Multimedia Principles Discussed in “Is Your Tutorial Pretty or Pretty Useless?”

- **Signaling principle**: Using signals, or cues, that highlight what information is important and should be noticed improves learning.

- **Contiguity principle**: Corresponding information (textual descriptions and images / audio narration and images) should be placed together.

- **Split-attention principle**: Diagrams should be integrated.

- **Segmenting principle**: Break up tutorials into pieces that allow the learner to pace themselves.

- **Sequencing principle**: If one concept builds on another, have a clear order for your tutorials / tutorial segments.

- **Coherence principle**: Remove any audio, image, and text that is not necessary / relevant for better learning.

- **Animation principle**: Static images can (sometimes) generate more learning than animation.

- **Modality principle**: People learn more from audio narration and images than from text and images.

- **Redundancy principle**: People learn more from audio narration and images than from audio + text + images.

- **Personalization principle**: Tutorials should be in a conversational style.

- **Voice principle**: Friendly, human voices without accents are best for learning.

- **Pre-training principle**: Introducing learners to concepts before seeing them in action increases learning.

- **Worked examples principle**: Showing the process of solving a problem increases learning.

- **Self-explanation principle**: Prompting students to think metacognitively about what they have learned increases learning.

- **Expertise reversal principle**: Those with previous knowledge of a subject need less worked examples, sequencing, and explanations.