The purpose of this study was to examine teaching effectiveness in an elementary music setting using student achievement as a dependent measure. Because Orff Schulwerk instruction is one of the most prevalent pedagogies in elementary music education, this study examined the rehearsal strategies of recognized Orff Schulwerk teachers as they worked to refine learned repertoire for percussion instruments. Eight instructors and their upper elementary students were videotaped in four regular rehearsals each. Systematic analyses of rehearsal frames in which teachers were working to improve student performance revealed fast teacher pacing and a predominance of instructional directives that were procedural (e.g., where to begin playing) rather than musical (e.g., how to perform more accurately or expressively). The majority of students’ performance problems were related to precision, often caused by rushing the underlying pulse. Instructional targets were most often related to technique. Students successfully accomplished proximal goals in 63% of the performance trials in which the targets were verbalized by the teacher prior to performance and in 74% of the performance trials when the targets were verbalized by the teachers while students were playing. Students were most successful when teachers used clear, explicit directives and positive modeling.

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Refining Learned Repertoire for Percussion Instruments in an Elementary Setting

For over a decade, the National Standards have provided a curricular outline for music teachers who are dedicated to providing meaningful education for their students (MENC, 1994). “Performing on instruments, alone and with others, a varied repertoire of music” is listed as one of nine content standards, which reflects the value of instrumental performance in a comprehensive music education. Many elementary music teachers use Orff Schulwerk instruction to introduce children to instrumental performance. According to the American Orff-Schulwerk Association, over 10,000 teachers incorporate the Orff Schulwerk process into their curriculum (American Orff-Schulwerk Association, 2006).

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To create a refined, artistic performance, teachers must use rehearsal strategies that address musical issues relative to each piece, such as dynamics, rhythmic precision, and phrasing. Unfortunately, research examining rehearsal strategies for performing on classroom instruments in an elementary setting is scant. However, much can be gleaned from studies examining rehearsal strategies in bands, choirs, and orchestras.

Studies examining successful teachers' verbalizations indicate that, during rehearsals, teachers talk frequently and succinctly in alternation with student performance trials (Cavitt, 1998; Derby, 2001) and that rhythmic precision is a frequent instructional target in band rehearsals (Carpenter, 1988; Goolbsy, 1997, 1999; Pontious, 1982) and choral rehearsals (Derby, 2001) conducted by experts. Studies also indicate that effective instructors tend to focus on style, balance, and phrasing, rather than note accuracy. Likewise, rather than tuning notes individually, effective teachers address intonation in relation to surrounding notes within a passage of repertoire (Bauer, 1993; Cavitt, 1998; Derby, 2001; Doerksen, 1999; Goolsby, 1999; Pontious, 1982).

Reports of teacher feedback indicate that feedback results in higher student achievement as well as positive attitudes toward rehearsals and the instructor (Dunn, 1997; Price, 1983). Although high levels of positive reinforcement can result in higher rates of on-task behavior among elementary students (Forsythe, 1975; Kuhn, 1975; Madsen & Alley, 1979), high rates of disapproval do not seem to alter attentiveness among secondary students in ensemble rehearsals (Madsen & Alley, 1979; Murray, 1975). Additionally, across grade levels, negative feedback is no less effective in measures of student achievement than is positive feedback (Duke & Henninger, 1998; Kuhn, 1975; Murray, 1975). Although teachers tend to be generous with academic praise during the elementary years (Hendel, 1995, Moore, 1981; Moore & Bonney, 1987; Wagner & Strul, 1979; Wang & Sogin, 1997; Yarbrough & Price, 1989), they tend to be less approving as students mature (Carpenter, 1988; Cox, 1986).

Research results show that modeling is one of the most effective tools to elicit positive changes in student performance. Sang (1987) reported that students studying with teachers who had strong modeling skills were better performers than were those studying with teachers who had weaker modeling skills. Investigators examining the effects of modeling on student achievement have also demonstrated that modeling can be more effective than verbal instruction (Dickey, 1991; Rosenthal, 1984), silent practice, and singing (Rosenthal, Wilson, Evans, & Greenwalt, 1988), and that modeling can be used effectively in conjunction with student self-evaluation (Hewitt, 2001).

