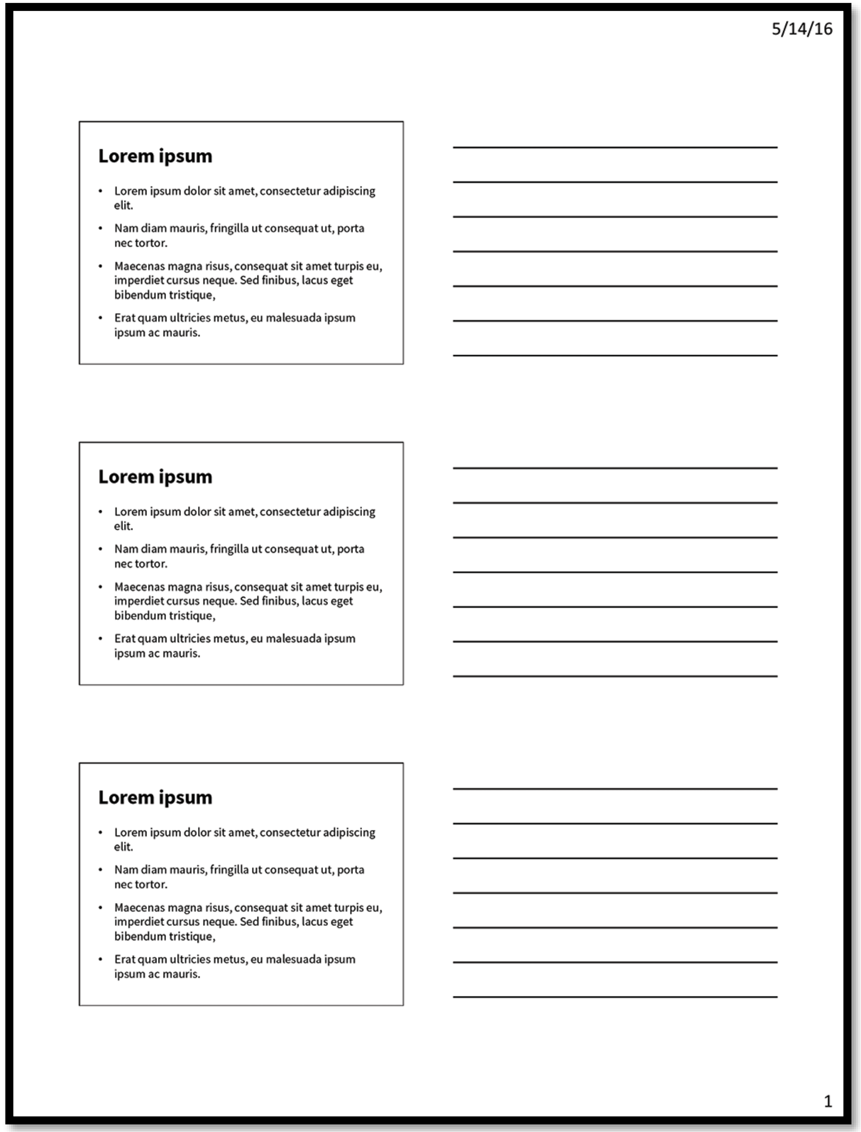
Focusing and organizing your thoughts

2

Expanding on technically dense material

3

Avoid this


5/14/16
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1

Skeleton Guided Notes

Section 6.4: Rational Exponents

- All radical expressions are asking the same general question: "What number or term raised to the nth power will give you the radicand?"

Consider the following:

- Using this relationship, we can rewrite any radical expression in an ***equivalent*** form using fractional (rational) exponents instead of radicals.

$\sqrt{36} = 36^{\frac{1}{2}}$ $\sqrt[3]{64} = 64^{\frac{1}{3}}$ $\sqrt[4]{16} = 16^{\frac{1}{4}}$

Ex.1 ***Ex.2***

Ex.3 ***Ex.4***

Section 6.4: Rational Exponents

$a^{\frac{1}{n}} = \sqrt[n]{a}$ and $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$

- **Convert to Radical Form**

Ex.1 ***Ex.2***

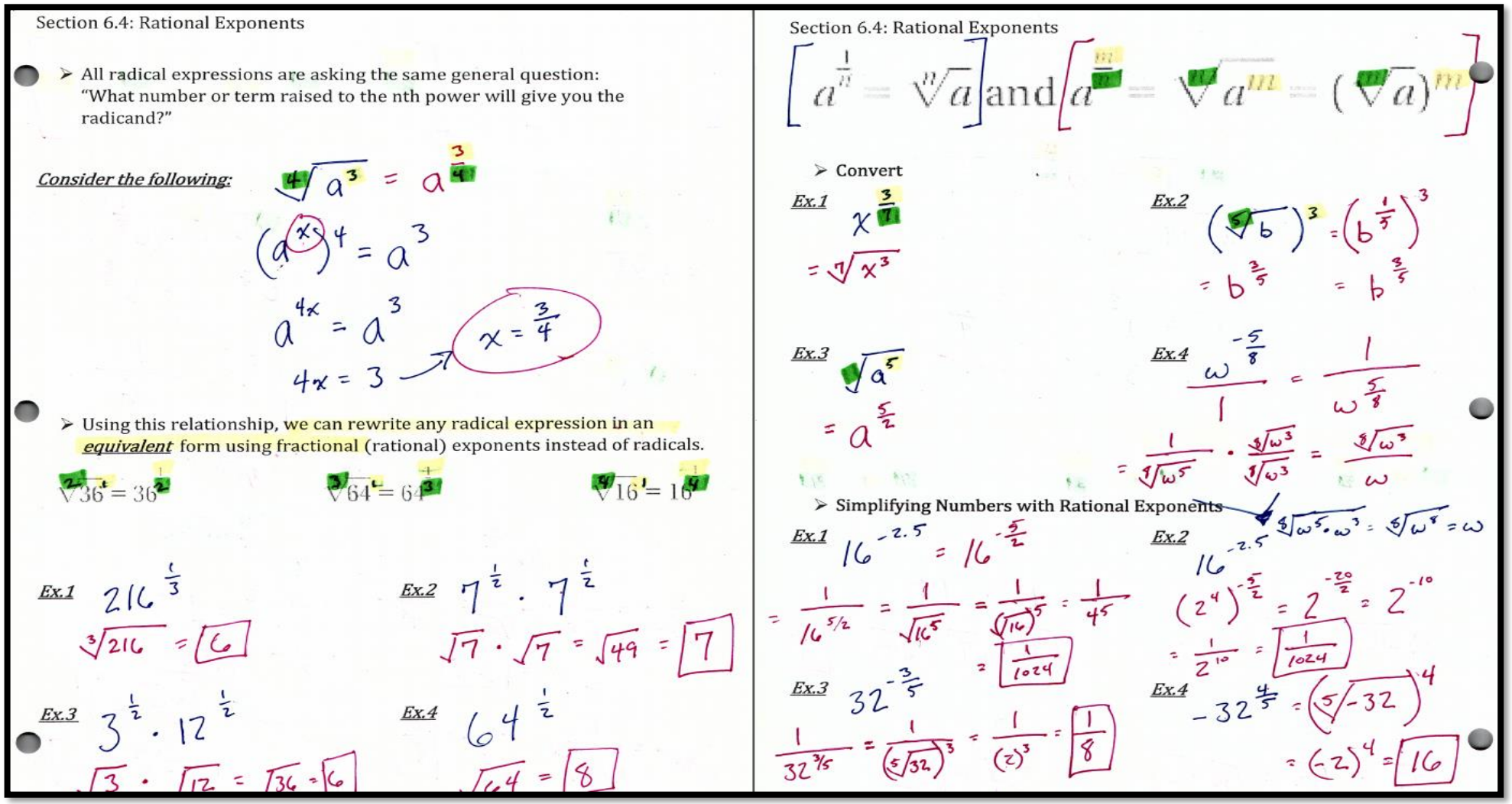
Ex.3 ***Ex.4***

- **Simplifying Numbers with Rational Exponents**

Ex.1 ***Ex.2***

Ex.3 ***Ex.4***

Skeleton Guided Notes



Section 6.4: Rational Exponents

- All radical expressions are asking the same general question: "What number or term raised to the nth power will give you the radicand?"

Consider the following: $\sqrt[4]{a^3} = a^{\frac{3}{4}}$

$(a^x)^4 = a^3$

$a^{4x} = a^3$

$4x = 3$

$x = \frac{3}{4}$

- Using this relationship, we can rewrite any radical expression in an *equivalent* form using fractional (rational) exponents instead of radicals.

$\sqrt{36} = 36^{\frac{1}{2}}$ $\sqrt[3]{64} = 64^{\frac{1}{3}}$ $\sqrt[4]{16} = 16^{\frac{1}{4}}$

Ex.1 $216^{\frac{1}{3}}$

$\sqrt[3]{216} = 6$

Ex.2 $7^{\frac{1}{2}} \cdot 7^{\frac{1}{2}}$

$\sqrt{7} \cdot \sqrt{7} = \sqrt{49} = 7$

Ex.3 $3^{\frac{1}{2}} \cdot 12^{\frac{1}{2}}$

$\sqrt{3} \cdot \sqrt{12} = \sqrt{36} = 6$

Ex.4 $64^{\frac{1}{2}}$

$\sqrt{64} = 8$

Section 6.4: Rational Exponents

$a^{\frac{1}{n}} = \sqrt[n]{a}$ and $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$

- Convert

Ex.1 $x^{\frac{3}{7}} = \sqrt[7]{x^3}$

Ex.2 $(\sqrt[5]{b})^3 = (b^{\frac{1}{5}})^3 = b^{\frac{3}{5}} = b^{\frac{3}{5}}$

Ex.3 $\sqrt[5]{a^5} = a^{\frac{5}{2}}$

Ex.4 $\frac{\omega^{-\frac{5}{8}}}{1} = \frac{1}{\omega^{\frac{5}{8}}} = \frac{1}{\sqrt[8]{\omega^5}} \cdot \frac{\sqrt[8]{\omega^3}}{\sqrt[8]{\omega^3}} = \frac{\sqrt[8]{\omega^3}}{\omega}$

$\sqrt[8]{\omega^5 \cdot \omega^3} = \sqrt[8]{\omega^8} = \omega$

- Simplifying Numbers with Rational Exponents

Ex.1 $16^{-2.5} = 16^{-\frac{5}{2}}$

$= \frac{1}{16^{5/2}} = \frac{1}{\sqrt{16^5}} = \frac{1}{(\sqrt{16})^5} = \frac{1}{4^5} = \frac{1}{1024}$

Ex.2 $16^{-2.5}$

$(2^4)^{-\frac{5}{2}} = 2^{-\frac{20}{2}} = 2^{-10}$

$= \frac{1}{2^{10}} = \frac{1}{1024}$

Ex.3 $32^{-\frac{3}{5}}$

$\frac{1}{32^{3/5}} = \frac{1}{(\sqrt[5]{32})^3} = \frac{1}{(2)^3} = \frac{1}{8}$

Ex.4 $-32^{\frac{4}{5}} = (\sqrt[5]{-32})^4$

$= (-2)^4 = 16$

Use **guided notes** to:

Summarize main points

Keep students engaged throughout the lesson

Provide organization and structure to students' notes

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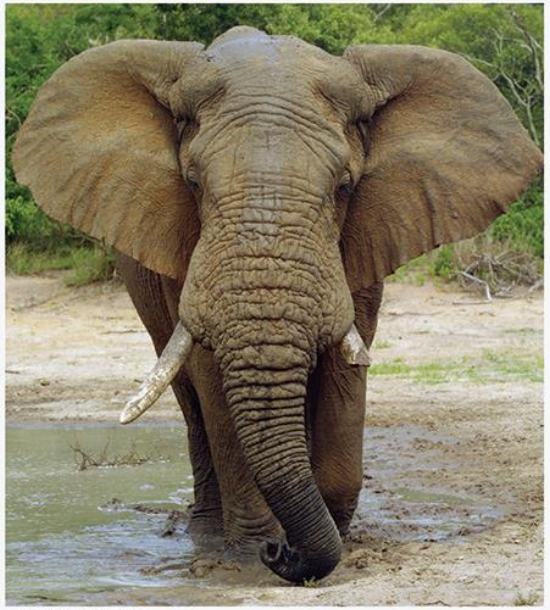
Visual Aid or Decoration?

Serial position in memory recall

- Primacy and recency effects
- Number of items on the list matters
- First described by Hermann Ebbinghaus in 1885



Godot13 via Wikimedia Commons

Fandrey (2018)

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Public Domain

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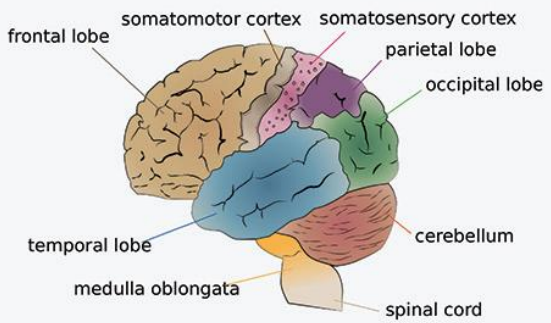
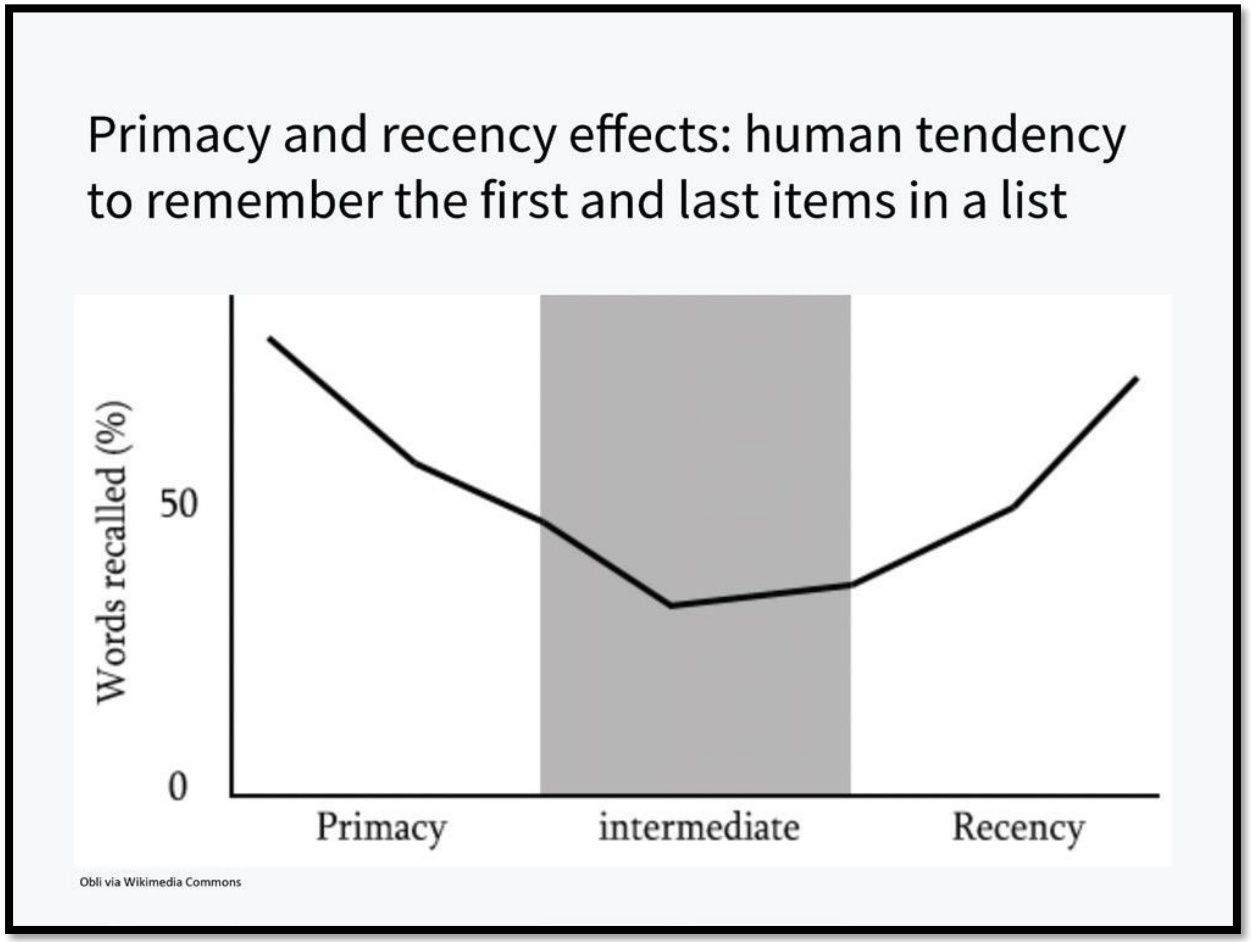


Parts of the brain. National Cancer Institute.

