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## Teacher Knowledge and Lesson Preparation in Music Education: A Review of the Literature

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### Abstract

*Reviews of the literature on lesson preparation in music education may provide a variety of information, techniques, and methods with which to improve lesson structure. The use of Shulman's (1987) teaching knowledge, specifically pedagogical content knowledge and content knowledge, could help students prepare in a more effective manner. The present review of the literature describes important issues in preservice teachers' development, including knowledge of teaching, music content knowledge, pedagogical content knowledge, and lesson planning, as well as potential applications to help better prepare instrumental music teachers.*

**Keywords:** lesson planning, pedagogical content knowledge, content knowledge, music teacher education, preservice education

Although rehearsal preparation has been investigated extensively (Bazan, 2010; Conway, 2002; Lane, 2010; Lane & Talbert, 2015; Millican, 2013; Shaw, 2017; Silvey & Montemayor, 2014), there are often too many variables to study at one time; consequently, researchers have investigated individual techniques, such as how lesson planning (Brittin, 2005; Lane & Talbert, 2015; Schmidt, 2005), score study (Lane, 2006; Silvey & Montemayor, 2014; Silvey, Montemayor, & Baumgartner, 2017), conducting skills (Forrester, 2018; Manfredo, 2008; Silvey, 2011), and pedagogical content knowledge (Ballantyne & Packer, 2004; Haston & Leon-Guerrero, 2008; Millican, 2009, 2016; Wacker, 2018) influence preservice music teachers' preparation. These extensive approaches to lesson preparation allow for a revisioning related to preservice teacher development. I will describe the relationship between pedagogical content knowledge, content knowledge, and lesson planning. Given the exploration of lesson planning in general education settings and music education specifically, a more well-rounded exploration of the aforementioned topics is important in understanding preservice music teacher preparation. Therefore, I will highlight the important intersections of preservice teachers' development, including content knowledge, pedagogical content knowledge, and lesson planning, as well as explaining potential applications to help better prepare instrumental music teachers.

### **Knowledge of Teaching**

During the latter part of the 20th century, Shulman (1986, 1987), an educational psychologist, began research on teacher knowledge and proposed a framework describing how effective educators combine various skills and components of teaching. He introduced the concept of teacher knowledge in response to what he called a "missing paradigm" (Shulman, 1986, p. 7) in teaching and teacher education. He identified seven types of knowledge teachers can use in the classroom:

- content knowledge (CK);
- general pedagogical knowledge;
- curriculum knowledge;
- pedagogical content knowledge (PCK)
- knowledge of learners and their characteristics
- knowledge of educational contexts; and
- knowledge of educational ends, purposes, and values (Shulman, 1987, p. 8).

Scholars exploring content in various ways became interested in CK and PCK. Several researchers have used these frameworks in multiple content areas, such as math (Ball, 1993; Hill, Schilling, & Ball, 2004; Ball, Thames, & Phelps, 2008; Silverman & Thompson, 2008), science (Gess-Newsome & Lederman, 2001; Magnusson, Krajcik, & Borko, 1999; van Driel, Verloop, & de Vos, 1998), and music (Ballantyne & Packer, 2004; Forrester, 2018; Millican, 2008) to further understand teaching practices.

Within music education, researchers have begun to investigate the role of PCK in preservice music education majors' development as teachers. Several investigators have suggested that preservice teacher preparation programs must emphasize PCK that is related to music teaching, such as instrument knowledge, proper breathing skills, and posture (Ballantyne & Packer, 2004; Forrester, 2018; Gohlke, 1994; Haston & Leon-Guerrero, 2008; Millican, 2013). More specifically, scholars have investigated how PCK affects the delivery of instruction (Millican, 2012; Raiber & Teachout, 2014), the application of technology in the classroom (Bauer, 2013; Mroziak & Bowman, 2016), jazz education (Venesile, 2011), applied music teaching (Emerich, 2015; Villarreal, 2010) and rehearsal preparation (Wacker, 2018).

Pedagogical content knowledge is important in music education because with it, novice teachers

may be able to create more useful lesson plans, which will lead to better student outcomes.

