Pedagogical Content Knowledge for *Vibrato*:

More than a Toolbox of Tricks

Citation:

Grieser, D. R., & Hendricks, K. S. (accepted; 2018, Fall). Pedagogical content knowledge for vibrato: More than a toolbox of tricks. *American String Teacher.*

How many workshops or clinics have you attended in the hope that you would walk away with a toolbox of tricks to teach vibrato to your students? In addition to workshops and clinics, a simple internet search for teaching vibrato on a stringed instrument will display numerous vibrato videos and tricks that can be added to your vibrato-teaching toolbox. However, all the tricks and exercises for teaching vibrato are useless without a solid foundation of content knowledge, or the basic understanding of skills and principles of vibrato technique.

The primary goal of using a particular instructional strategy or "trick" would be to introduce and reinforce specific content knowledge for complex skills such as vibrato. Using "tricks" learned at a workshop or online might be helpful as long as the underlying content knowledge is taught in conjunction with the instructional strategy. However, instructional strategies sometimes used to teach a complex skill such as vibrato may or may not have an explicit connection to the content knowledge.

This article focuses on the content knowledge and pedagogical knowledge for vibrato in the heterogeneous string classroom. In our first article, "Pedagogical Content Knowledge for *Shifting*: More than a Toolbox of Tricks" we focused on content knowledge and pedagogical knowledge needed for successfully teaching shifting. Teaching vibrato is similar to the complexity of teaching shifting, which involves a series of muscles, motion and mechanics. As a result, string educators need to be able to choose instructional strategies that will transform content knowledge in a way that students can understand and apply that new knowledge.

Pedagogical Content Knowledge

Pedagogical content knowledge (PCK) includes "the ways of representing and formulating the subject that make it comprehensible to others" (Shulman 1986, p. 9). In other words, a teacher must know the facts and concepts of a subject, in addition to understanding how

the principles and structures are organized. Research suggests that teachers tend to acquire PCK through a variety of sources, including their student experiences, teacher education programs, classroom experience, and professional development activities (Grossman 1990; Shulman 1986, 1987). Pedagogical content knowledge with regard to music has been defined as the "knowledge of music teaching techniques, engaging students with music in a meaningful way, implementing the music curriculum effectively, assessing students' abilities in the various aspects of music, [and] explaining and demonstrating musical concepts" (Ballantyne & Packer 2004, p. 302).

Content Knowledge of Vibrato

Vibrato is the oscillation of a pitch. Although the definition is straightforward, vibrato is a complicated skill. Moreover, teaching vibrato in a heterogeneous string class can be challenging. Hamann and Gillespie (2013, p. 96) provided a few general principles for basic vibrato, provide basic content knowledge required for the skill: For violins and violas, arm vibrato uses the left forearm as the primary mechanism to generate vibrato, whereas wrist vibrato uses the wrist as the mechanism to generate vibrato. The vibrato motion is generated by moving the arm and hand as a unit for cellos and basses. Additionally, the arm or hand can move either as a unit or independently for the violin and viola depending in whether arm vibrato or wrist vibrato is taught. The vibrato motion is measured by speed and width. Furthermore, rolling the fingertip while flexing the first knuckle on the violin and viola produces vibrato. For cello and basses rolling the finger on the string while moving the arm and hand in a straight line produces vibrato.

Pedagogical Knowledge of Vibrato

String pedagogues offer various pedagogical approaches and beliefs about how to teach vibrato (Applebaum & Lindsay 1986; Fischer 1997; Galamian, 1962; Mantel 1972). There seems

to be a general agreement among the various approaches that vibrato should be continuous, initiating at the beginning of the tone and carrying through to the next tone (Applebaum & Lindsay 1986; Fischer 1997; Galamian 1962). In addition to the work of major string pedagogues there have been systematic approaches developed to teach vibrato technique (Allen et al. 2004; Applebaum & Lindsay 1986; Fischbach & Frost 1998; Galamian 1962; Gillespie 1993; Rolland et al. 1986).

Pedagogical Content Knowledge for Vibrato: A Scaffolding Approach

In the previous article on shifting, we presented instructional scaffolding as an effective process to teach shifting. Scaffolding techniques can also be systematically planned to help students gradually learn. Similar to shifting, new concepts and skills are broken into chunks, providing a concrete structure for the teacher and students. Using specific PCK for vibrato, we present a scaffolding process that includes: preparatory vibrato exercises (no instrument and no bow), vibrato exercises (instrument and no bow), vibrato exercises (instrument and bow) and vibrato in context (exercises and string repertoire). Rolland et al. (1986), Hamann and Gillespie (2013), and other pedagogues have provided many useful instructional strategies for teaching vibrato that have been adapted and included in this scaffolding process. We invite the reader to consider with each exercise how both content and pedagogy are incorporated to provide a clear awareness of both what is being taught, and how.