Fandrey (2018)

Visual Aid or Decoration?

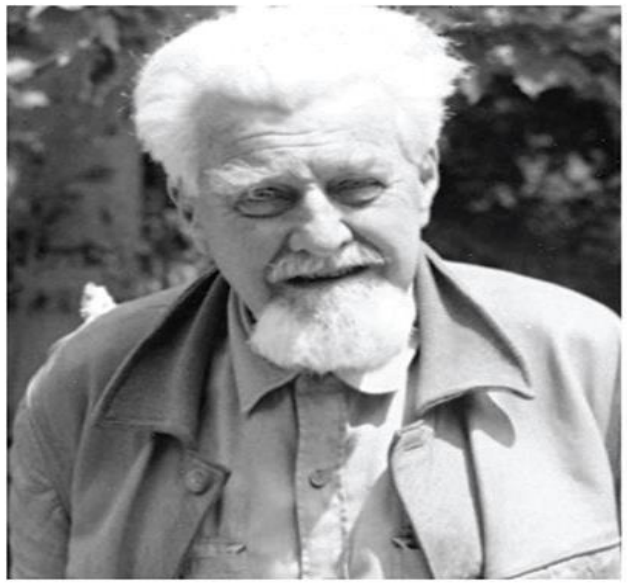


Fandrey (2018)

Visual Aid or Decoration?

+ Filial imprinting

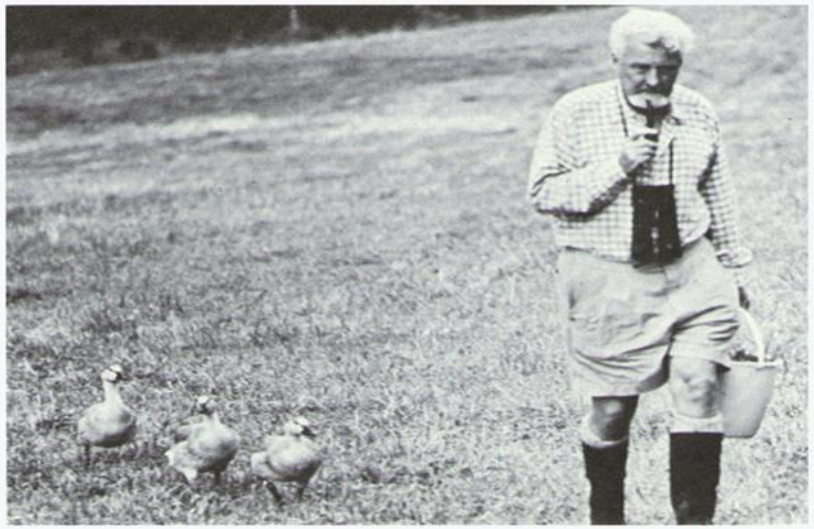
- 1935
- Konrad Lorenz worked with greylag geese
- incubator-hatched geese would imprint on the first suitable moving stimulus they saw within "critical period" (13–16 hours after hatching)
- Goslings imprinted on Lorenz, inanimate objects
- Filial imprinting is not restricted to non-human animals that are able to follow their parents



Fandrey (2018)

Visual Aid or Decoration?

Filial imprinting is a type of animal learning where the newborn attaches to the first moving stimulus it sees.



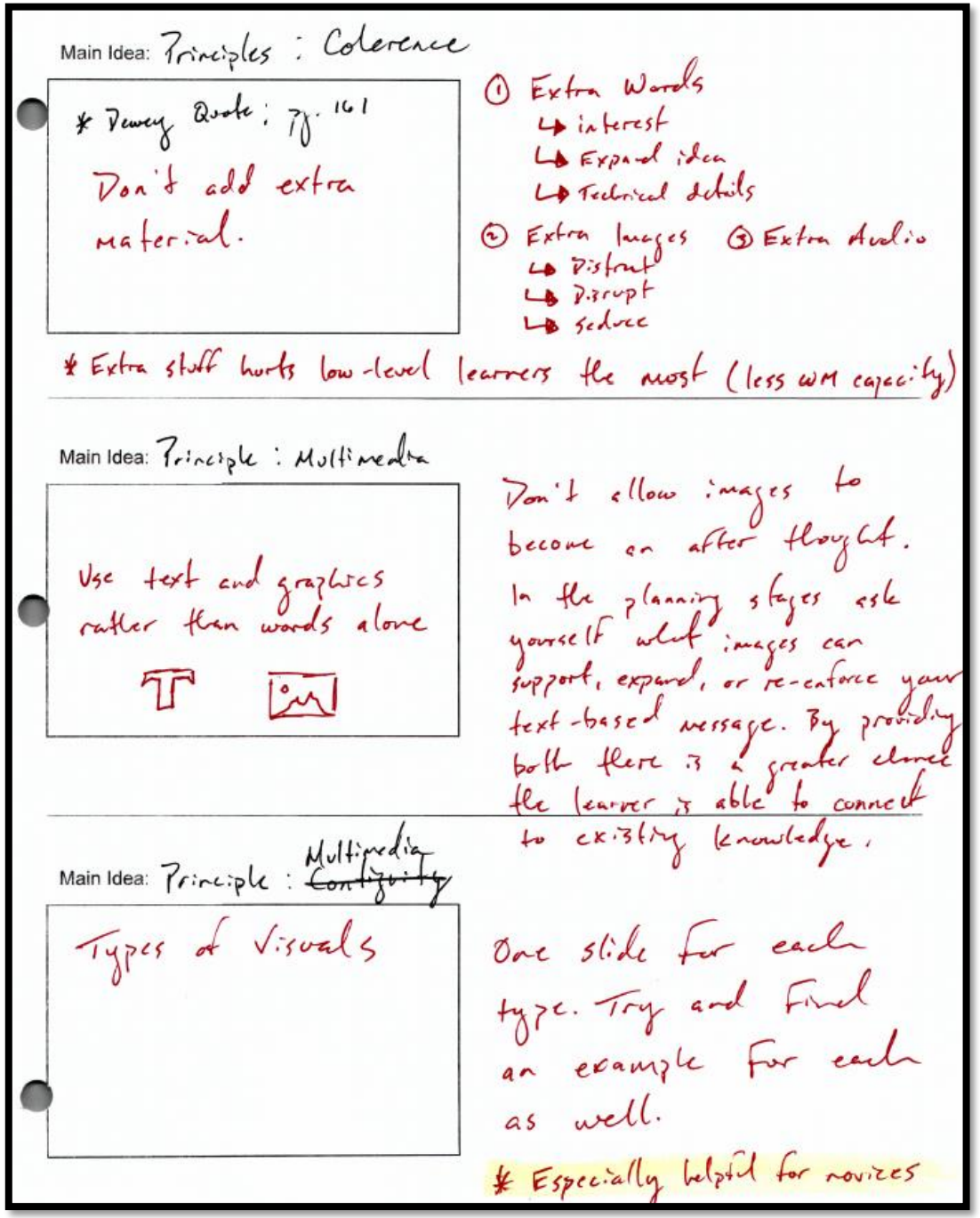
http://psychology.wikia.com/wiki/File:Lorenz.gif

Fandrey (2018)

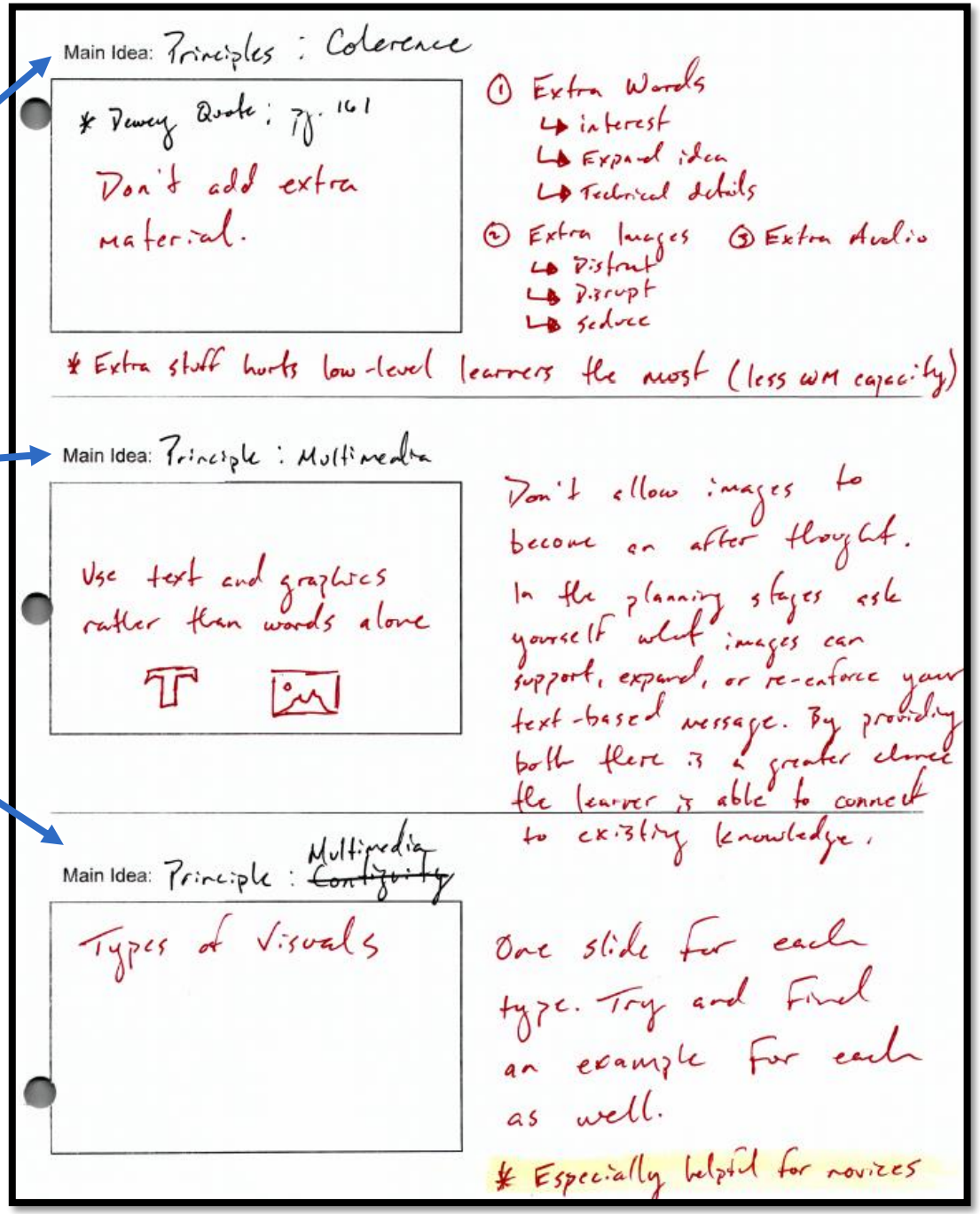
Stay away from built-in themes

Fandrey (2018)