Although researchers have examined teaching effectiveness in numerous settings using a variety of dependent variables, Duke (1999/2000) reveals that very few studies have measured music teaching effectiveness using student achievement as a dependent
measure. The purpose of this study was to examine rehearsal strategies in an elementary music setting using student achievement as a dependent measure. Because Orff Schulwerk instruction is one of the most predominant pedagogies, this study focused on the rehearsal strategies of eight recognized Orff Schulwerk instructors and their upper elementary students (Grades 3–6) as they worked to refine learned repertoire for percussion instruments. Numerous independent variables were scrutinized, including teacher verbalizations, modeling, and pacing; yet, all factors were measured in light of their effect on student performance.

Specific research questions were as follows:

1. What behaviors do teachers and upper elementary students exhibit during the rehearsal of learned repertoire for percussion instruments?

2. How frequently do students demonstrate accurate or improved performance during the rehearsal of learned repertoire?

3. What conditions are associated with student improvement?

4. What targets do teachers identify, and how often do students achieve these targets in subsequent performance trials?

METHOD

To create a study rich in detail, I followed research models that examined multiple variables among a few recognized teachers rather than examining one or two variables among a multitude of teachers (Buckner, 1997; Cavitt, 1998; Colprit, 2000; Derby, 2001; Siebenaler, 1997; Younger, 1998).

Teachers included in this study were chosen based on their training and reputation. Every teacher had completed American Orff-Schulwerk Association Level I certification or higher and had either had an ensemble perform at a state or national music teachers' convention or had been recommended by an Orff Schulwerk chapter president, a university music education professor, or a public school district music supervisor. Eight teachers who met the criteria were selected for observation. Five teachers worked in large metropolitan school districts in Texas, two taught in rural Texas school districts, and one taught in a rural district in Florida. A total of 140 upper elementary students (Grades 3–6) participated in the study. Six of the ensembles met before or after school, and two consisted of regular intact classes during the school day.

Each group was videotaped four times in their regular setting while rehearsing learned repertoire (pieces that had been introduced in earlier sessions) for percussion instruments. After filming was completed, I viewed the 32 tapes to identify periods of instruction in which teachers were working to refine students' performances. These excerpts were separated into 86 Rehearsal Frame Groups (RFGs), based on descriptions by Duke (1994, 1999/2000) and Derby (2001) in previous research. RFGs represented periods of
rehearsal in which teachers were working with a particular instrumental group to improve one or more aspects of performance within a passage of repertoire. Transcriptions were created for each of the 86 RFGs. Behaviors were coded and quantified using SCRIBE: Simple Computer Recording Interface for Behavioral Evaluations (Duke & Farra, 1997), and student performance was assessed in every trial.

SCRIBE is a computerized behavior analysis program used to quantify specific teacher and student behaviors. Categories of teacher behaviors recorded included verbalizations (e.g., directives, questions, information statements, positive feedback, and negative feedback), modeling, and instructional sequence (e.g., how often teachers introduced new tasks, simplified difficult passages, increased difficulty, or simply repeated a passage of music). Categories of student behaviors included performances by the full ensemble, sections, or individuals, and rehearsal activities in which performance tasks were modified in some way for remedial purposes (e.g., playing at a slower tempo, playing with one hand instead of two, chanting note names while playing). Operational definitions of these categories are provided in Table 1.

After collecting SCRIBE data, I reviewed transcripts to code teacher directives as Musical, if they addressed a musical or technical performance goal, or Procedural, if their only function was to direct students where and when to play their parts. Similarly, I coded all feedback statements as specific or general.

ASSESSING STUDENT PERFORMANCE

I assessed student performance in two ways. First, I used a performance grid to assess every instrumental part in each student performance trial for note and rhythmic accuracy, irrespective of targets identified by teachers. (For instance, during a trial, if four students played the bass xylophone, three students played the alto xylophone, and one played the guiro, I made three assessments: one for the bass part, one for the alto part, and one for the guiro part. Thus, that trial would result in three separate assessments.) The grid provided enough space to record evaluations of each trial with a plus (+) or a minus (−) and to add commentary describing the reasons for each assessment. A plus (+) was assigned to every trial in which student performance was accurate or represented an improvement from the previous trial. A minus (−) was assigned if student performance was inaccurate, with no signs of improvement from the previous trial. After assessing each RFG, I pasted the completed performance grids into the transcript and reviewed each RFG to identify conditions preceding student improvement. These conditions were noted and entered into a spreadsheet to identify categories of behaviors associated with student improvement.

