

E-Learning Principles For Effective Instruction

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The internet is flooded with e-learning tools for math, language arts, history, and science. Many of them effectively use key design principles noted by Michael Allen. There is a limited amount of e-learning instructional tools available for learning music, specifically music notation. Music notation is the language of reading and writing music used in the western hemisphere. It is taught in a music class concurrently with learning to play an instrument. Like other languages, it contains symbols with specific meanings. These symbols can be combined to create different aural contexts. Just like a book is made of chapters, paragraphs, and sentences to convey ideas, music has its own structures ranging from a monophonic cell phone ring tone to a polyphonic Beethoven symphony. Several websites attempt to teach the language of music notation, using instructional tools ranging from text to java applets. When applying theories of effective design principles to these e-learning websites, some succeed where others fail.

Clark and Mayer's design principle of segmenting and pretraining applies to complex curriculum. Segmenting breaks down the complex curriculum material and into smaller learning segments. They suggest too much presentation of material containing interrelated concepts leads to cognitive overload (Clark, Mayer 2008). Pretraining presents the learner with key curriculum material and concepts before the instruction is given. Pretraining is necessary when instruction includes complex procedures and processes (Clark, Mayer 2008). Key concepts can be presented before or after to reduce the cognitive strain of the learner. Of the music notation websites researched, MusicTheory.net separates the different concepts of learning music notation into smaller segments. Content such as pitch, duration, staff structure, and others have been separated from each other. Users can easily navigate to each segment, which provides a lesson on the particular concept without introducing other unnecessary curriculum material.

Another successful example of segmenting is from a non-music notation website, Articulate.Community.com. These "E-learning Heroes" provide step by step instructions on creating e-learning courses from PowerPoint files (Asch, Kuhlmann, Schwartz, Schwartz, & Suros, 2011). The tutorials are broken down into segments, teaching a specific skill set of the software. The segments are hierarchical, and are easy to navigate to on the website.

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Clark and Mayer's principle of segmenting and pretraining is completely disregarded within several "learn how to read music" websites. ReadSheetMusic.info offers two courses of learning how to read music notation. Both courses are provided by two different authors. The first course, *The Basics of Reading Music* by Kevin Meixner, attempts to explain music notation on one single web page. Using little graphics and scarce interactivity, the author violates the principle by introducing too many musical concepts in the text at the same time. The author also fails to properly explain the key musical terms he loosely interjects into the textual description of reading and understanding music notation. Too much information is given too soon and fast, leaving the user confused with more questions than answers. The second course, *All You Ever Wanted To Know About Sheet Music And How To Read It*, attempts to segment the learning material on different webpages. However, the author also violates the principle by introducing too many musical concepts in each segment. Key terminology is used with inefficient explanations that only an experienced musician would understand. The first segment attempts to teach rhythms. The author provides a graphic with text of five musical notes, with no explanation of what a note is and its function in music notation. A description of the how long each note is given by how many beats they receive, with no explanation of what a "beat" is. The author then describes how each note's name relates to a measure, yet the term "measure" and its function hasn't been explained to the reader. The author violates the segment principle in his segments by using too much unexplained key terminology in the instruction. If the author had first explained the terminology separately using the pretraining principle, the author's instruction would not cause so much cognitive overload to the reader.

Another "learn to read music" website that violates Clark and Mayer's principle is DataDragon.com. The author segments how to read music into eight sections. The first lesson, *Clefs*, introduces the reader to the treble and bass clef by providing a graphic of each symbol. On the same web page the reader is also subjected to a graphic of two music staves, time signatures, quarter notes, pitch names, measures, and quarter rests labeled "ignore for now" (Lux, n.d.). No explanation for the other symbol's functions is given. The second lesson again violates the principle by explaining a time

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signature's function using the terminology whole note, half note, quarter note, and eighth note. Again, the author is using terminology that has yet to be explained, expecting the reader to already know it or miraculously understand. Both websites provide a very poor tutorial of how to read music. They attempt to segment the instruction, but fail by using too much unexplained terminology and concepts in the lessons. As Clark and Mayer state, "the learner does not have the sufficient cognitive capacity to engage in the essential processing required to understand the material."

Motivation is a lengthy principle Allen uses to promote good e-learning instruction. Motivation is so important, Allen creates an $e=mc^2$ formula for effective e-learning and prescribes seven different methods of motivating learners (Allen 2003). A good example of using the "learner at risk" method is the moon math activity from kidsNumbers.com. Learners navigate a spaceship using simple key presses while attempting to land on designated landing pads. The spaceship will eventually run out of fuel, and in order to continue the learner must solve a basic math problem to gain more fuel. The activity successfully motivates the learner by putting them at risk throughout the game. Learners must successfully navigate the board avoiding objects, or their spaceship will explode upon contact. They must also maintain their fuel otherwise their spaceship will fall to the ground and explode. The activity is challenging, avoids boredom, and reinforces basic addition practice for young learners.

SmartMusic is software that successfully uses Allen's motivation principle through intrinsic feedback. Intrinsic feedback allows the learners perform an exercise on their instrument and see if their performance was correct or incorrect. Students play a designated exercise while the software listens and assesses their performance of pitch and rhythm. Delayed to the end of the exercise, the software provides a graphical assessment displaying correct and incorrect notes and rhythms played by the performer. An audio recording is also provided for the student to listen to. The learner is given the opportunity to try the exercise repeatedly until they have reached a perfect score or are satisfied with their assessment. The software successfully motivates the learner by providing delayed intrinsic feedback away from the instructor and their peers.

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Both the Teoria and eMusicTheory websites offer activity drills for practicing music theory concepts. Activities such as naming pitches, naming intervals, and pressing the correct piano key for a given pitch are available for learners to use for free. Unfortunately the activities violate Allen's principle of motivation in several ways. The remedial exercises lack anticipated outcomes, and are not interesting or appealing to the learner. The tasks given are simple and are completed in a single step by clicking on the correct answer. An argument could be provided for intrinsic motivation, as the activity displays feedback for correct or incorrect answers, however the feedback is immediate and not delayed until the end of the session. The activities use a timer and show a percentage of correct answers, however the learners are not put into an "at risk" motivational situation, as there is no goal given to achieve in the exercise. The exercises provide remediation of various music notational concepts, however they are dull and become boring very quickly.

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