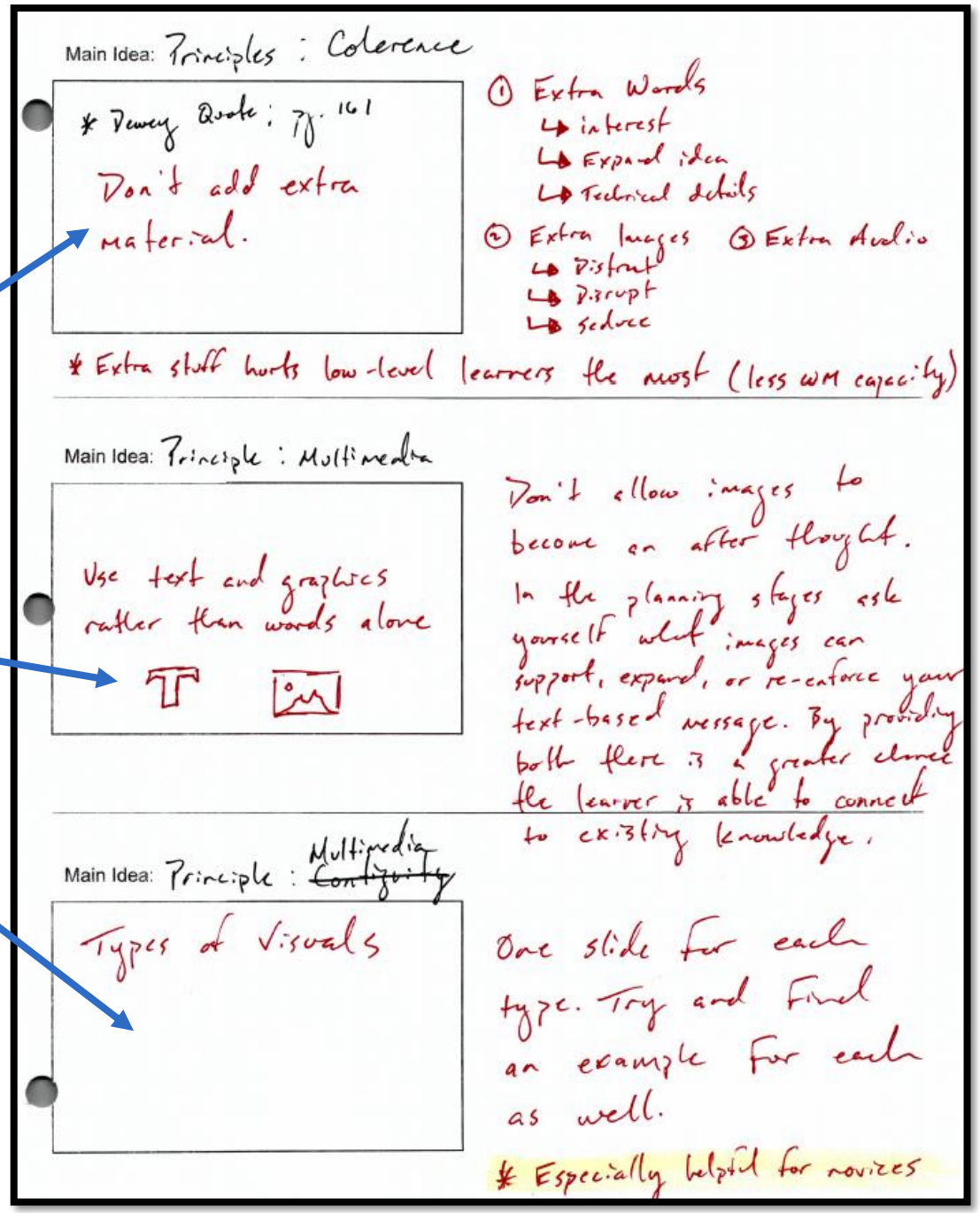
Use a template…



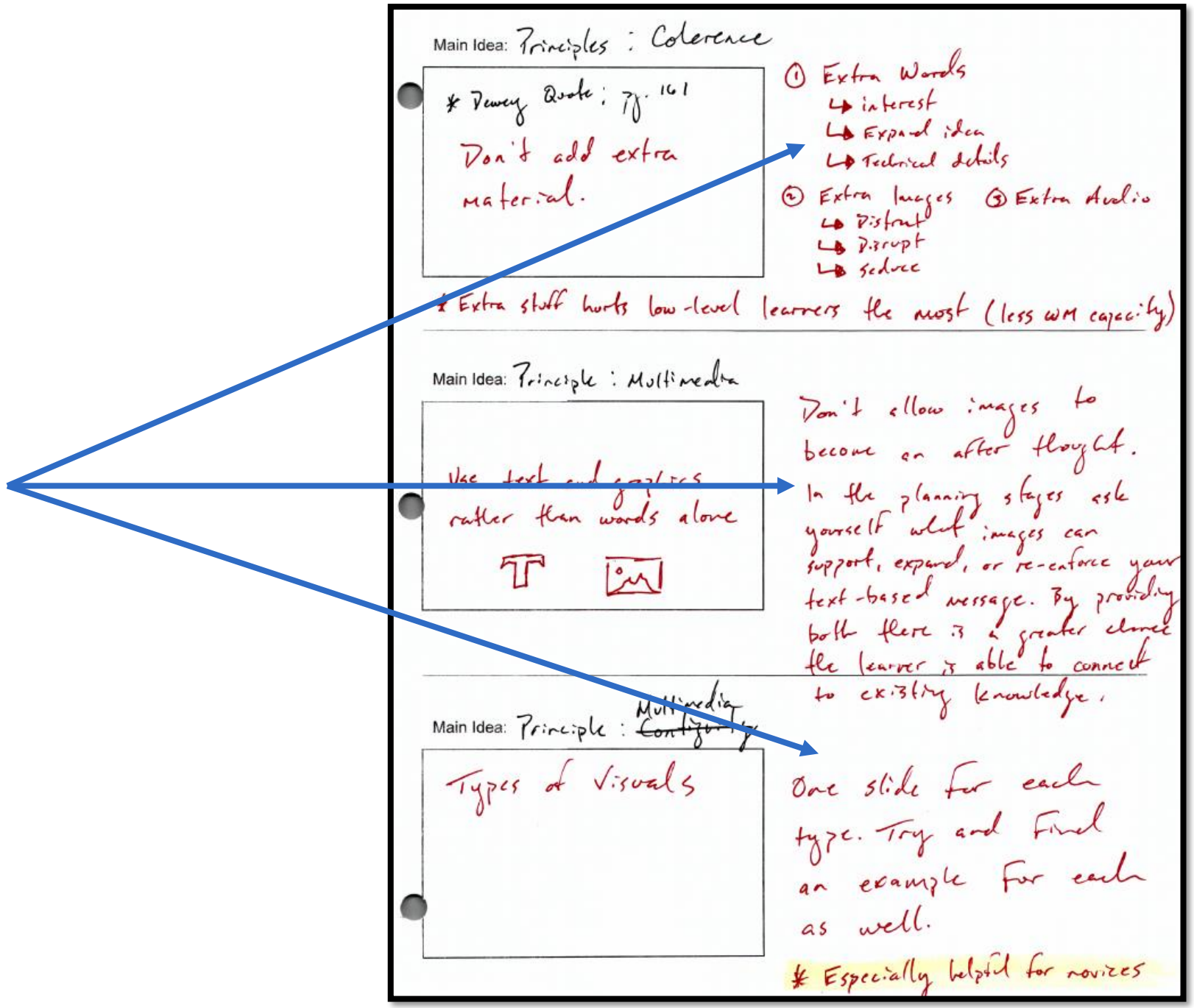
1 main idea per slide



Rough sketch of visual or description of content



Space to elaborate



Start analog, then go digital.

Use **guided notes** handouts to **elaborate.**

Visual aids are not decorations.

Avoid using **built-in themes.**

Use a **template to organize** your presentation.

Fandrey's (2018) Academic Slide Design Method

1. Write a script (I know)
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3. Identify and sketch visuals
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Academic Slide Design

What are the most **common issues** in regard to **slide-based presentations**?

Common Issues

US Wireless Market – Q2 2010 Update

Executive Summary

The US wireless data market grew 6% Q/Q and 22% Y/Y to exceed $13.2B in mobile data service revenues in Q2 2010 - on track so far to meet our initial estimate of $54B for the year.

Having narrowly edged NTT DoCoMo last quarter for the first time, Verizon Wireless continued to maintain its number one ranking for the 1H 2010 in terms of the operator with the most mobile data revenues (though the difference was thinner than the amoeba membrane). The total wireless connections for Verizon were almost 100M with 92.1M being the traditional subscriber base. Rest of the 3 top US operators also maintained leading positions amongst the top 10 global mobile data operators.

Sprint had the first positive netadd quarter in 3 years and has been slowly and steadily turning the ship around. T-Mobile did better on the postpaid netadds but overall additions declined again. The larger question for the market is if 4 large players can stay competitive. Generally, the answer is no. But these are different times and there are a number of permutations and combinations that are possible.

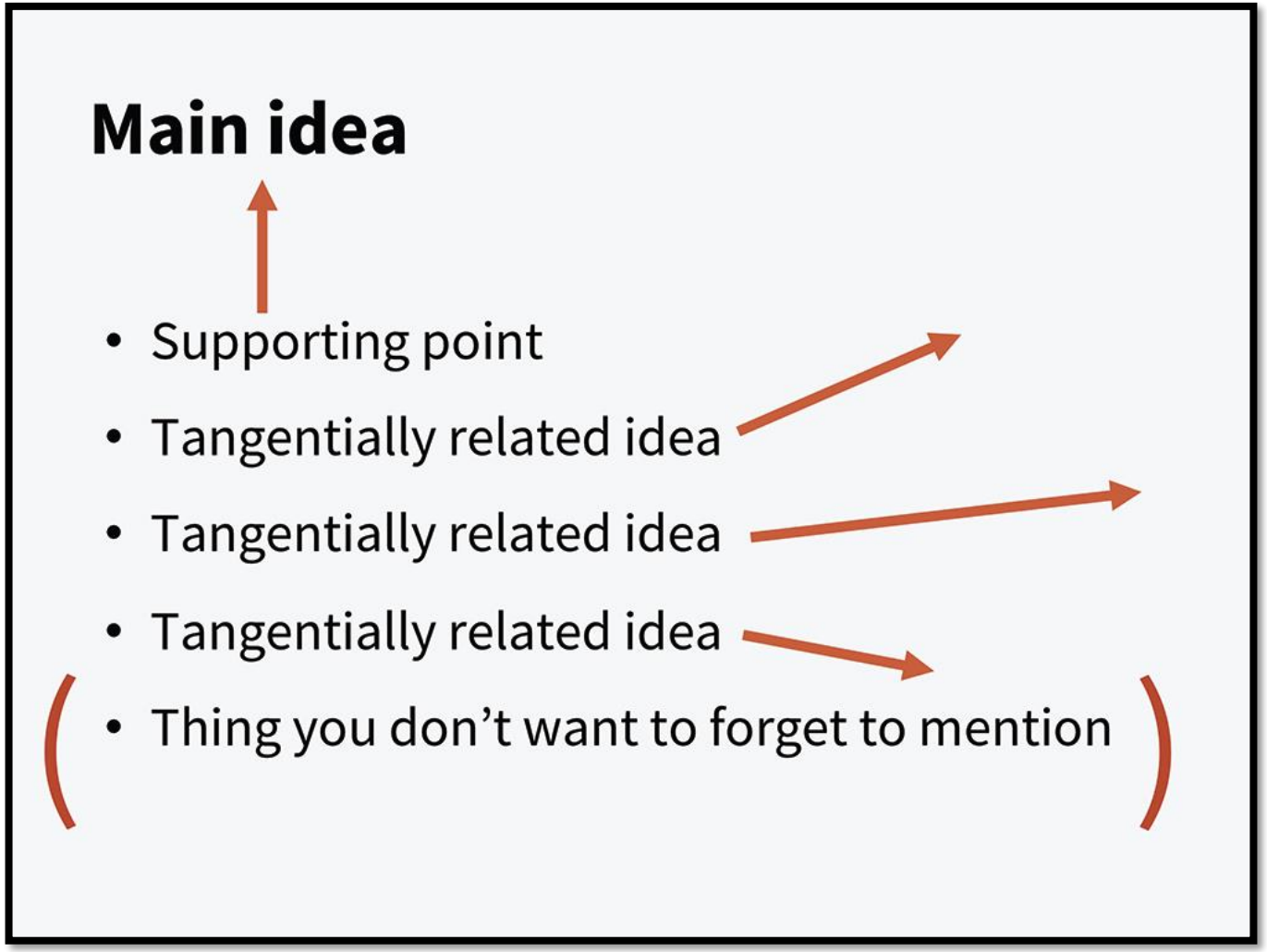
The US subscription penetration crossed 95% at the end of Q2 2010. If we take out the demographics of 5 yrs and younger, the mobile penetration is now past 100%. While the traditional net-adds have been slowing, the "connected device" segment is picking up so much that both AT&T and Verizon added more connected devices than postpaid subs in Q2 2010. Given the slow postpaid growth, operators are fiercely competing in prepaid, enterprise, connected devices, and M2M segments.

Data traffic continued to increase across all networks. By 1H 2010, the average US consumer was consuming approximately 230 MB/mo up 50% in 6 months. US has become ground zero for mobile broadband consumption and data traffic management evolution. While it lags Japan and Korea in 3G penetration by a distance, due to higher penetration of smartphones and datacards, the consumption is much higher than its Asian counterparts. Given that it is also becoming the largest deployment base for HSPA+ and LTE, most of the cutting edge research in areas of data management and experimentation with policy, regulations, strategy, and business models is taking place in the networks of the US operators and keenly watched by players across the global ecosystem.

As we had forecasted, the tiered pricing structure for mobile broadband touched the US shores with AT&T becoming the [illegible]jor operator to change its pricing plan based on consumer consumption. We will see the pricing evolve over the [illegible]4 quarters as the US mobile ecosystem adjusts to the new realities and strategies for mobile data consumption.

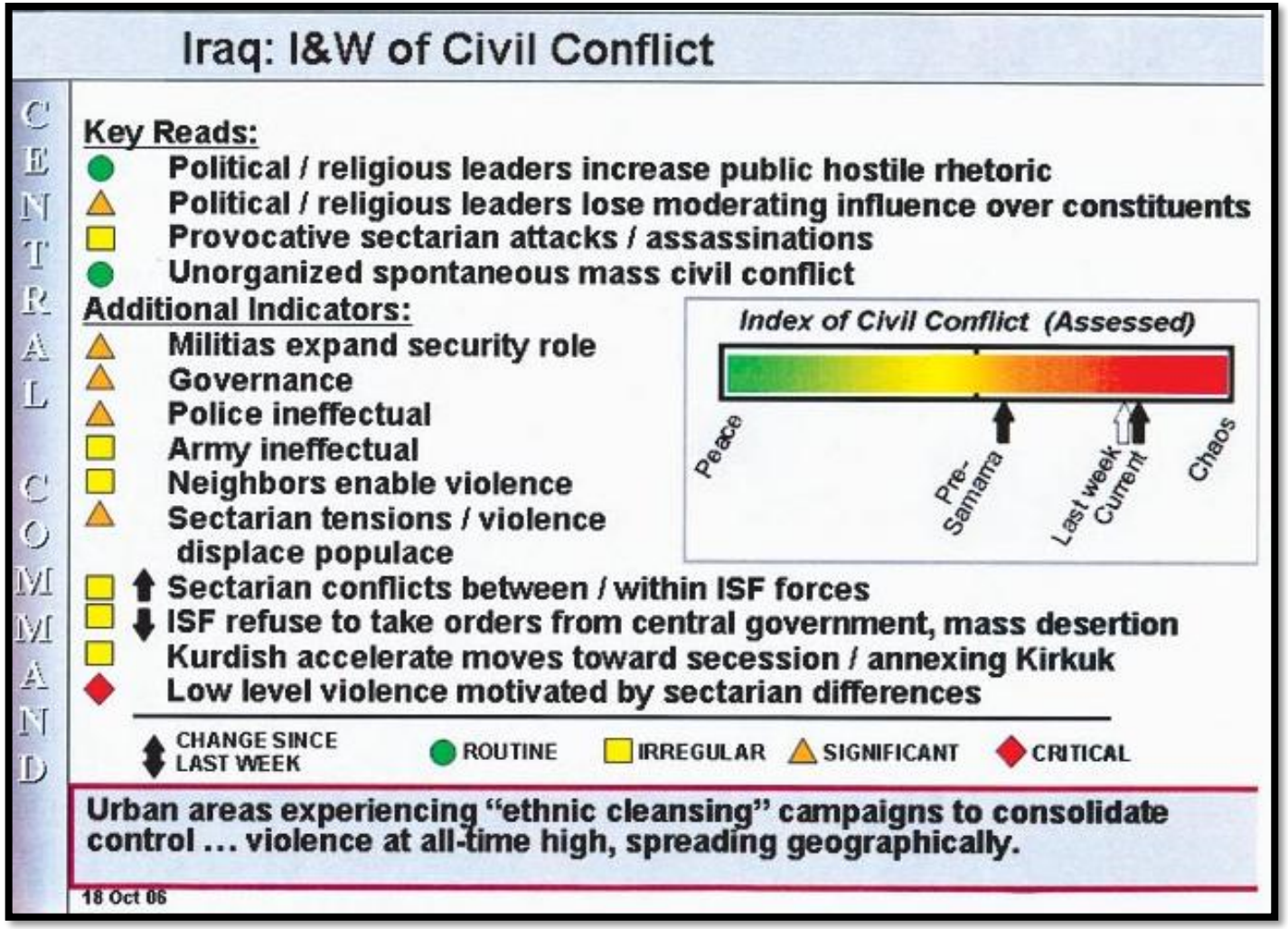
http://www.chetansharma.com 2 © Chetan Sharma Consulting. All Rights Reserved Aug. 20[illegible]

Common Issues



Fandrey (2018)

Common Issues

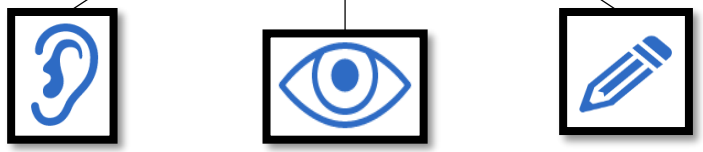


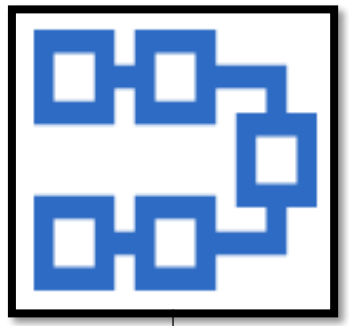
One slide = One main idea

Why not bullets?