Figure 1 provides an example of an RFG excerpt that includes a student performance trial with assessments. This 2-minute excerpt, taken from a 5-minute RFG transcription, documents teacher behav-
iors surrounding a student performance trial played by a 17-member ensemble of fifth-graders. The performance grid in this excerpt demonstrates that students playing the soprano xylophone part (SX) improved during the trial when the teacher began clapping their part. It also demonstrates that students playing the second alto xylophone part (AX2) began the trial playing with accuracy (an improvement from the previous trial), yet were driven to rush by the faster eighth note rhythm in the first alto xylophone part (AX1). An examination of behaviors preceding AX2 students' successful beginning shows that the teacher provided AX2 students with positive modeling before they began playing.

For the second assessment, I reviewed transcripts to identify all teacher targets and evaluated students' ability to achieve these instructional goals. All instructional targets and student performance evaluations were entered into a spreadsheet. Next to each assessment, I documented teacher behaviors preceding student performance to compare behaviors associated with successful and unsuccessful performance trials.

RELIABILITY

Reliability was calculated to assess the accuracy of transcript analysis and student performance evaluations. Twenty percent of each teacher's RFGs were randomly selected and analyzed by a trained reliability observer. Reliability for transcript accuracy and evaluation of student performance were both calculated by dividing the number of agreements by the total number of agreements and disagreements. Interobserver reliability was 99% for transcript accuracy and 96% for evaluation of student performance.

RESULTS

Out of 22 hours and 20 minutes of total recorded rehearsal time, I identified 86 RFGs, representing 6 hours and 44 minutes, for analysis. Data from SCRIBE indicated that teachers spent approximately 37% of the time talking, 10% modeling, and 30% performing with students during performance trials. When teachers were talking, the majority of their verbalizations occurred in the form of directives at a rate of 5.4 times per minute. Fifty-nine percent of these directives were procedural, rather than musical, in nature. Thus, teachers spent more time telling students what, where, or when to play rather than how to play. Teachers gave positive feedback (1.1 statements per minute) twice as often as they gave negative feedback (0.5 per minute). An examination of instructors' instructional sequence showed that teachers introduced new tasks, increased difficulty, or repeated passages more than twice as often as they simplified a task that had already been performed.

Data on student behaviors showed that students performed approximately 50% of the time, with the largest proportions of this
Table 1
Operational Definitions for Student and Teacher Behaviors Recorded Using SCRIBE

Teacher Verbalization Categories

Directive: Procedural or Musical instruction given to students between and during performance trials. Procedural directives include instructions regarding where to begin in the music and who plays. Musical directives refer to aspects of musical expression (e.g., “Bass xylophones, play softer.”).

Information: Teacher verbalization that conveys information about the subject matter but does not direct the student to perform any specific action (e.g., “Glockenspiels can be difficult to play because the bars are smaller than those on any other instrument.”).

Question: “On-task” question posed by the teacher related to the subject matter or rehearsal and to which the teacher expects a student response (e.g., “How many times should you repeat this motive?”)

Specific Positive Feedback: Positive evaluations of preceding trials that describe one or more specific aspects of performance (e.g., “You maintained a steady tempo very well that time.”)

General Positive Feedback: Positive evaluations of preceding trials that do not describe any specific aspects of performance (e.g., “Good job!”)

Specific Negative Feedback: Negative evaluations of preceding trials that describe one or more specific aspects performance (e.g., “You’re rushing.”)

General Negative Feedback: Negative evaluations of preceding trials that do not describe any specific aspects of performance (e.g., “That’s not good.”)

Teacher Modeling Categories

Positive Modeling: Teacher behavior occurring between student performance trials in which the teacher sings, chants, plays an instrument, or mimics playing an instrument (e.g., moving arms in the air to demonstrate mallet technique) to demonstrate the correct performance of a passage.

Negative Modeling: Teacher behavior occurring between student performance trials in which the teacher sings, chants, plays an instrument, or mimics playing an instrument (e.g., moving arms in the air to demonstrate mallet technique) to demonstrate the incorrect performance of a passage.

Teacher Performance with the Ensemble: Teacher performance occurring simultaneously with student performance, including singing, chanting, patting, snapping, playing an instrument, or movement that mimics playing an instrument.

(Table 1 continues on next page.)
Table 1 (concluded)

**Instructional Sequence Categories**

**Forward**: The assigned task adds a new degree of complexity (moving to a new section, playing faster, playing longer sections, or adding other parts).

**Backward**: The assigned task simplifies the skill, breaking the task down into sub-skills, or reducing the musical material (isolating technical problems, working on a smaller section of the previous performance, slowing the tempo, or playing alone without other parts).

