

<p><u>Slide 1:</u> Title Slide</p>	<p>Text Only/No Narration</p>
<p><u>Slide 2:</u> Instructional Objectives</p>	<p>Text Only/No Narration</p>
<p><u>Slide 3:</u> Book Image</p>	<p>The second edition of the book “e-Learning & The Science of Instruction” by Ruth Colvin Clark & Richard Mayer defines the “Modality Effect” & “Redundancy Effect” in chapters 5 & 6.</p>
<p><u>Slide 4:</u> Modality Principle</p>	<ul style="list-style-type: none"> • The Modality Principle states that words in a presentation should be listened to rather than read when visual images are present. • The fundamental concern is that learners may experience an overload of their visual/pictorial processing when they must simultaneously process images and the printed text that refer to them. • This is especially the case if the information is complex or presented at a rapid pace. • Essentially, the top chart shows the overload that should be avoided, while the bottom chart displays the separation of the visual and auditory channels that should be encouraged. • Cognitive Psychologists and educators following the <u>cognitive theory of multimedia learning</u> believe the evidence supports learners retain MORE by splitting information into separate, complimentary visual and auditory channels.
<p><u>Slide 5:</u> Example</p>	<ul style="list-style-type: none"> • [WAIT 10 SECONDS BEFORE NARRATING SLIDE] • When an image and text is presented simultaneously, the information must both be initially process by the visual channel. • Additionally, the scanning back and forth between words and images mean that the learner cannot fully attend to the image, and may miss out on the presentation’s content.

	<ul style="list-style-type: none"> • Modality Principle is VERY well researched. • A Study by Moreno & Meyer in 1999 found students produced twice as many solutions to problems given with animation and narration as compared to questions given with animation and text.
<p><u>Slide 6:</u> Exceptions</p>	<ul style="list-style-type: none"> • Of course, if only the printed word is read without graphics present, there is no overload of the visual channel. • If the learner is already very familiar with the material, OR if they are second language learners extremely unfamiliar with the presentation's language, there may be a need to include text with the visual graphics. • Other exceptions may occur when the terms are extremely technical or giving directions w/many steps . In these cases, key terms may be important for reference support.
<p><u>Slide 7:</u> Redundancy Principle</p>	<ul style="list-style-type: none"> • The Redundancy Principle states that visuals should be explained with EITHER narrated audio or printed text, but NOT both. • Although it may seem like common sense to include as much information as possible in order to offer the learner multiple learning modalities, evidence suggests that this may be detrimental to acquiring the presentation's content. • This chart demonstrates the overload of the visual channel along with the redundancy of words being spoken and read.
<p><u>Slide 8:</u> Example</p>	<ul style="list-style-type: none"> • All energy comes from the sun. • Plants use the light energy to take in oxygen and give off carbon dioxide. Animals also give off carbon dioxide when exhaling, and also while decomposing after death. • Volcanoes and lightning lit forest fires are natural releasers of carbon dioxide. • Human lit fires, cars, & factories are un-natural releasers of carbon dioxide.

	<ul style="list-style-type: none"> • Including both spoken audio and written text with graphics not only overloads the visual channel, requiring the learner to continually scan back and forth between text and graphics, but when narration is included with text, the learner may also try to compare the two streams of information, and waste cognitive effort in reconciling the content rather than comprehending the intended message. • A study by Craig, Gholson, & Driscoll in 2002 found that students in the non-redundant group produced 43 to 69 percent MORE solutions than students within redundant groups. • This example should help to demonstrate that if we combine our knowledge of the Modality Principle with the Redundancy Principle, we come to the conclusion that ideally, pictures should be accompanied with spoken narration INSTEAD of printed words.
<p style="text-align: center;"><u>Slide 9:</u> Exceptions</p>	<ul style="list-style-type: none"> • Again, if there is no pictorial presentation, then there will not be an overload of the visual system. • Low Level Second Language Learners may need to read the printed text in addition to hearing how the words are pronounced.
<p style="text-align: center;"><u>Slide 10:</u> Solutions for ELL</p>	<ul style="list-style-type: none"> • For Low Level Language Learners, the following accommodations will be helpful: <ul style="list-style-type: none"> ○ If words are narrated AND printed, make sure the text is read EXACTLY as printed. ○ Do not use overly technical, unfamiliar, imprecise words. ○ Read the text audibly, clearly, and at a slower than conversational pace in order to allow for additional processing time of the language. ○ Leave each slide on the screen longer than normal in order to give ample opportunity for the learner to process the graphics combined with the printed text.