Slide-u-prompter

Split-attention effect





Cannot convey complex relationships

Use bullets to…

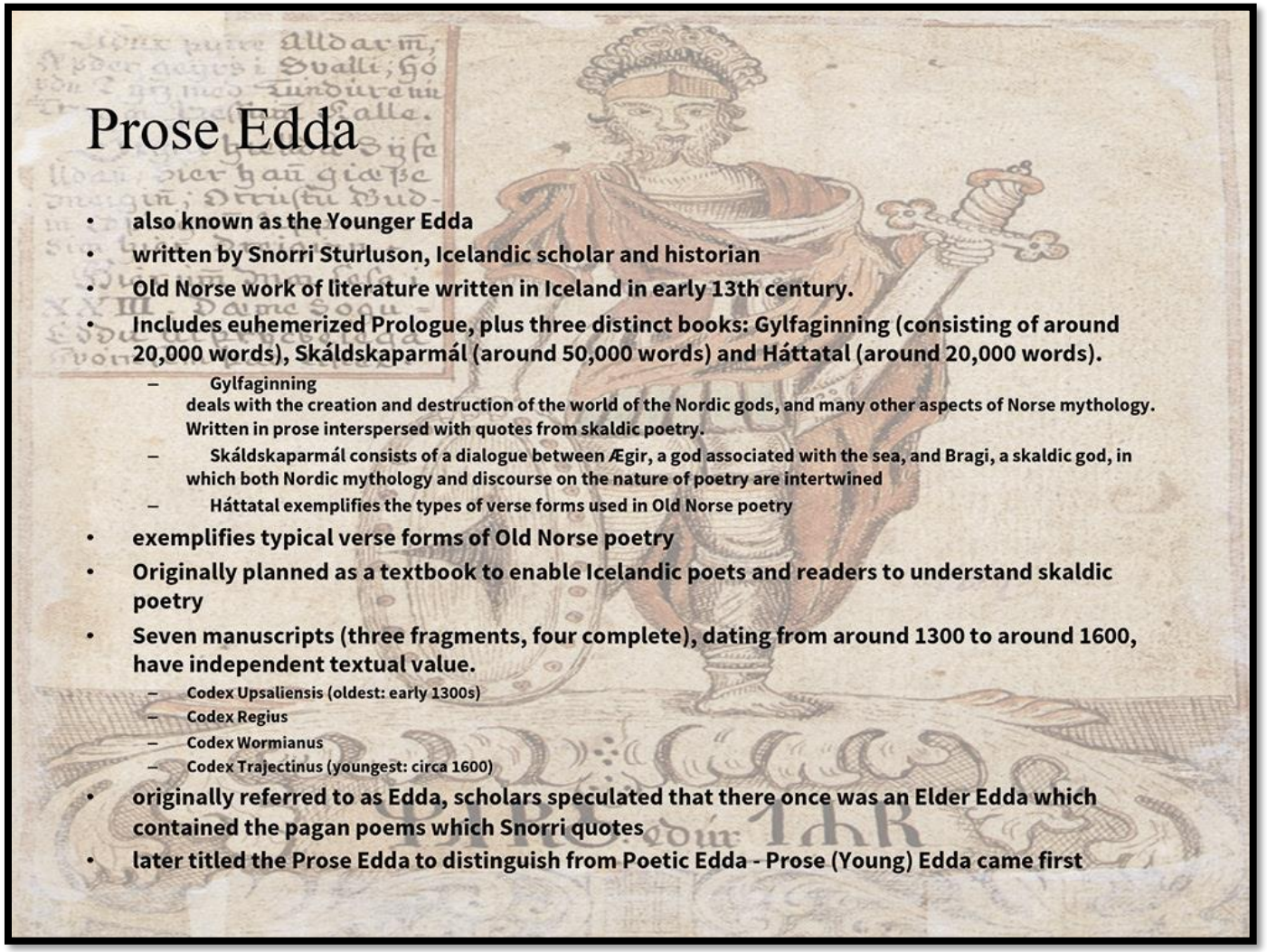
- Explain an idea with several supporting statements
- Show an overview of a list of items you plan to explicate individually in coming slides
- Provide a summary of points you have already discussed

Design Strategies

One main idea per slide

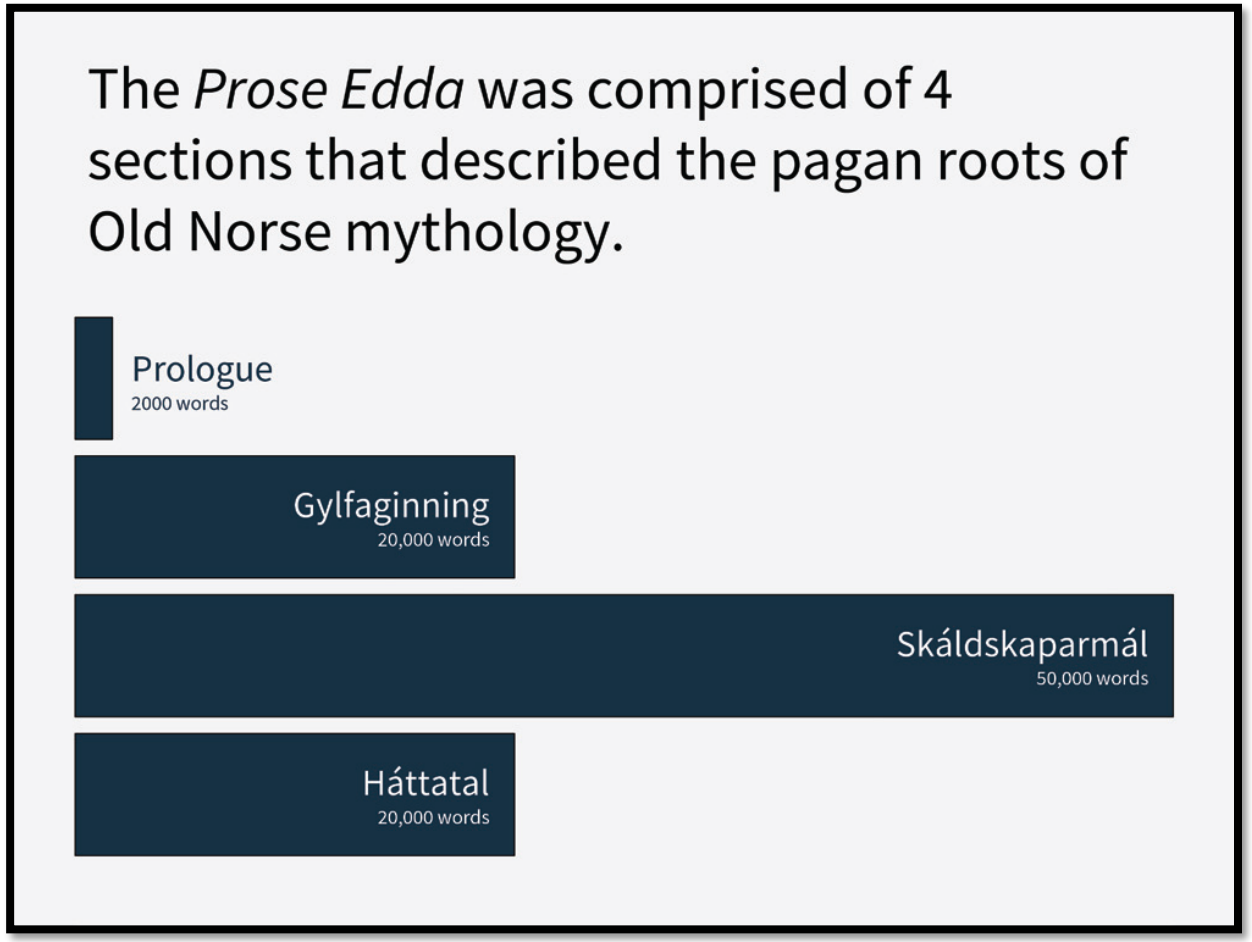
1. Assertion-evidence structure
2. Spatial positioning
3. Whitespace
4. Lines and shapes
5. Proximity and similarity
6. Full screen image with text
7. Graphics with labels
8. Information Typologies (SmartArt)

Slide makeovers



Fandrey (2018)

Slide makeovers



Fandrey (2018)

Theme

- The message of the film
- A film means something, whether or not the filmmaker intends it
- Interpretation—supplying meaning—is the job of the audience
- The skeleton, on which action, character and setting, are arranged
- When bare bones are missing; audience knows it

Theme, cont.

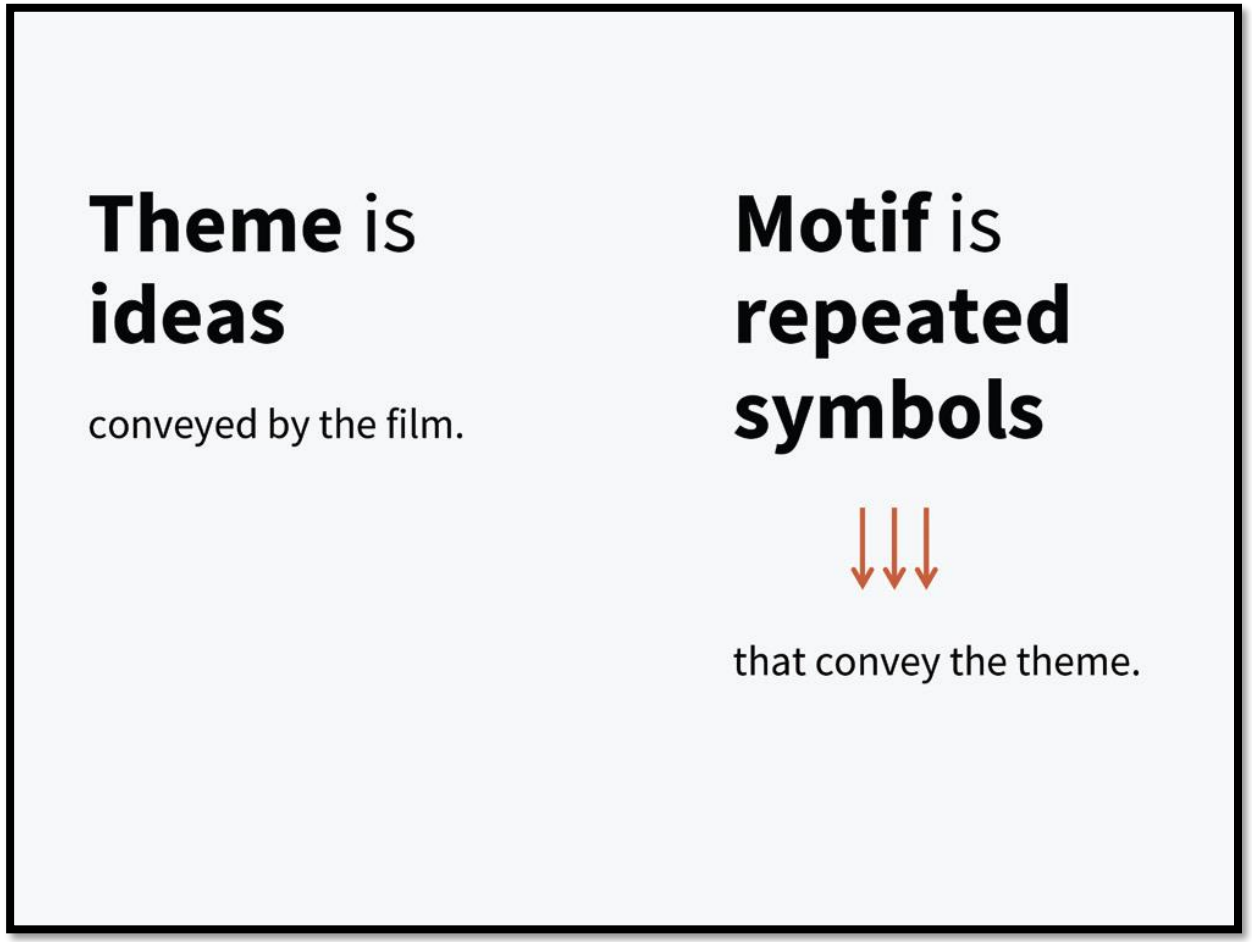
- Differ from motif in that themes are ideas conveyed by a film
- Motifs are repeated symbols that represent those ideas
- Leit-motif: reiteration of those themes

Theme, cont.

- Arise from interplay of plot, characters, and the attitude the director takes toward them
- The same story would be given very different themes in the hands of different directors
- Different from director style, which is less visible to amateur viewers

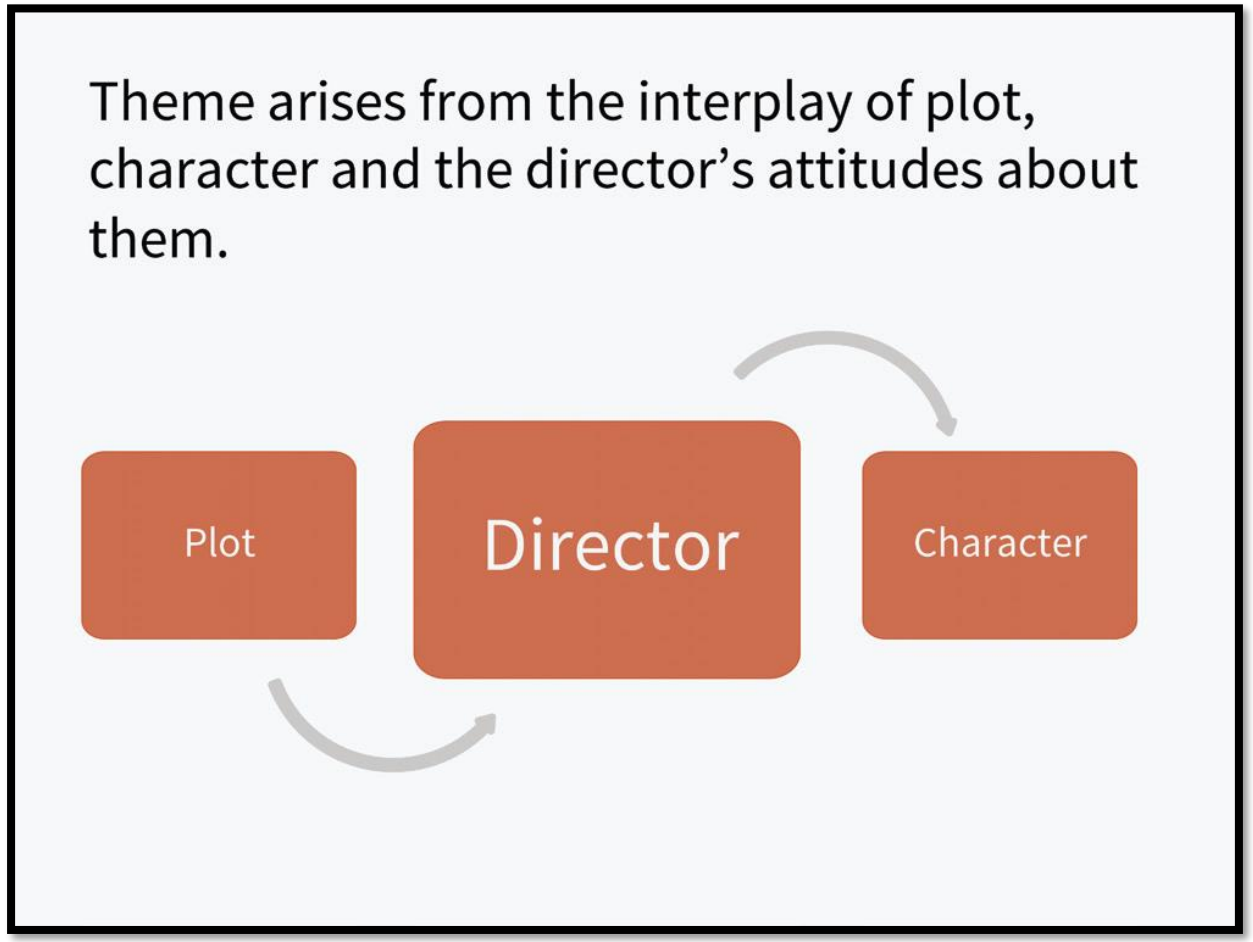
Fandrey (2018)