**Repeat**: The assigned task is a repetition of the preceding task. The repetition is intended to improve, correct, or reinforce the target skills. This category included repeated attempts to achieve the goal without changing the complexity of the music performed.

**New Task**: The assigned task is a new student performance behavior, distinct from the previous task (a new part is addressed; student sings, claps, or counts a piece previously played).

**Student Performance Categories**

**Student Full Ensemble Performance**: Student performance by the entire ensemble.

**Student Full Ensemble Related Activities**: Student performance by the entire ensemble in which the music is altered in some way such as chanting, clapping, playing barred instruments with fingers or with the mallets turned backward, or playing barred instruments while singing or chanting note names.

**Student Section Performance**: Student performance by a section of the ensemble.

**Student Section Related Activities**: Student performance by a section of the ensemble in which the music is altered in some way such as chanting, clapping, playing barred instruments with fingers or with the mallets turned backward, or playing barred instruments while singing or chanting note names.

**Student Individual Performance**: Student performance by an individual in the ensemble.

**Student Individual Related Activities**: Student performance by an individual in which the music is altered in some way such as chanting, clapping, playing barred instruments with fingers or with the mallets turned backward, or playing barred instruments while singing or chanting note names.

time devoted to Full Ensemble Performance (28%) or Section Performance (14%). Individual Performance accounted for just 4% of student activity, and only about 4% of time was devoted to Related Activities in which the teacher directed students to play a simplified
Pretrial Teacher Behaviors:
Directive: Can I hear the two of you (AX1) and the two of you (AX2)?
Directive: Tammy, let her play a couple of them first, OK? So you can get the feel.
Information Statement: It’s on your big C.
Positive Modeling: Teacher pats knees and chants AX2 part.

Student Trial 3:
Teacher chants AX2 part
Directive: Join whenever you’re ready, Tammy.
Teacher brings in BX.
Directive: [to SX] Start on beat number one.
Teacher starts chanting SX part.
Teacher points to one SX player’s instrument.
Directive: G first
Teacher begins singing the song.
When teacher sees SX players having problems, s/he begins chanting and clapping their part.
Teacher begins singing the song again.
Teacher chants the AX2 part again.

<table>
<thead>
<tr>
<th></th>
<th>Assessment Grid for Student Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BX</td>
<td>They rushed in two places. The trial was so long that the pulse in all parts was uneven.</td>
</tr>
<tr>
<td>AX1</td>
<td>Good start (improvement from previous trial); they rushed with the AX2, but the AX2 part drives the pulse.</td>
</tr>
<tr>
<td>AX2</td>
<td>Uneven 8th notes in the pattern throughout. A couple of places with lots of rushing. When the teacher started chanting their part, they improved.</td>
</tr>
<tr>
<td>SX</td>
<td>They missed many notes during the first part of the trial. They got off the beat later. When the teacher started clapping the part, students improved rhythmically, but after s/he stopped, they had problems again.</td>
</tr>
</tbody>
</table>

Posttrial Teacher Behaviors:
General Positive Feedback: We had it really nice for just a minute.

Figure 1. Excerpt of an Rehearsal Frame Groups (RFG) transcript including a completed performance assessment grid for Student Trial 3 (Italicized words indicate events occurring during the trial.)
version of the repertoire. When students played as an entire ensemble, performance trials were almost twice as long as trials played by smaller groups or sections. The mean episode duration for Full Ensemble Performance was 25.4 seconds (SD = 28.9 seconds); the mean episode duration for Section Performance was 14.2 seconds (SD = 13.6 seconds). Students performed alone, in sections, or as an entire ensemble 667 times. An analysis of instructional targets revealed that teachers verbally identified targets prior to student performance in only 318 of these trials, representing just 48% of all trials.

Within these 667 instances of student performance, I evaluated each instrumental part for note and rhythmic accuracy, resulting in a total of 1,240 individual performance trial assessments. Students demonstrated accuracy in 96 of these trials (8%) and exhibited improvement from a previously unsuccessful performance in 266 trials (21%). Descriptive data showed that errors related to pulse or precision accounted for the most salient problems in 74 of 86 total RFGs.

One or more conditions were associated with each case of student improvement. These conditions were observed 287 times in 7 main categories. Teacher target identification, the largest category, accounted for just 39% of all conditions. In the remaining 61% of conditions associated with student improvement, teachers did not explicitly identify an instructional goal.

