

## **CORE Approach to PowerPoint: Evidence-Based Slide Design**

The PowerPoint slides in CORE were designed using principles of cognitive psychology and research done by experts in the field of multimedia learning.

This is a growing field of research that incorporates many different theories. Please visit the Additional Reading section of the site to see the articles, books, Web sites, and other resources that were used to develop the CORE slide design.

### **Introduction**

The PowerPoint slide design in CORE is primarily based on the Cognitive Theory of Multimedia Learning (Mayer, 1997). This theory incorporates principles from:

1. Dual Coding Theory (Paivio, 1986)
2. Model of Working Memory (Baddeley, 1986)
3. Cognitive Load Theory (Sweller, 1988)

The basic principles of these theories and their application to the CORE slide design are summarized below.

### **Principle 1: People process visual and verbal information separately.**

- There are separate pathways in the brain for processing visual information (images) and verbal information (spoken words).
- Written text is processed as verbal information, not visual information. People “hear” words when reading written text, which engages the verbal process in the brain.
- When people are exposed to corresponding images and spoken words at the same time, they use both visual and verbal information processes to store the information in their working memory. Using both processes improves peoples’ ability to integrate the information and recall it at a later time.
- This is the major principle underlying both the Model of Working Memory and Dual Coding Theory.

### **Application to CORE**

- Each slide in CORE is designed with visual images and speaker notes that are meant to be used together.
- The images on the slides are selected to maximize the visual learning process.
- The speaker notes correspond with the visual information on the slides to help the presenter verbally convey information to the audience.

**Principle 2: People can only focus on a few pieces of information at once.**

- When people are confronted with too much visual and verbal information at one time, they are unable to process it effectively through the pathways in the brain. This makes it more difficult for people to store the information in their working memory and retain it over the long-term.
- Because written text is processed as verbal information, the working memory can be overwhelmed when spoken words are combined with too much written text.
- To optimize learning, visual and verbal information should be presented in relatively small, manageable chunks.
- This is the basic tenet of Cognitive Load Theory.

Application to CORE

- Each slide in CORE is designed to visually convey only one or two key points. Extraneous images, like graph axes, are removed to reduce the amount of visual information for the audience to process.
- Slides contain as little written text as possible to reduce the amount of verbal information for the audience to process.
- The speaker notes for each slide help the presenter provide corresponding verbal information to the audience and engage the auditory pathway in the brain.

**Principle 3: People learn better when they can take relevant pieces of information and integrate them with their prior knowledge.**

- When people use both the visual and auditory pathways in the brain to process information, they are more likely to identify relevant information and integrate it with what they already know.
- Incorporating interactive elements into the presentation (i.e., asking questions, sharing relevant case examples, using storytelling, etc.) will engage the audience and increase the likelihood that they will remember the key points of the presentation.
- This is a key component of the Cognitive Theory of Multimedia Learning.

Application to CORE

- Using the speaker notes provided with each slide, the presenter should try to relate the key points to experiences with which the audience is familiar.
- Suggestions for interactive exercises are included in the speaker notes whenever possible.
- Please visit the How to Be an Effective Presenter section of the site for more information about how to do this.