Slide makeovers



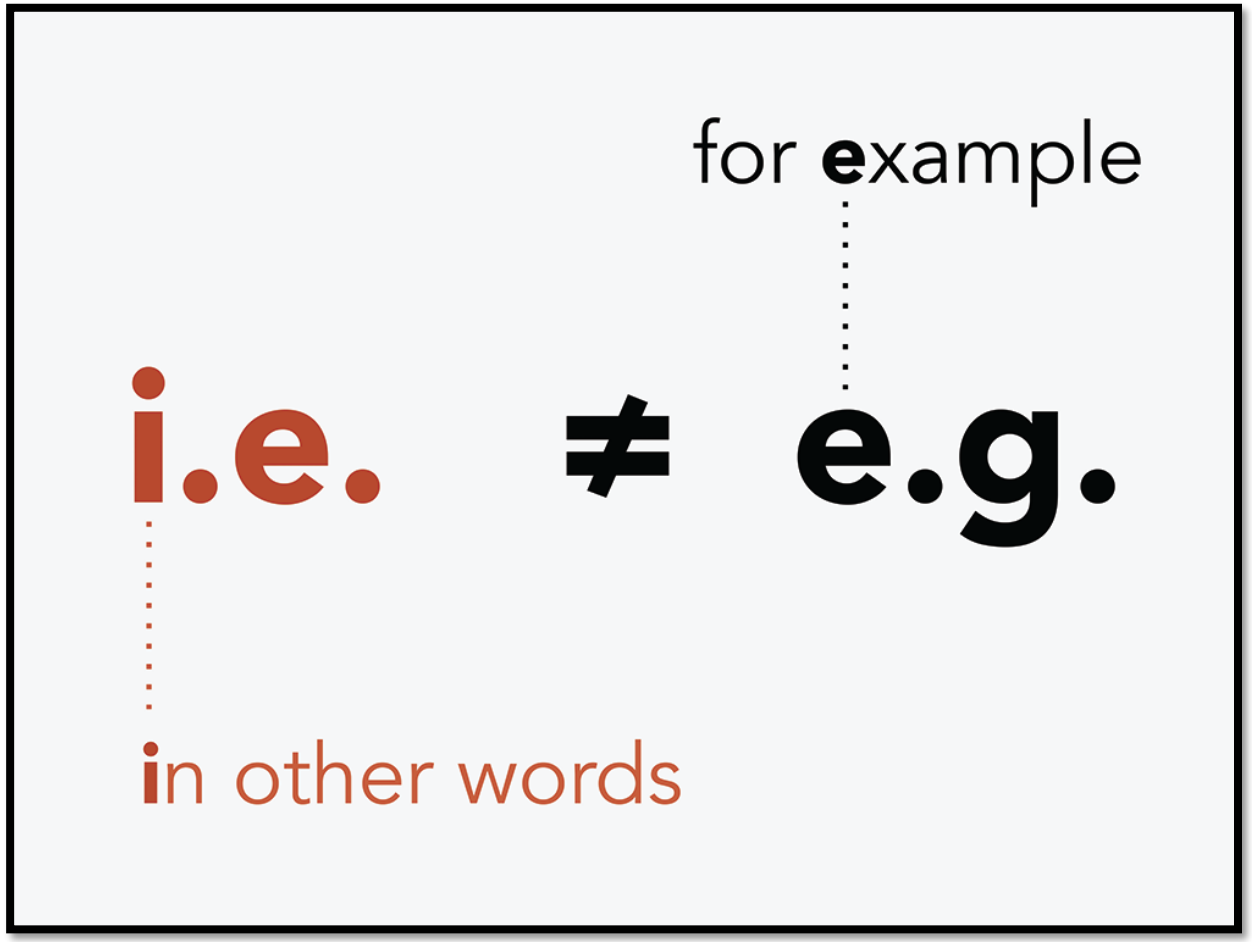
Fandrey (2018)

Slide makeovers



Fandrey (2018)

Graphics with labels



Fandrey (2018)

Full-screen image with title

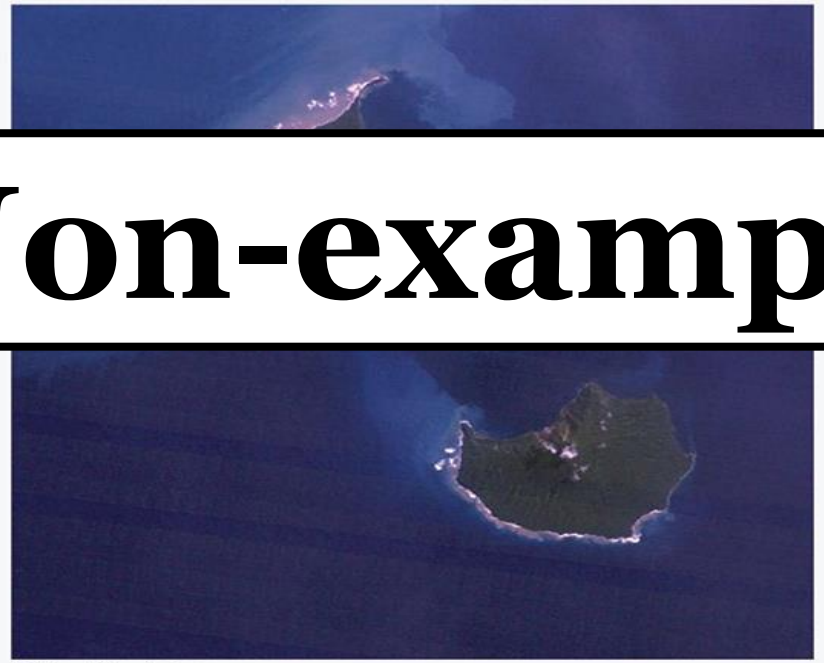
Fandrey (2018)

Assertion-evidence structure

1. Identify the main idea
2. Write it as a brief statement at the top of the slide
3. Use the remaining space on the slide to provide visual evidence
4. Ensure you are making an assertion and not simply explaining the graphic.

Assertion-evidence structure

The final explosions of the 1883 Krakatoa eruption had massive effects.

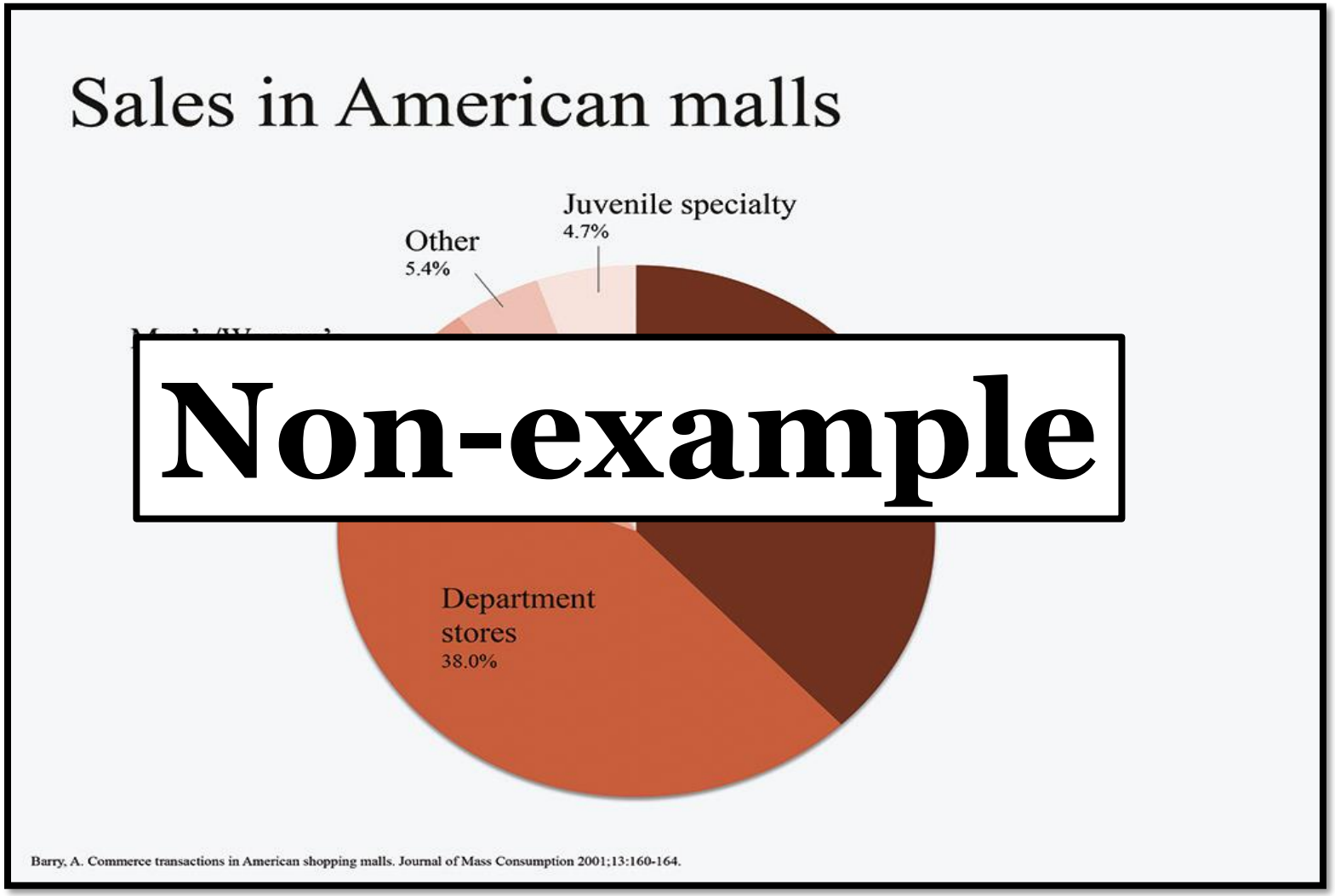


Krakatoa, Wikimedia Commons

Non-example

Fandrey (2018)

Assertion-evidence structure



Non-example

Fandrey (2018)

Assertion-evidence structure

Fandrey (2018)

Assertion-evidence structure

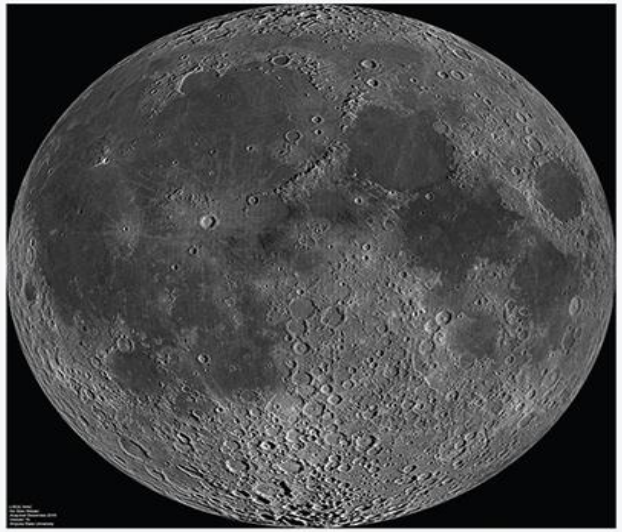
Near side of moon

- Moon hemisphere always seen from earth
- Sometimes illuminated by earthshine
- Dark spots are high in iron
- First mapped early 17th cent., early astronomers thought they were bodies of water
- Lunar maria (Latin for "sea")

Fandrey (2018)

Assertion-evidence structure

The near side of the moon is characterized by lunar maria, low-lying areas high in iron.



Wikimedia Commons

Fandrey (2018)

Assertion-evidence structure

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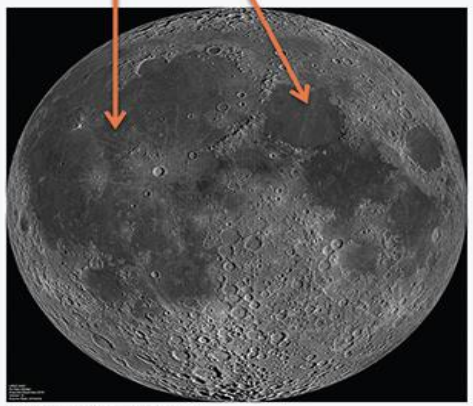
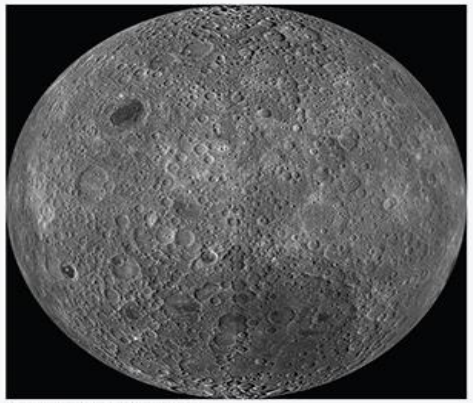


Wikimedia Commons

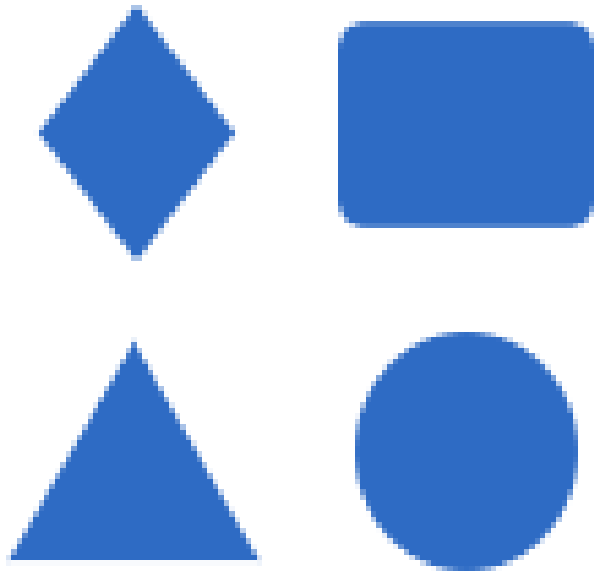
Near side



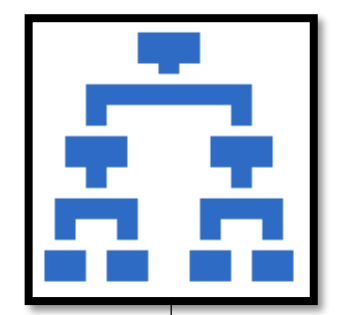
Wikimedia Commons

Far side

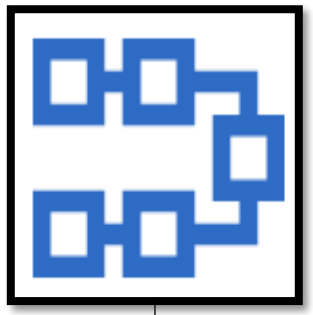
Fandrey (2018)



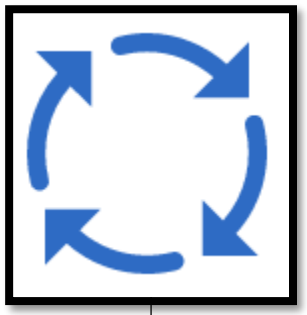
Use **spatial positioning** to communicate:



Hierarchy

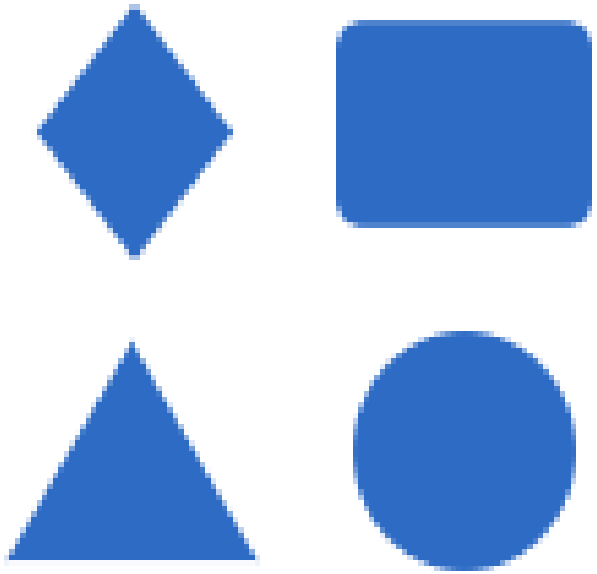


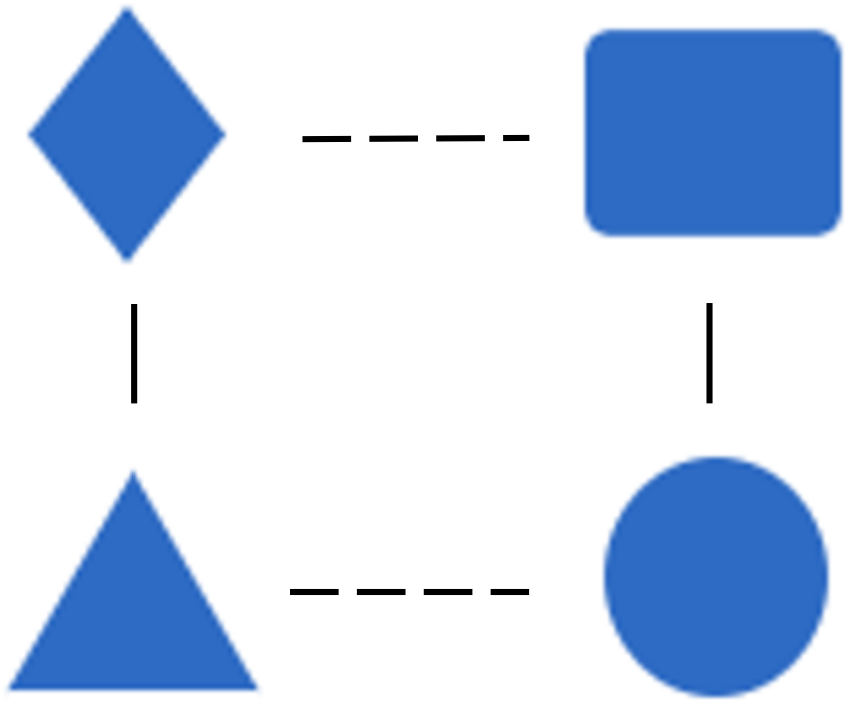
Relationships

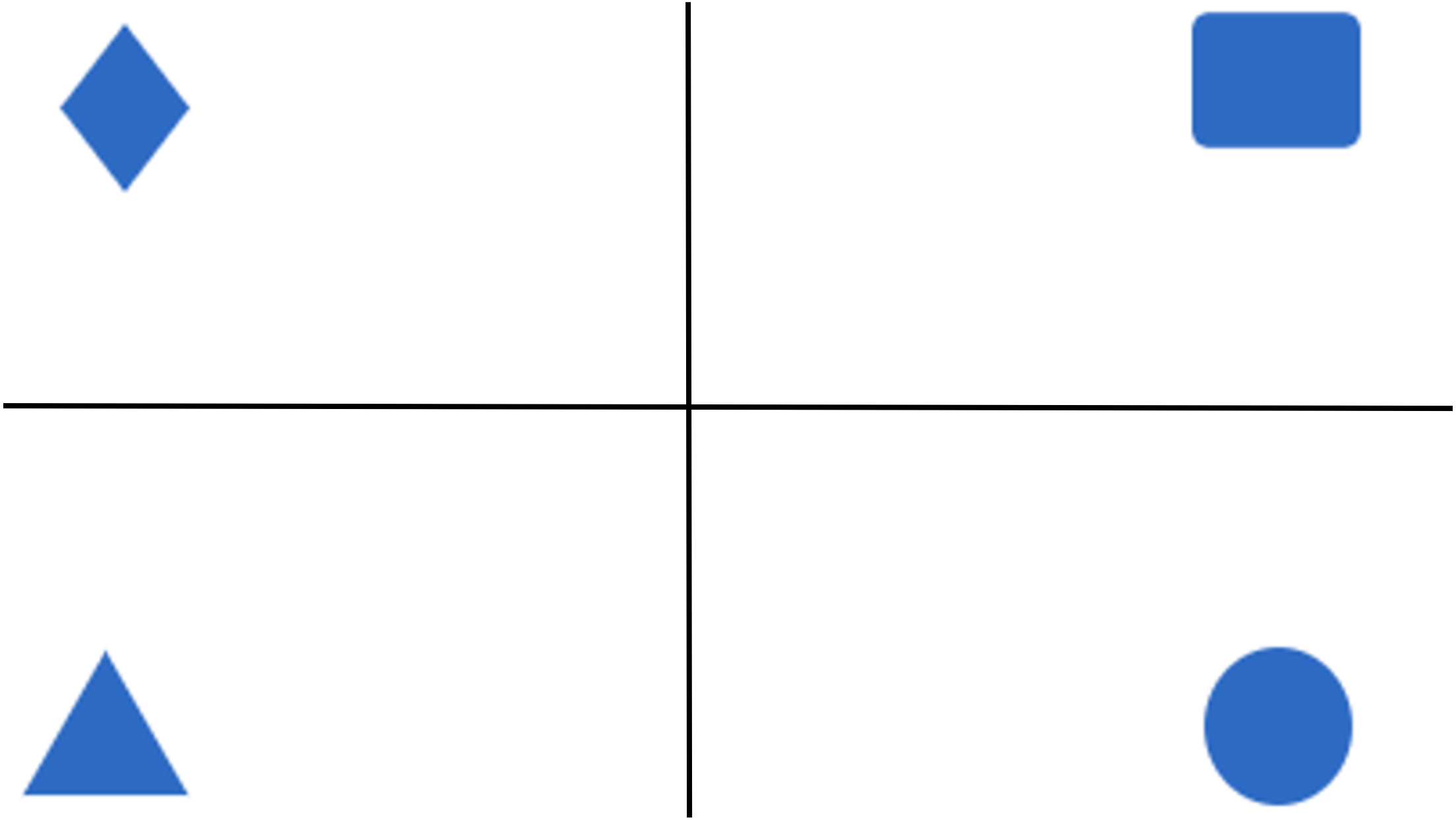


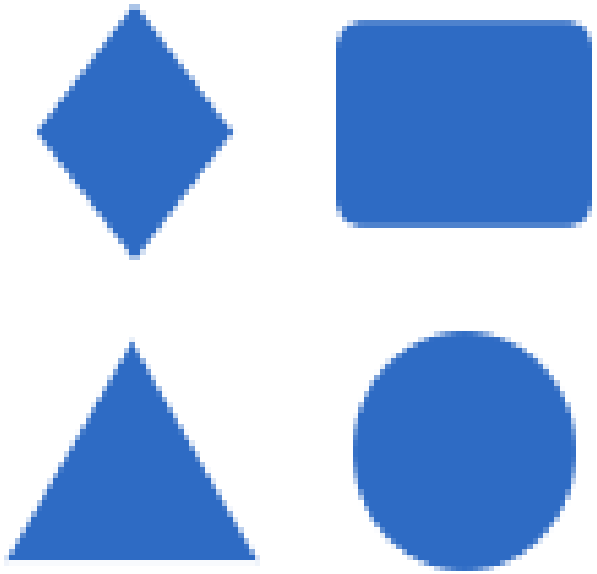
Process

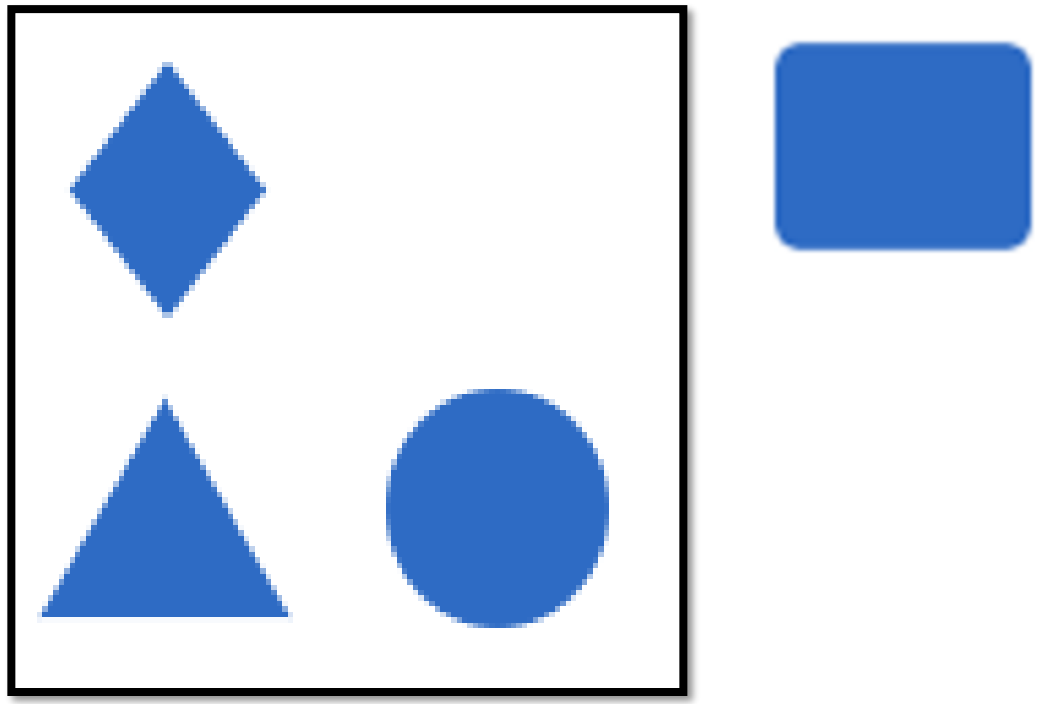
Anomalies





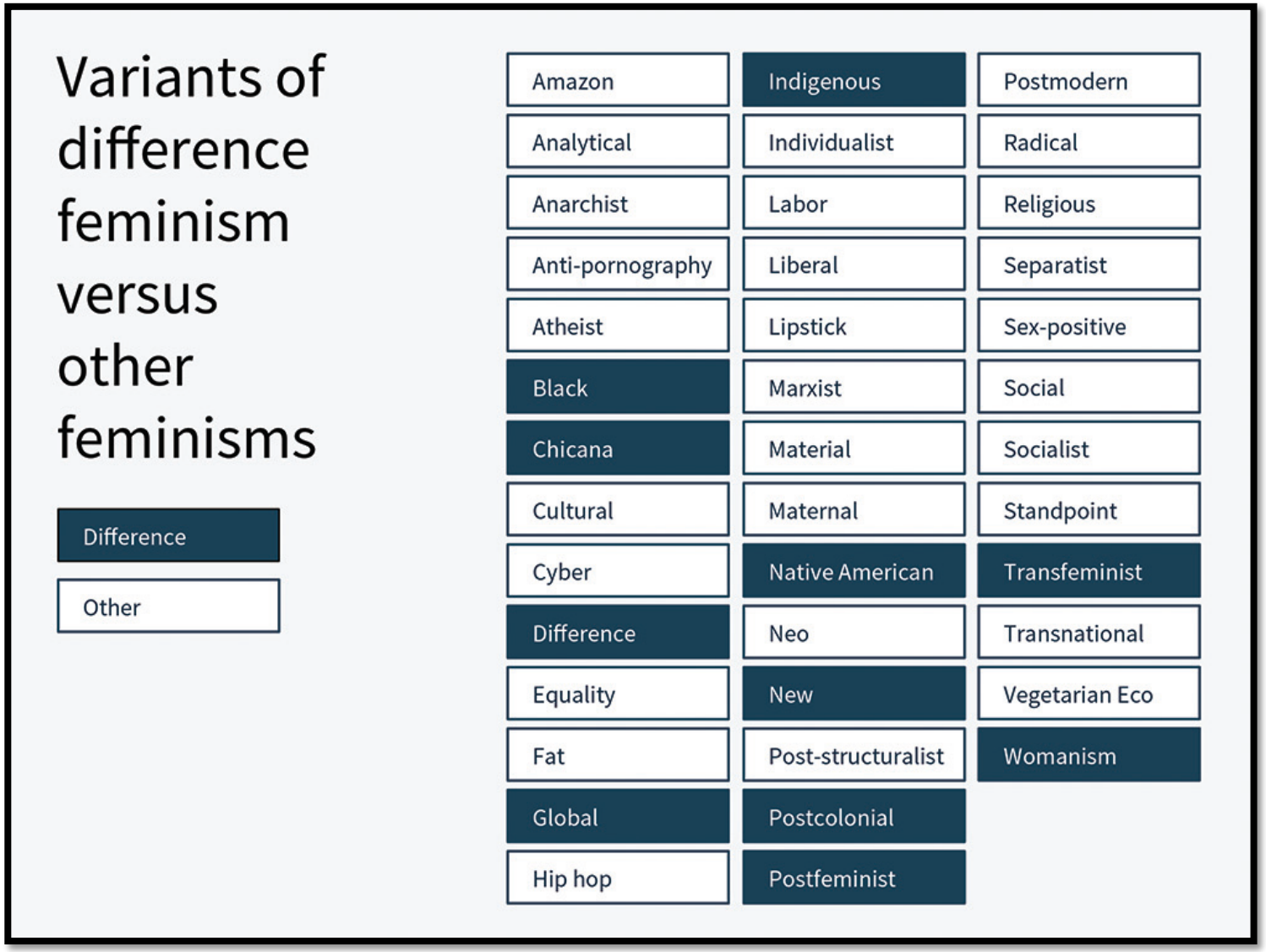




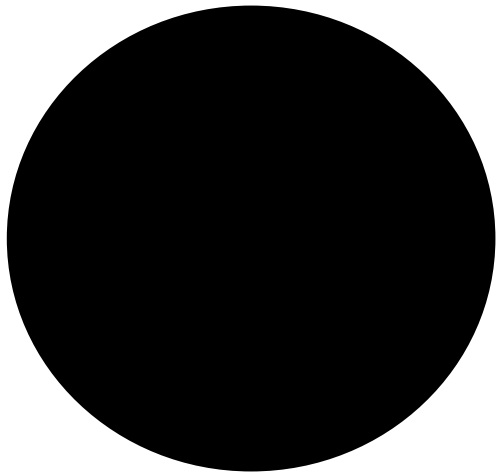


Sign of approval

Will get you punched

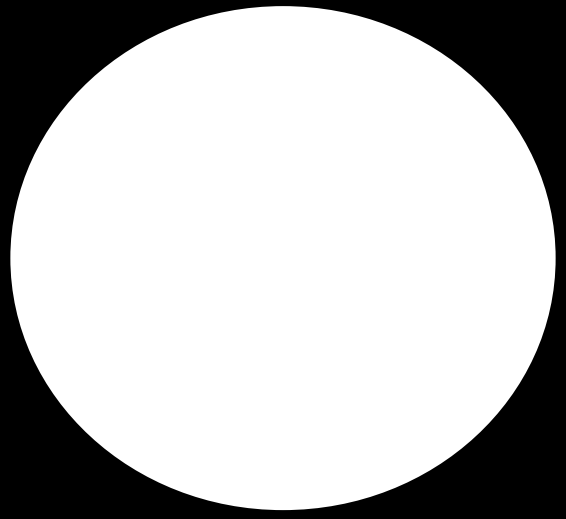


Fandrey (2018)



Whitespace

The absence of content



Layout and Composition

Be **consistent** with the **layout** of your slides and the **placement of repeated elements**. This helps with **wayfinding** and **reduces** overall **cognitive load**.