Simply repeating a musical passage accounted for 18% of conditions surrounding student improvement. In these instances, teachers gave no directives and made no modifications to the music performed (e.g., slower tempo). Although repetition may have accounted for student progress, other variables that could not be detected may have played a role in student improvement. Other categories, each accounting for 10% or less of conditions associated with student improvement, included the following: Positive Modeling, Shorter Performance Trials, Improved Teacher Cues, Improved Student Readiness, and Unrelated Directives (i.e., directives about aspects of performance other than the improvement observed).

An examination of teachers' instructional targets revealed that teachers identified a total of 622 targets between and during student performance trials. Most of these instructional goals emerged in categories related to Technique (25%), Pulse (17%), Note Accuracy (13%), and Dynamics (12%). Other categories, each accounting for less than 10% of all targets, included the following: Pattern Sequence, Precision, Watching Teacher, Tempo, Rhythmic Accuracy, Balance, Student Readiness, and Singing. When teachers identified targets between performance trials, students were successful 63% of the time. When teachers identified targets during performance trials, students were successful 74% of the time.

Further scrutiny of frequently identified targets between trials revealed that students were most successful when teachers gave explicit directives (i.e., concrete, specific directives pertaining to the instructional goal) and used positive modeling. Negative feedback did not seem to affect student performance consistently.
DISCUSSION

In addition to the difficulties encountered during Orff ensemble instruction, elementary music teachers usually have limited rehearsal time with their students. As discussed by Jellison in her address to the Society for Research in Music Education, many elementary music teachers are charged with teaching 600–800 students every 3 days or less (Jellison, 2004). None of the teachers in this study saw their students more than twice weekly. In fact, six out of eight teachers rehearsed with their students once per week or less. These time constraints demand that elementary music teachers work as efficiently as possible to help students achieve important musical goals.

The rehearsals in this study were fast-paced, much like the rehearsals observed in other investigations of expert and experienced music educators (e.g., Cavitt, 1998; Derby, 2001; Goolsby, 1996). Likewise, all teachers in this study demonstrated superb musicianship through modeling. There is no doubt that all teachers and students were committed to the task at hand. Yet, as Davis (1998) reported in a study of performance achievement in choral rehearsals, concise verbalizations and high pacing do not always result in performance gains.

Results from this study indicate that success had more to do with the nature of verbalizations than the quantity. Fifty-nine percent of the teacher directives observed in this study were procedural rather than musical in nature. Teachers more often told students when and where to play than they described how to play. Yet, when teachers explicitly identified musical targets, students usually met their demands.

An examination of the teaching episodes preceding student improvement provides useful information for practical application. Not surprisingly, concrete, explicit directives often preceded successful or improved student performance. Explicit directions that left little room for interpretation seemed to provide students with the exact focus they needed to succeed.

In addition to explicit directives, positive modeling often preceded successful student performance. These findings are consistent with the notion that modeling is a useful component of performance instruction (Dickey, 1991; Rosenthal, 1984; Rosenthal, Wilson, Evans, & Greenwalt, 1988; Sang, 1987). All teachers in this study exhibited superb musicianship and appeared very comfortable performing for their students. One teacher even managed to provide simultaneous models as she played the recorder for one group of students, tapped out the bass xylophone rhythm pattern with her left foot, and provided an entrance cue for glockenspiels with her right foot.

Negative feedback alone did not result in successful student performance. However, when negative feedback was followed by concrete directives, students were more likely to succeed. Practically speaking, this finding is not surprising. Although identifying the root of a performance problem through negative feedback is important,
providing a solution with explicit directives is probably more important. In conjunction with clear directives and positive modeling, students can benefit from an understanding of the problem, its solution, and an immediate example of the desired outcome.

Elementary music teachers often have limited rehearsal time with their students. For this reason, teachers must be extremely efficient. Results from this study indicate that instructors should maintain a high pace of instruction characterized by frequent target identification. Targets should be identified not only through feedback, but also through explicit directives and positive modeling.

This study examined a number of independent variables in light of student achievement. While this research provides a beginning, further study examining student performance in an elementary instrumental setting is needed. Future studies exploring variables including repetition, trial length, technical exercises, and practice context could provide practical information for elementary music teachers interested in refining student performance.

1. According to Shamrock (1995), "The term 'Orff-Schulwerk,' with the hyphen, since 1988 should apply only to the publications issued by Schott, Inc., and its affiliates, and to the title 'American Orff-Schulwerk Assocation.'" (Foreword).

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