## Summary

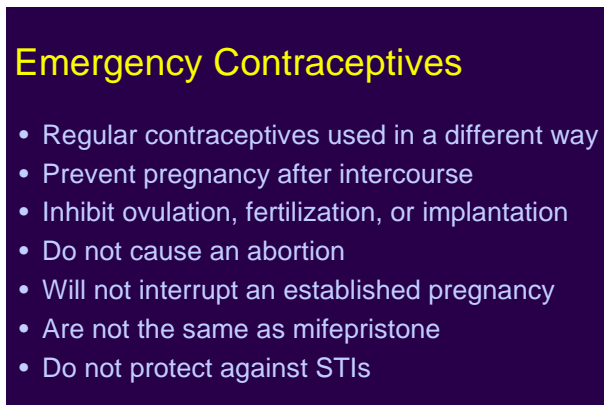
1. People are more likely to store information in their working memory and recall it at a later time when they receive corresponding visual and verbal information together.
2. To avoid overwhelming the working memory, visual and verbal information should be presented in manageable chunks of just a few key points at one time.
3. The CORE PowerPoint slides have less visible content on them than you may be used to seeing; this is designed to maximize the visual learning process.
4. Since written text is processed as verbal information, the CORE PowerPoint slides contain as little written text as possible.
5. Each CORE PowerPoint slide contains thorough speaker notes that correspond with and support the visual images on the slide. This is designed to maximize the verbal learning process.
6. Engaging the audience and making key points from the presentation relevant to them helps optimize learning.

## Applying the Evidence: Before and After Slide Examples

Too much visible information on a PowerPoint slide can overwhelm the visual pathway in the brain, causing both visual and verbal information to be lost on the audience. The examples below show how the CORE slide design maximizes retention of both visual and verbal information.

### Example 1: Distilling the Key Point

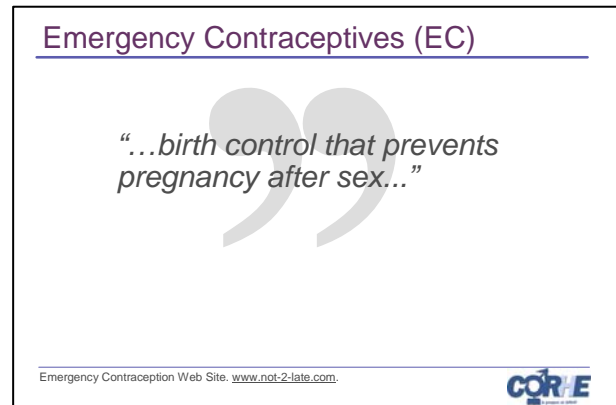
Before



**Emergency Contraceptives**

- Regular contraceptives used in a different way
- Prevent pregnancy after intercourse
- Inhibit ovulation, fertilization, or implantation
- Do not cause an abortion
- Will not interrupt an established pregnancy
- Are not the same as mifepristone
- Do not protect against STIs


After



**Emergency Contraceptives (EC)**

*“...birth control that prevents pregnancy after sex...”*

Emergency Contraception Web Site, [www.not-2-late.com](http://www.not-2-late.com)



*A minimal amount of text is used to visually depict the key point. Text from the original slide is now in the speaker notes for the presenter to verbally convey to the audience.*

### Example 2: Using Visual Representation

Before

**Defining Menopause and Perimenopause**

**Menopause**

- Cessation of menses
- Defined retrospectively after 12 months without menstruation

**Perimenopause**

- Begins with first signs and symptoms of endocrinologic change
- Menstrual cycle becomes irregular
- Ends one year after final menstrual cycle

ARHP NAMS, Menopause Curriculum Study Guide 2002  
Utian WH, Menopause 2001.

After

**Defining Menopause & Perimenopause**

A woman's lifetime

Perimenopause: First signs of change

Menopause: Diagnosed 12 months retrospectively

NAMS, Menopause Curriculum Study Guide, 2002.  
Utian, WH, Menopause, 2001.

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*The key points are shown visually, supported by a small amount of text. The speaker notes verbally reinforce the image and key points.*

### Example 3: Reducing Extraneous Visual Information

Before

**Why Patients Don't Bring Up Sexuality Issues with Providers**

% of respondents

Reason	Percentage
Fear of embarrassing provider	68%
Believe provider will dismiss concerns	71%

ARHP Marwick JAMA 1999

After

**Why Don't Patients Bring Up Issues?**

68%: Fear of embarrassing provider

71%: Believe provider will dismiss concerns

Marwick C. JAMA, 1999.

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*Removing the axes reduces the amount of visual information for the audience to process without losing the main point of the slide.*