There are **3 main issues** with composition

Lack of a point of entry

1

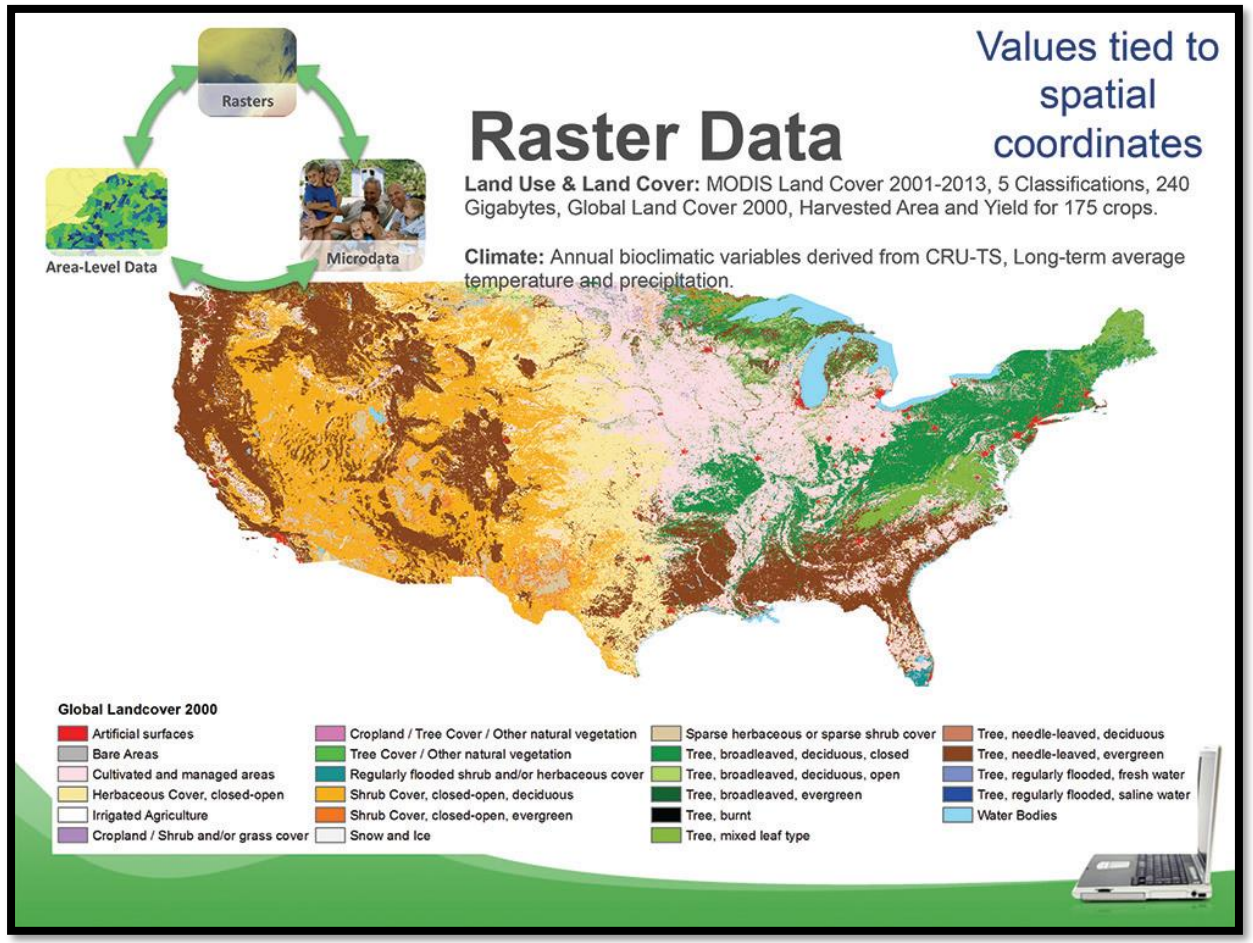
Lack of a focal point

2

Failure to comply with established norms

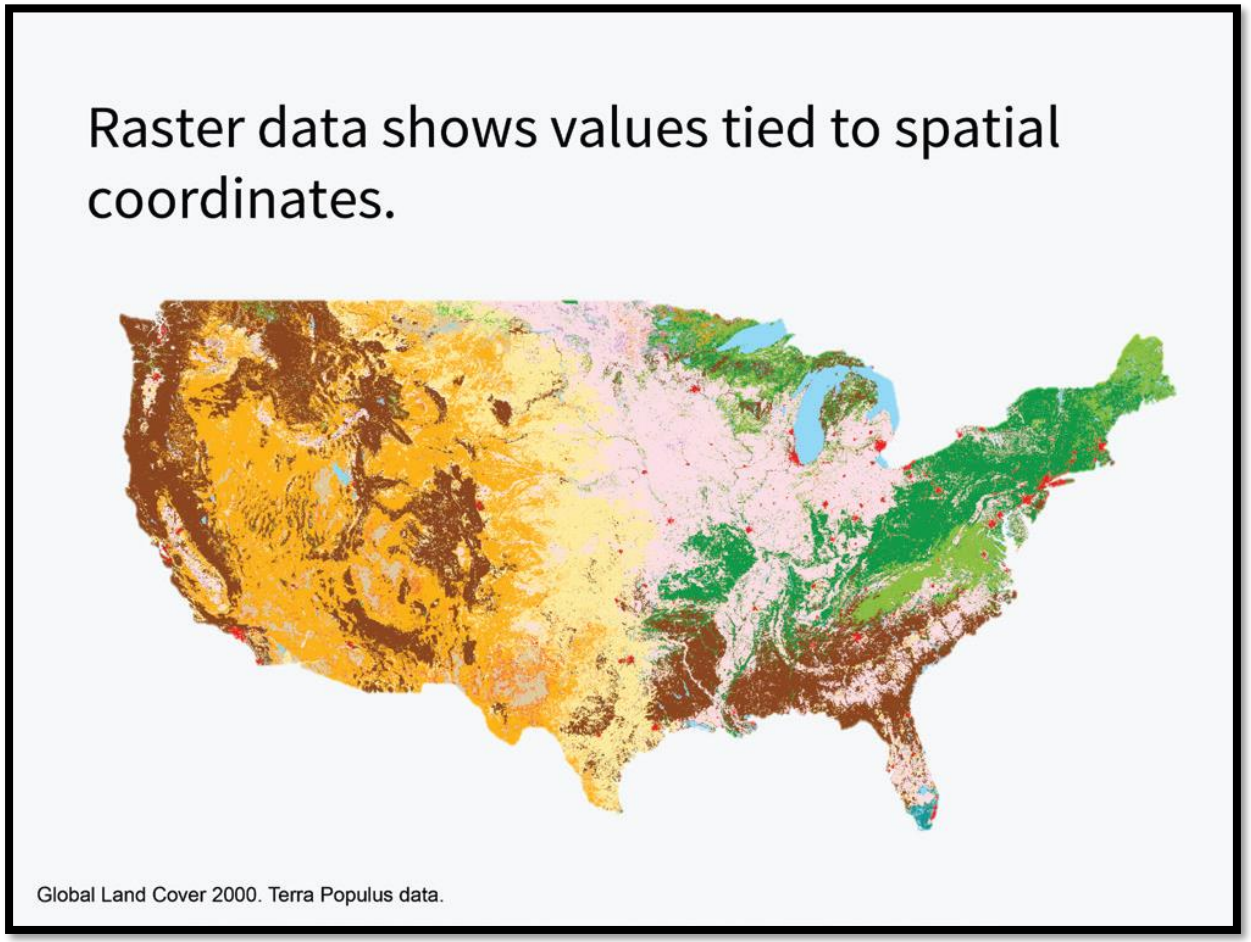
3

Where is the point of entry?



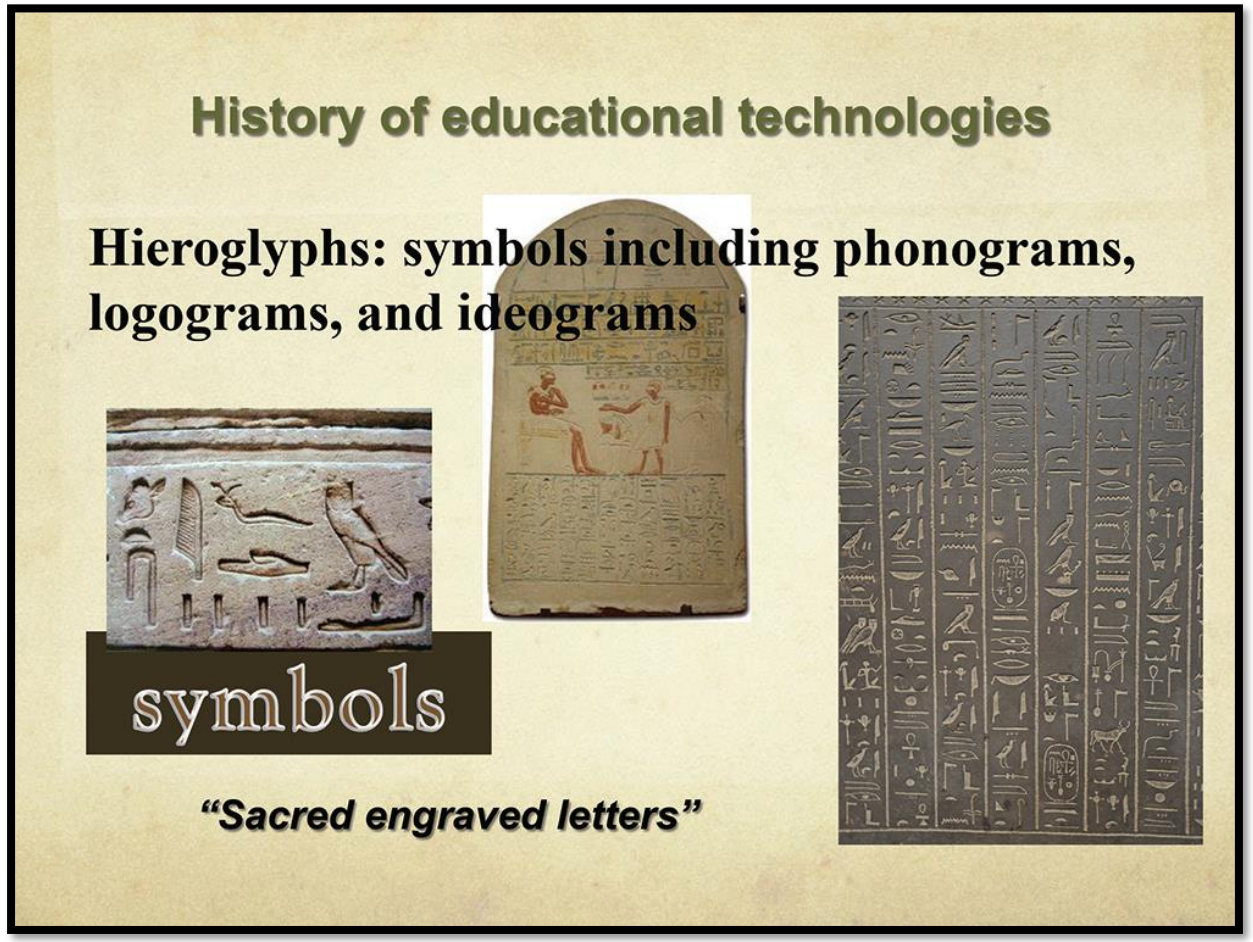
Fandrey (2018)

Slide makeover



Fandrey (2018)

What is the focal point of this slide?



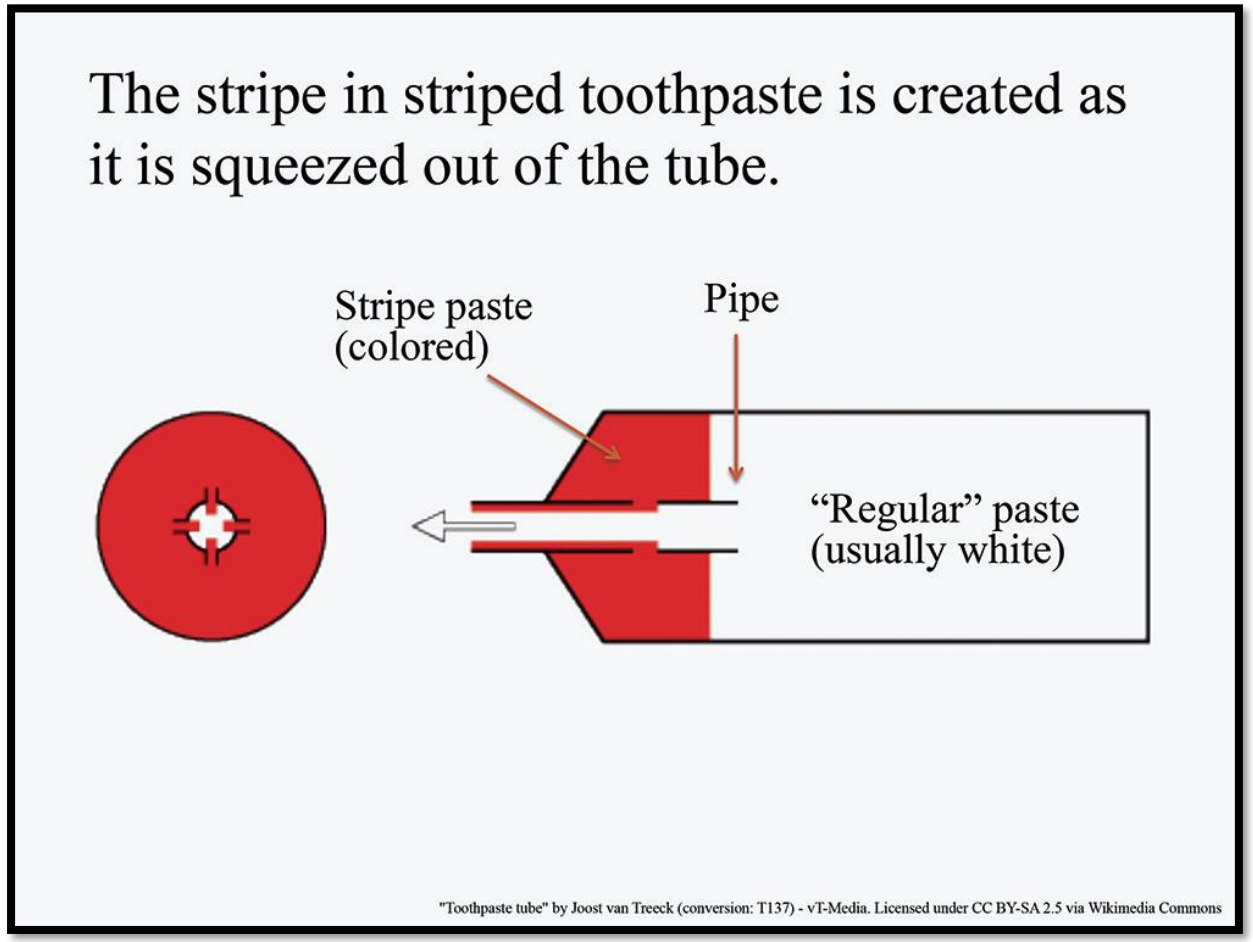
Fandrey (2018)

Slide makeover

Hieroglyphs can be interpreted as phonogram, logogram, or ideogram depending on context.

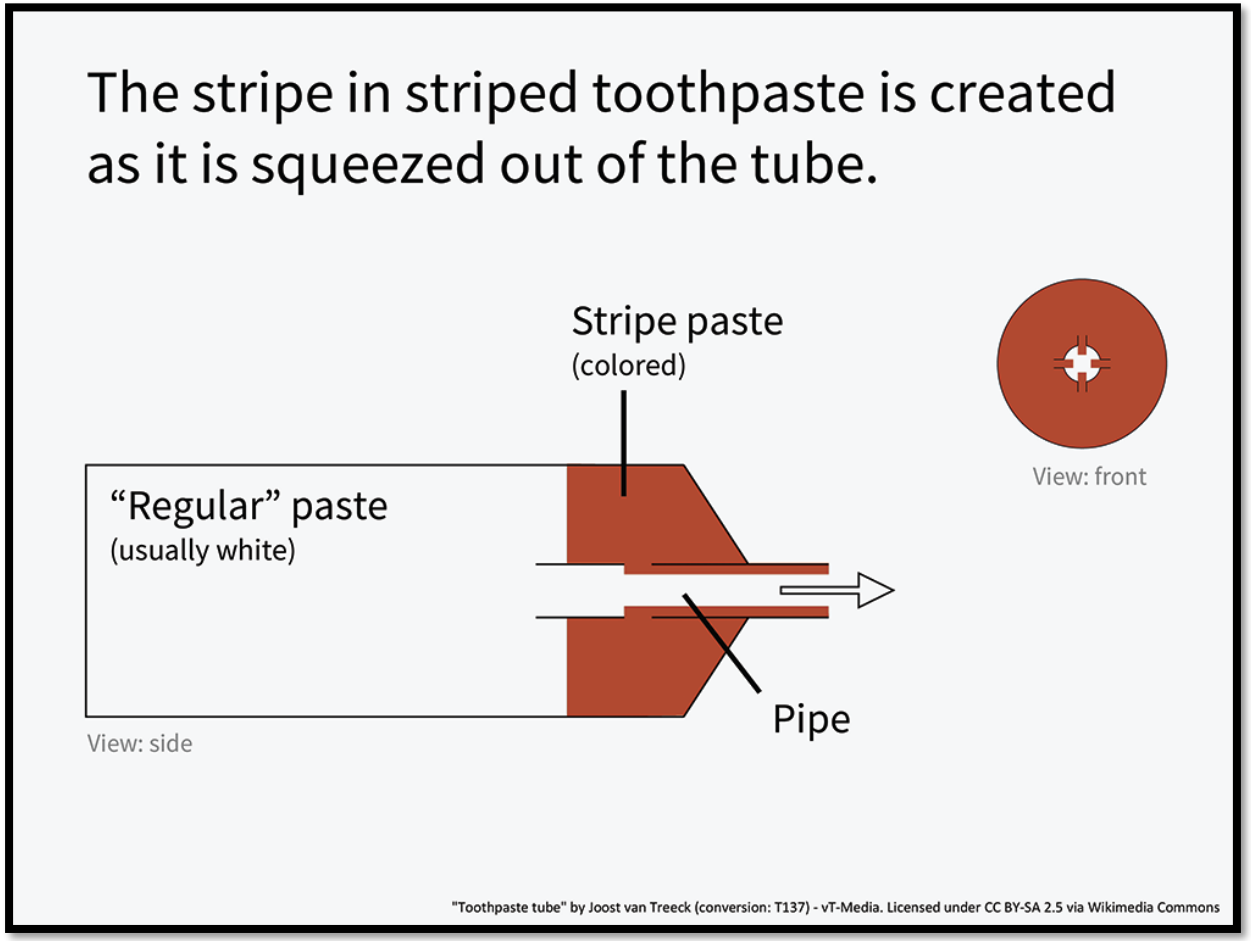
Fandrey (2018)

Progression of events right to left…?



