Using MaxMSP to Integrate Learning of Physics and Music

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This project integrates musical activity with the learning of concepts in areas such as physics and computer science. While the expression of musical ideas utilizes the laws of physics on many levels, the study of the two fields often is disparate. Traditional music education does little to promote understanding of the scientific concepts behind disciplines such as acoustics. Similarly, the field of acoustics only tangentially addresses issues relatable to a student educated in the traditional U.S. music system. The goal of this research is to develop a computer software application that will more closely integrate learning and understanding of both music and the physics of sound, which is the scientific field of acoustics. This work will take place utilizing the MaxMSP programming environment, which enables the construction of small applications known as *Max Patches*. These patches can be tailored in an infinite number of ways for teaching, study, and musical expression. The Max patch to be developed will include a virtual keyboard, an oscillator, and a series of computer objects that will visually output mathematical information based on the waveform that is created by the notes on the keyboard. Hence the virtual keyboard will provide understanding into basic acoustics through the exposition of the fundamental musical waveforms and the underlying principles of their nature. Playing the notes on the keyboard serves two purposes. First, it will help participants grasp basic musical concepts such as note memorization and relative pitch. Simultaneously, it will expose subjects to a visual approach to understanding the physics of the notes being played. The goal is to more closely integrate scientific understanding of sound while teaching the user to engage those concepts in a musical fashion.