### **Content Knowledge**

There are several applications of CK in secondary music teaching. Content knowledge is defined as factual knowledge of a specific subject (Millican, 2008; Shulman, 1987) and Millican (2008) has further defined concepts related to particular disciplines. Knowledge of content can include formulas in mathematics, phonemes in English, scientific methods, or music theory. Additionally, there is evidence that the possession of strong CK is an important criterion for quality teaching (Kaplan & Owings, 2002; Okpala & Ellis, 2005).

Researchers have indicated that CK is important, and teachers must understand their content deeply in order to be successful (Hill, Schilling, et al., 2004; Kennedy, 1998). Without appropriate levels of CK, teachers may struggle to help students learn necessary content (Ball & McDiarmid, 1990; Snow, 1998). Hill, Ball, and Schilling (2008), who investigated mathematics education, broke CK down into three groups: common CK, specialized CK, and knowledge at the mathematical horizon. They described common CK as the basic skills known by most adults, whereas specialized CK is knowledge of the content specifically needed by educators (Ball, Thames, et al., 2008). Mathematical horizons indicate an “awareness of how mathematical topics are related over the span of mathematics included in the curriculum” (Ball, Thames, et al., 2008, p. 403). In other words, teachers should not only know if a student is correct or incorrect, they should also know why his or her answer is wrong and how to fix the problem, which requires a deeper understanding of the content.

### **Music Content Knowledge**

There are several applications of CK in secondary music. One application involves the skills required for leading a rehearsal. These skills can include techniques such as beat pattern

and gestural techniques (Johnson & Fredrickson, 1995; Mayne, 1992), conceptual knowledge of the musical score (Lane, 2006; Silvey, Montemayor, et al., 2017), error detection and correction (Green & Gibson, 2004; Hunsberger & Ernst, 1992; Labuta, 2010), instrumental fingerings and repair (Millican, 2008), and a knowledge of secondary instruments (Millican, 2017). Another component of CK in music education is score study. Researchers have sought to understand various components of CK in music education. Investigations regarding score study have helped uncover how experts and novices internalize music (Lane, 2006; Silvey, Springer, & Eubanks, 2015) and how CK affects novices' rehearsal preparation skills (Silvey & Montemayor, 2014; Wacker, 2018). Overwhelmingly, these findings have indicated that although score study may differ between conductors, it remains when preparing to lead a rehearsal.

Although music education research involving instrumental ensemble preparation has primarily addressed CK in music education research (Crowe, 1996; Lane, 2006; Montemayor & Moss, 2009), possessing a high level of CK may not be the only skill necessary for music teachers to be successful (Millican, 2008). Villarreal (2010) found that music teachers believed that they might benefit from more specific instruction regarding private lesson teaching during their education. Although CK is important in teaching, knowledge alone does not necessarily indicate that a teacher will be successful in conveying his or her knowledge to students (Loughran, Berry, & Mulhall, 2012). Understanding how to teach the content may be just as important and meaningful as knowing the content.

### **Pedagogical Content Knowledge**

Pedagogical content knowledge is rooted in the idea that teaching requires more than just delivering CK to students. Shulman (1987) indicated that PCK is “the category most likely to distinguish the understanding of the content specialist from that of the pedagogue” (p. 8). Since

the initial investigation of teacher knowledge in the 1980s, researchers, especially in the fields of science and mathematics education, have explored specific components of PCK. Research findings have indicated that teachers should have knowledge of students' interests (Hill, Schilling, et al., 2004; Ball, Thames, et al., 2008), common difficulties in understanding content (Koehler & Mishra, 2009; Tamir, 1988), specific strategies to teach concepts within a discipline (Magnusson, Krajcik, et al., 1999; Rowan et al., 2001), the ability to convey instruction with appropriate sequencing (Hill, Ball, et al., 2008), typical errors made by students and frequent misunderstandings of content (Hill, Ball, et al., 2008), and how to interpret student work and performance (Hill, Schilling, et al., 2004; Hill, Ball, et al., 2008). These concepts have also been used in other content areas, including music education, and they have helped researchers to better understand the importance of PCK.