Fandrey (2018)

Slide makeover

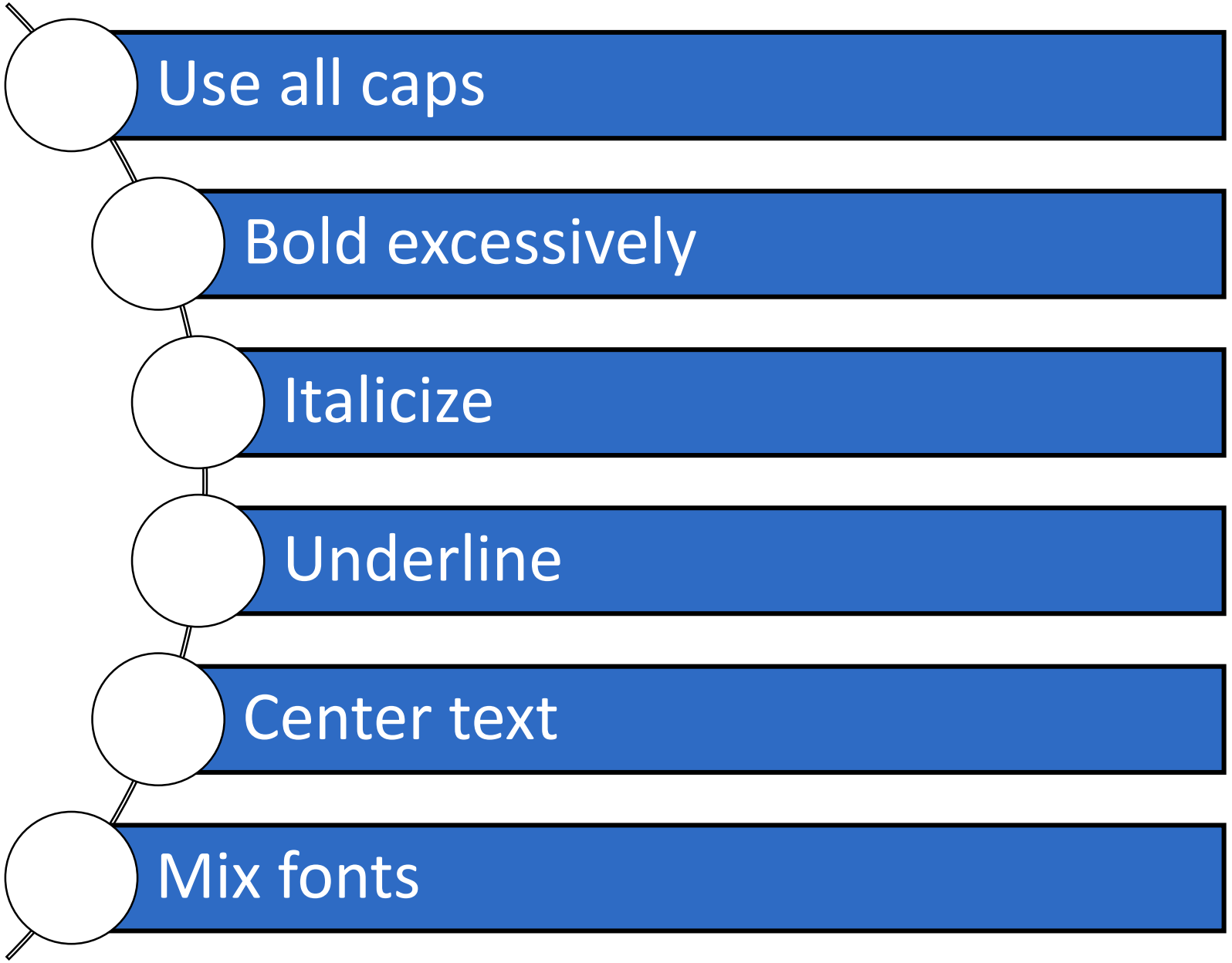


Fandrey (2018)

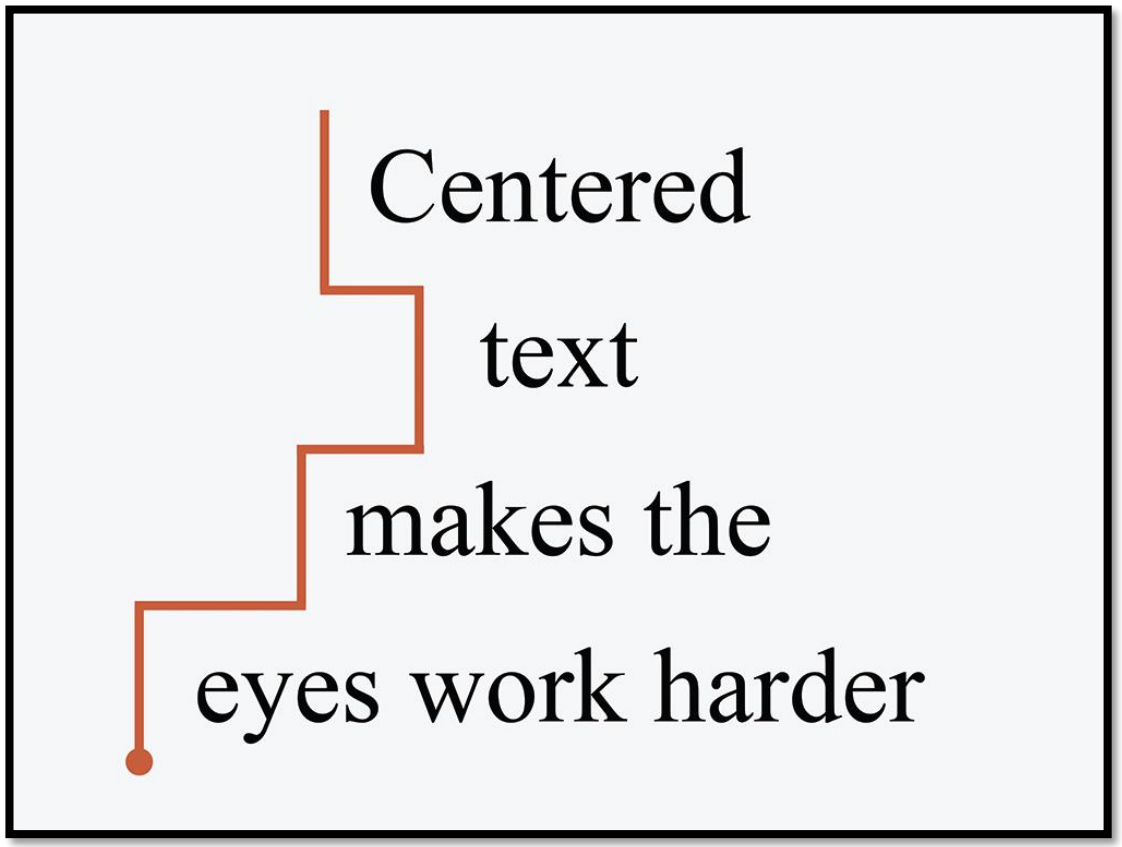
Typeface

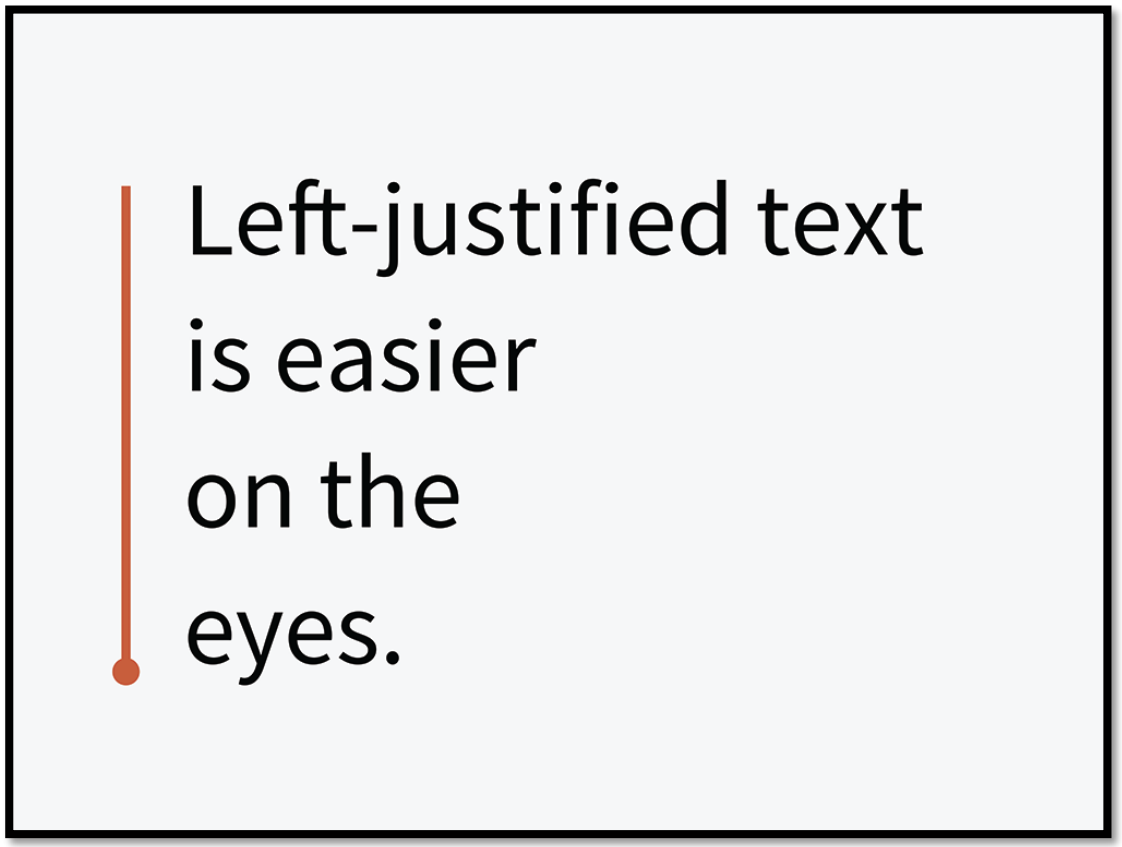
The **most important** thing about your font is that the **audience doesn't notice it**.

Don’t…


Use all caps
Bold excessively
Italicize
Underline
Center text
Mix fonts

Alignment





Fandrey (2018)

Spacing

Ipsum **vegum**

- Turnip vulputate endive cauliflower in etit euismod kohlrabi
- Avocado sodales spinach ultrices velit.
- Amaranth sem at daikon cabbage asparagus winter purslane erat kale.
- Celery ullamcorper potato scallion desert raisin horseradish spinach duis carrot in pulvinar mauris.

Ipsum **vegum**

- Turnip vulputate endive cauliflower in etit euismod kohlrabi.
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- Celery ullamcorper potato scallion desert raisin horseradish spinach duis carrot in pulvinar mauris.

Traditionally…

- We use this slide layout
- The “Title + Content” default slide layout in PowerPoint is the most commonly used slide.
- This layout promotes what you see here.
- We will refer to this as the “topic sub-topic design” and I will add some more text here because I need two lines ☺
- This design approach attempts to use the slide for three purposes simultaneously…

Guiding Attention

You can use

progressive disclosure

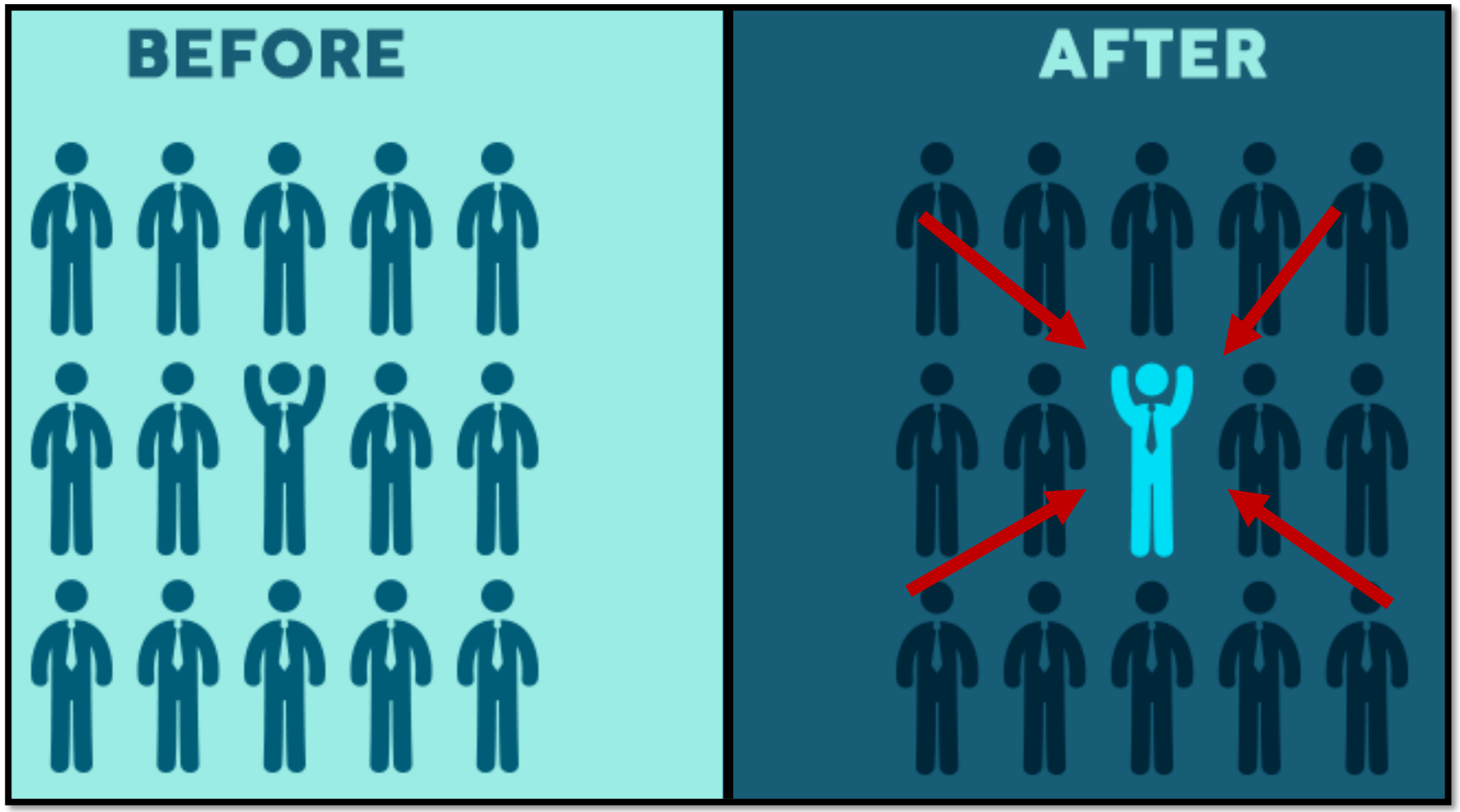
to reveal information

at a slower rate

to allow students

more processing time

Use color to draw the eye to the main point of the slide



One main idea per slide.

Utilizing **spatial positioning** and **whitespace** will drastically improve your slides

Provide a **point of entry** and **focal point**.

Attend to **spacing and alignment** issues

Use **one font** throughout your presentation

References

Fandrey, A. (2018). Academic slide design: visual communicating for teaching and learning. Scale & Fine, Minneapolis, MN.