Preparatory Vibrato Exercises (No Instrument, No Bow)

Beginning vibrato exercises reinforce the necessity for relaxation in the left-hand. Additionally, vibrato exercises without an instrument or bow allow students to focus entirely on new left hand movements. The wrist and arms joints can move freely while the student maintains the shape of the hand for real vibrato. Gearhart (2016) refers to the violin and viola motion as the

vibrato pulse. The "pulse" is a light forward and rebound motion that should be practiced separately away from the instrument so that the motion can be learned kinesthetically without extra complexity and tension of holding the instrument simultaneously.

Shakin (Hamann & Gillespie 2013). Provide students with a small container (tic-tac, nerd candy, egg shaker) and have students hold shaker in the same manner as playing an instrument. Violins and violas should loosen their wrists so that the hand flops toward the shoulder and then send the wrist in opposite direction so the hand moves away from the shoulder. Cellos and bass should hold the shaker between the thumb and first and second fingers and the practice an up and down motion of the arm, not from the rotation of the wrist or hand. Turn on a metronome and have the students shake their containers together and gradually increase the tempo of the metronome. The objective of this exercise is to help the students learn to oscillate the shaker back and forth with the wrist in an even, relaxed way.

Flexibilbity of first knuckle joint (violins and violas). Have the students create a circle with their left index finger and thumb. Then have them "flex" their first knuckle joint so that it alternates between a concave and a convex position (see Figure 1). This exercise helps students loosen the knuckle joint, giving students a visual and physical sensation of finger flexibility. The exercise should be repeated with each finger so that all fingers receive equal and consistent practice.

Pivot (cello and bass). Have the students place their left thumb in the center of their right palm and lightly close the right hand. Practice the vibrato motion on top of the right hand by having the students rotate the forearm down and back. Using the right hand as a gentle "spotting" technique allows students to feel the sensation of a relaxed thumb (i.e., they can feel when they are squeezing their own hand too hard). They are also able to use the shape of the lightly-closed

hand as a mold for the direction of the left hand, without losing the general full arm movement. Next, have students touch their collarbones with the end of their second finger and rotate their arm while keeping their elbow motionless (Hamann & Gillespie 2013). The movement to the collarbone allows a gradual shift to a more authentic location, but without adding the more challenging step of conducting the exercise on the cello or bass itself.

Vibrato Exercises with Instrument; no Bow

Vibrato exercises without a bow enables the students to practice the correct movement without the added complexity of the bowing technique, so that students can focus their attention on keeping the left arm, elbow, wrist, fingers and thumb relaxed. During the exercises, the teacher can monitor violin and viola students to make sure that the first knuckle joint of the finger bends. Cellos and basses will roll the finger on the string while ensuring that the forearm does not rotate incorrectly but moves in a straight line.

Relaxation of left arm, hand and thumb. "Swingplop" is an exercise where the instrument is held in playing position and the left arm swings freely and relaxed imitating an elephant trunk. On cue, the arc of a swing is completed by seating or "plopping" the fingers on the neck of the instrument (Fischbach & Frost 1998). This activity promotes a loose arm, large muscle activation, and encourages dropping arm weight down on the string without pressing.

Tapping Exercises (violins and violas). While the thumb is positioned at the heel of the neck with the fingers curved, the students tap the body of the instrument with their third finger. Have students repeat the same exercise with their other fingers one at a time (Hamann and Gillespie 2013). Practicing this exercise at the shoulder of the instrument prevents students from collapsing the wrist, thereby providing extra support for positioning the hand correctly.

Moveable Bout (violins and violas). Have students simulate the vibrato motion at the bout of the instrument. Place one fingertip on the D or A string and practice the vibrato motion and repeat the same exercise with the other fingers. Gradually transfer the vibrato motion from the bout of the instrument to first position. Practice the vibrato motion in all the intermediate positions between the bout and first position (Gillespie 1993). The gradual movement from the bout to the string allows students to focus attention on the correct technique without the added complexity of playing on the string. Once they have established a kinesthetic memory of the skill, they can then transfer that knowledge to their playing position.

Polishing the String (Rolland et al. 1986). Have students slide one finger up and down the string, covering the distance of three half steps. Repeat the exercise with each finger separately on all four strings, so that the arm has an opportunity to practice the sliding motion at all the various angles and levels that are produced with different fingers and at different strings. Gradually shorten the distance, from two half-steps to one half-step, so that students are able to mimic the actual distance of the vibrato after first mastering the technique at a slower, more visible level. The cello and bass vibrato motion is produced by a combination of sliding and pivoting. Similar to violins and violas (and for the same pedagogical reasons), cellists and bassists can practice sliding their fingers up and down the string, gradually shortening the travel (Hamann and Gillespie 2013).

Pivot and Silent Bow (cello and bass). Have students move the pivot exercise discussed earlier to the string and practice the pivot motion on each string. Students can silent bow while they are practicing the pivot motion, thereby adding another physical element to the skill (as students are ready for more challenge), but without yet adding sound, which may distract the students or cause their attention to focus too much on other technical elements of bowing.