### **Music Pedagogical Content Knowledge**

In music education, Ballantyne and Packer (2004) defined music PCK as “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” (p. 302). Pedagogical content knowledge helps teach musical concepts, as compared with CK, which is the knowledge of the content itself. For example, if a teacher identifies that a clarinet player is not playing tenuto markings for the correct length of time, this is CK. Pedagogical content knowledge is knowing how to teach the clarinet player where to put their tongue, how to use their air, and how long to play a note to obtain the proper tenuto articulation.

Music education researchers have investigated the components of teaching related to PCK and how teachers use it during the implementation of music curricula (Haston, 2018;

Millican, 2012; Raiber & Teachout, 2014). Moreover, researchers have explored other rehearsal skills, including feedback (Goolsby, 1999; Sullivan, 1998), pacing (Price & Byo, 2002; Worthy, 2005), and error detection (DeCarbo, 1982; Forsythe & Woods, 1983) to better understand preservice educators' preparation and its effects on teaching. Millican (2013) applied Shulman's PCK framework to explore the thought processes of expert beginning band teachers. Four expert band directors identified elements of PCK while viewing videotaped beginning band performances. The most common observed elements were (a) mental imaging/modeling; (b) understanding the outcomes of the manipulation of variables to positively affect student performance; and (c) gathering and interpreting specific data to interpret student work and develop specific rules, procedures, and guidelines to help students master the principles of performance. In a related study, Forrester (2018) interviewed four experienced school band directors about their understanding of teaching knowledge in relation to conducting. She suggested that instrumental music teaching requires a specialized form of knowledge that integrates teaching and conducting, rather than teaching these concepts separately.

Pedagogical content knowledge provides promising models for understanding the knowledge and skills needed to become an effective music teacher. In-service teachers agree that PCK is important for teaching music courses (Millican, 2008, 2013) and that preservice teachers need help reinforcing PCK through experience, including observation and interaction with experienced teachers (Millican, 2008; Paul, 1998). These opportunities can be developed through field experience (Wolfgang, 1990), laboratory classes (Butler, 2001; Paul, 1998), and reflective teaching and planning activities (Barry, 1996). Once preservice teachers observe these skills being used successfully, they may better be able to use PCK in their classrooms. Additional

studies investigating the most effective means of developing PCK and technological pedagogical content knowledge in preservice music teacher preparation are warranted.

### **Lesson Planning**

To prepare for classes, music teachers are expected to develop detailed plans that will help students understand the subject matter. Although preparing for a class appears to differ for novice and experienced teachers (Brittin, 2005; Goolsby, 1999), such activities are commonly referred to as lesson planning. Examining how preservice music teachers prepare to lead a rehearsal or teach music classes can provide insight into their thought processes and help prepare them to teach. In addition, CK and PCK may allow teachers to plan more appropriately for their classes (Vermette & Gattuso, 2014).

### **Types of Lesson Plans**

Lesson planning among teachers occurs in various forms; nonetheless, written plans are the dominant approach used by teacher educators when helping preservice teachers plan for classroom instruction (Clark & Peterson, 1986; Mutton, Hagger, & Bum, 2011; Panasuk & Todd, 2005; Shorner-Johnson & Moret, 2015; Skowron, 2001). Because some expert teachers prepare without creating written lesson plans, researchers have used “think-aloud” and interview methodologies to capture how in-service teachers plan to teach their classes (McCutcheon, 1980; Sardo-Brown, 1988; Van der Valk & Broekman, 1999; Yinger, 1979, 1980; Zahorik, 1975). Through these investigations, researchers have found that planning is often fragmented (Yinger, 1980) and not always objective-driven (McCutcheon, 1980; Sardo-Brown, 1988; Zahorik, 1975), that CK influences PCK when writing lesson plans (Van der Valk & Broekman, 1999; Vermette & Gattuso, 2014), and that all planning may not be captured in written documents (Clark & Peterson, 1986; McCutcheon, 1980; Sardo-Brown, 1988; Yinger, 1979).