Vibrato Exercises with Instrument and Bow

Right Hand Support (violins and violas). Have students move their left hands to first position and have their right hand fingers touch their left arm below the wrist. The student's own right hand becomes a "teacher," assisting the left hand as it simulates the vibrato motion. Students should practice the vibrato motion with one finger at a time and gradually remove the assistance of the right hand when the left hand is able to move independently without the extra support. After the students are able to continue the vibrato motion without the assistance of the right hand, they can then begin bowing while vibrating (Hamann and Gillespie 2013). This gradual sequencing of skills allows the student to move from dependence on teacher, to dependence on the help of another hand, to independent left hand movement, and finally to independent movement while introducing an unrelated and additionally complex technique.

Pivot and Bow (cello and bass). After students can pivot and silent bow, have the students practice the pivot exercise and bowing on an adjacent string. For instance, the student is practicing a pivot exercise on the D string and bowing an open A string. This activity adds one more level of complexity with the bow while students continue to reinforce a correct and relaxed vibrato with the left hand.

Vibrato in Context: Exercises and String Repertoire

Lastly, vibrato opportunities within the context of music are introduced. Due to the complexity of vibrato, the combination of music reading knowledge and vibrato knowledge simultaneously can be difficult. Therefore, once the teacher has introduced the student to performing vibrato while bowing on the same string, then the student can practice using vibrato while playing songs that are memorized or by simply "improvising" a variety of slow notes in various positions.

When students have fluent and relaxed vibrato across their range of notes and positions, the teacher can purposefully select repertoire and method books that provide students with opportunities to reinforce the vibrato. For example, *Viva Vibrato* (Fischbach and Frost 1998); and *Essential Technique for Strings* (Allen et al. 2004) are method books that can help students reinforce key shifting concepts addressed in the classroom when they are at home, and can also be used as supplemental materials in the classroom. Furthermore, music repertoire such as *Jupiter* (Holst and Monday 2006) can help students practice vibrato on slow and sustained notes, allowing them to hear the distinct sound difference when they add vibrato to each note.

Conclusion

In this article we have supplemented a few vibrato exercises with a discussion of the content and pedagogical knowledge that supports each of them. Vibrato is a complex skill and requires a certain level of string-specific content knowledge before any pedagogical approach should be introduced. The use of certain activities without a connection to foundational principles of vibrato technique might result in teaching faulty vibrato concepts to our students, as we may lack the awareness of what is needed – or why it is needed – and thereby miss or misuse an approach.

Often the depth of subject-specific content knowledge will influence a teacher's pedagogical choices, and a lack of pedagogical content knowledge can affect a teacher's instruction (Grossman et al. 1989). Furthermore, previous research of (PCK) suggests that teachers need both subject-matter content knowledge and pedagogical knowledge to teach a specific discipline (Shulman 1986, 1987). Based on this premise, we can assume that string educators with a strong foundation in both string-specific content knowledge and pedagogical

knowledge will select and use strategies that are most helpful and productive in ensuring long-term student success.

References

Allen, Michael, Robert Gillespie, and Pamela Tellejohn Hayes. *Essential technique for strings: intermediate technique studies.* Hal Leonard Corporation, 1997.

Applebaum, Samuel, and Thomas Lindsay. *The art and science of string performance*. Alfred Music, 2005.

Ballantyne, Julie, and Jan Packer. "Effectiveness of preservice music teacher education programs: Perceptions of early-career music teachers." *Music Education Research* 6, no. 3 (2004): 299-312. doi:10.1080/1461380042000281749

Holst, Gustav and Deborah Baker Monday. *Jupiter,* Kjos Music Company, 2006

Fischbach, Gerald, and Robert S. Frost. *Viva vibrato!: Teacher's manual and score*. Neil A. Kjos Music Company, 1997.

Fischer, Simon. *Basics: 300 exercises and practice routines for the violin*. Vol. 7440. Edition Peters, 1997.

Galamian, Ivan. *Principles of violin: playing & teaching*. Englewood Cliffs, N.J.: Prentice-Hall, 1962.

Gearhart, Fritz. "An Approach to Teaching Hand Vibrato." *American String Teacher 66*, no. 4 (2016): 22-25.

Gillespie, Robert. "Factors for evaluating upper string instrument vibrato and a comparison of two instructional approaches." *Dialogue in Instrumental Education* 17 (1993): 37-51.

Grossman, Pamela L. *The making of a teacher: Teacher knowledge and teacher education*. Teachers College Press, 1990.

Hamann, Donald L., and Robert Gillespie. *Strategies for teaching strings: Building a successful string and orchestra program*. (3rd ed.). Oxford University Press, USA, 2013.

Mantel, Gerhard. *Cello technique: principles and forms of movement*. Indiana University Press, 1995.

Rolland, Paul, M. Mutchler, and F. Hellebrandt. "The teaching of action in string playing." *Urbana* 51 (1986): 61801.

Shulman, Lee S. "Those who understand: Knowledge growth in teaching." *Educational researcher* 15, no. 2 (1986): 4-14. doi:10.3102/0013189X015002004

Shulman, Lee. "Knowledge and teaching: Foundations of the new reform." *Harvard educational review* 57, no. 1 (1987): 1-23. doi:10.17763/haer.57.1.j463w79r56455411