While educators disagree about how to use lessons plans, most in-service music teachers do agree that some type of planning is necessary (Bauer & Berg, 2001; Fredrickson, Geringer, & Pope, 2013; Shaw, 2017; Teachout, 1997). Typically, practitioners suggest planning that is both objective-based and considerate of a means-end approach, for example, Tyler's (1950) template. This model describes planning as a four-step process: specifying behavioral objectives, choosing and sequencing appropriate learning activities, organizing and sequencing the chosen activities, and selecting evaluation procedures. This and similar templates (see, e.g., Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956; Hunter, 1982) have been a common form of lesson planning for over 60 years; however, these are not the only templates teachers can use.

### **Experienced and Inexperienced Teachers' Lesson Planning**

There are often differences between how preservice and in-service teachers use lesson plans. In general education settings, researchers have found that preservice teachers' understandings of effective teaching may be in the formative stages of development (Butler, 2001; Leinhardt, 1989). Likewise, there is evidence that novices are less efficient and effective when attempting to resolve issues they did not specifically identify in their scripted plans (Borko, Livingston, & Shavelson, 1990; Brittin, 2005; Schmidt, 2005). Goolsby (1999) found that novice teachers spent more time in music rehearsals having students play repertoire from the beginning to the end, whereas experts led more sequenced rehearsals. Other researchers have suggested that preservice teachers see the lesson planning process as a task that obstructs the teaching process (Harwood & Wiggins, 2001; Schmidt, 2005). Contrary to novices' lesson plans, which used more words but were vague, expert teachers' plans were more specific and used fewer words (Brittin, 2005; Goolsby, 1999). Similarly, some researchers suggest that expert teachers should not use a written plan when preparing for class, because teachers may plan spontaneously

throughout the day without writing their plans down (Borko, Livingston, et al., 1990; Clark & Peterson, 1986; Shorner-Johnson & Moret, 2015; Stigler & Hiebert, 1999). Despite some preservice teachers' reluctance to use lesson plans (Schmidt, 2005), Dorovolomo, Phan, and Maebuta (2010) and Lane (2010) found that lesson planning quality is related to teacher instructional quality. The pattern that emerges from the previously mentioned investigations indicates that expert teachers' plans are more succinct than inexperienced preservice teachers' plans.

Though teachers plan in various ways, teacher education programs may consider building on the CK that preservice teachers already possess to help build PCK (Haston, 2018; Özden, 2008; Van der Valk & Broekman, 1999). In a process called the Lesson Preparation Method, teachers are instructed to write a lesson plan as if they were going to teach a course the next day. After the teacher finishes planning, the researcher holds individual interviews to determine the participants' PCK knowledge. When using this method, researchers found that both preservice and in-service teachers showed a great deal of PCK in their lessons plans and CK had a positive effect on PCK (Özden, 2008; Van der Valk & Broekman, 1999; Vermette & Gattuso, 2014). Interestingly, in-service teachers' levels of PCK depended on the understanding of CK. That is, the higher their understanding of CK, the greater the evidence of PCK in their plans (Vermette & Gattuso, 2014). Future researchers might consider using The Lesson Preparation Method to further understand how teachers use CK and PCK during their planning processes.

### **Lesson Planning in Music**

Further research on lesson planning in music settings is needed due to variations in class type. For example, extant research findings have indicated that there may be differences between elementary and secondary music planning structures (Schmidt, 2005; Scott, 2011; Shorner-

Johnson, 2015a, 2015b; Standerfer, 2011). Music teachers claimed that lesson planning was problem/solution focused and suggested that a prescribed plan was not crucial to a successful lesson (Bazan, 2010; Shaw, 2017; Shorner-Johnson & Moret, 2015). In the practitioner literature regarding both general and secondary classes, de Frece (2010), Kearns (2011) and Scott (2011) also explored less sequential planning. Because of these differences in approach in elementary and secondary settings, there is still a need to determine how CK and PCK influence the planning process.

Novice teachers may have difficulty separating the way expert teachers plan from how they teach their classes because they complete much of the planning outside of school. Preservice teachers often learn how to use lesson plans during field experiences (Clift & Brady, 2005; DeLorenzo, 1990; Millican, 2016). However, planning during field experiences can lead to conflict between what students learn in college and how in-service teachers instruct their own students (Zeichner & Tabachnick, 1981). Expert teachers write more concise lesson plans or plan mentally, whereas novice teachers write more extensively and plan with specific processes in mind (Brittin, 2005). Few preservice teachers have the opportunity to observe their instructors writing lesson plans (Schmidt, 2005), which could lead to students misunderstanding the lesson planning process.

Even though music teachers plan in a variety of ways, the introduction of Shulman's (1987) teacher knowledge (specifically CK and PCK) could be beneficial to the planning process. In general education, researchers have found that CK has a positive influence on PCK (Van der Valk & Broekma, 1999). O'Hanlon (2010) found that preservice teachers were lacking in PCK, although teachers' knowledge of instruction improved throughout the school year. Nevertheless, Wacker (2018) found no differences in evaluations of novice conductors, despite

rehearsal preparation that focused on either CK or PCK. Certainly, further investigation of how CK and PCK influence music teacher preparation is warranted.

### **Applications and Implications**

Preservice teachers learn how to prepare for secondary rehearsals through a variety of score study and planning techniques, but this does not necessarily account for all of their preparation. Research investigations into how to better prepare novice teachers to rehearse an ensemble have indicated that novices' teaching abilities are enhanced by both CK and PCK (Forrester, 2018; Millican, 2008, 2017). In addition, preservice educators' use of lesson planning helps them better prepare for teaching (Gauthier & McCrary, 1999). The development of these skills can help novice teachers become more successful in preparing to lead a musical ensemble. Even though few researchers have investigated the use of CK and PCK in planning for lessons or rehearsals, these investigations have highlighted the important intersections among CK, PCK, and lesson planning.

Researchers might investigate how the development of PCK can be used in planning for rehearsals. Although expert teachers plan in diverse ways (e.g., written plans, discussion with colleagues, or mentally), it may be possible to include CK and PCK techniques into the planning process. Music teacher educators often include score study and lesson preparation techniques in their courses, which could help preservice teachers understand the connection between teacher knowledge, such as PCK, and lesson planning. For example, if a student has poor tone quality, a teacher may be able to ascertain that the student is not using proper air support and plan to address this issue in future rehearsals. Another planning technique, however, may be to first have the student work on breathing exercises, followed by long tones, and then put the exercises into context with the part being played, using that instructional time to offer specific feedback to help

maximize tone production. Novice teachers that plan for both CK and PCK may be able to ensure a more effective rehearsal.

While many aspects of teaching will improve with experience, it may be possible to instruct preservice teachers in certain planning methods to better prepare them to be successful sooner in their music careers. By using teacher knowledge that has been discussed in the research literature (see Ballantyne & Packer, 2004; Millican, 2009; Shulman, 1986, 1987), novice teachers may be able to create more useful lesson plans that will lead to more successful teaching. Given the amount of preparation that teachers engage in prior to their lessons, novice teachers may benefit from more deliberate CK and PCK instruction in their undergraduate music education preparation programs. Because preservice teachers may have difficulty teaching skills or concepts not found in their written plans (Schmidt, 2005), they may benefit from the development of preparation skills, such as CK and PCK, during their teacher training programs.

Research on how Shulman's (1986, 1987) teacher knowledge influences lesson preparation is limited. Reviewing the literature in science, technology, English, math, and music education, I described the relationship between lesson planning and teacher knowledge. However, the majority of these articles have concerned subjects outside of music education (see Özden, 2008; Van der Valk & Broekman, 1999), and further research is needed to examine the effectiveness of including specific CK and PCK instruction in lesson planning in teacher educator programs. Investigating approaches to lesson preparation that use the aforementioned components of teacher knowledge might allow for a revisioning related to preservice teacher lesson development. Future research may help determine the best practices for effectively teaching preservice music teachers how to prepare to teach a music course.

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