Watching Learners Learn

To learn is to change. Whether the change refers to a modification of belief, a shift in attitude, a refinement in thinking, an enhancement of skill or the encoding of an experience that is recallable in the future, learning is generally understood to be reflected in one or more discernible changes in a learner. These changes are most often recognized by teachers, parents or other observers as new behavior—either new responses to stimuli or self-initiated movements and verbalizations—but the visible indicators of learning are but outward manifestations of changes in the physical structure of the brain.

When learning occurs, it’s the stuff of the brain that changes, and unlike adding data or new software to the contents of a computer hard drive, when brains learn, the hardware itself is reformed: the physical configuration of neurons, the relative abundance of neurotransmitters and their receptors, and the strength of signaling across synapses (Bruel-Jungerman, Davis, & Laroche, 2007; Kim & Linden, 2007; Matsuzaki, 2007; Neves, Cooke, & Bliss, 2008). All of this raises the question of what is required to elicit such structural modifications.

Experience and simple repetition clearly facilitate the formation of declarative memories—memories of events (episodic memories) and facts and ideas (semantic memories) that can be expressed in language. But rendering declarative memories resistant to interference and forgetting over time requires elaboration of some kind—a kind of practice that rehearses new memories in ways that enrich their connections to the memories already in our heads.

It is also well understood that strong emotions, negative emotions in particular, lead to lasting episodic memories. When we encounter experiences that have strong emotional content, the memories of those experiences often persist for a very long time; depending on the intensity of their emotional charge, memories for even one-time experiences can be indelible, lasting a lifetime. A small structure in the brain known as the amygdala (there is one in each hemisphere of the brain) seems to tag emotional-laden...
events in ways that makes their memories strongly resis-
tant to interference and forget-
ting (Maren, 2005).

Forming and refining memo-
ries for skills, called procedural
memories, require a different
kind of experience on the part
of the learner, one which, not
surprisingly, also involves rep-
etition. When we do things
repeatedly, memories for our
behaviors tend to be sustained
over time (Cooper, 2005). But
what if our goal is not simply
to render skill memory resis-
tant to interference and forget-
ting, but also to refine the
performance of skills and
make them more generalizable
across varied instances that
we may encounter in the
future? This kind of memory
adaptation requires variations
in the repetitions of skill, vari-
ations that lead to discrepan-
cies (errors) between what a
learner intends and what actu-
ally comes about. Through the
course of iterative experiences,
learners, either consciously or
unconsciously, resolve the dis-
crepancies between intentions
and outcomes from one repeti-
tion to the next.

This error correction is a
critical feature of effective skill
practice. Doing things over
and over absent recognition of
the inevitable variations
between one repetition and the
next is not sufficient to stabi-
lize and refine skill memories
over time. We retain and refine
procedural memories not only
because we’ve experienced
them frequently, but because
we’ve experienced them in var-
ied circumstances that result
in discernible discrepancies
between what we intend and
what actually occurs in each
repetition.

These aspects of memory for-
mation remain topics of
intense study in neuroscience,
cognition and motor learning.
And although much about skill
practice is understood intu-
itively by expert musicians
who have mastered the art of
acquiring and refining skill
memories, the physical mecha-
nisms by which such learning
occurs are still rather poorly
understood (Fanselow &
Poulos, 2005; Nader & Hardt,
2009).

The skills involved in teach-
ing are in many ways more
complex than the physical
skills engaged in music perfor-
mance. Teaching engages a
constellation of complex inter-
actional components that inte-
grate perception, problem
solving, goal setting and
behavior shaping. If we accept
the notion that teaching is a
skill, one which also requires
practice that reveals discrep-
cancies between intentions and
outcomes, how may we struc-
ture novices’ observation of
their own teaching so the dif-
fences between what teach-
ers intend and what learners
do are evident and there are
sufficient opportunities to
practice refining the elements
of teaching?

An essential part of assess-
ing the effects of teaching
behavior is the feedback that
signals whether goals are in
fact accomplished. This seems
quite simple and unremark-
able with regard to skills like
batting in baseball; either you
hit the ball into fair territory
and away from a fielder or you
don’t. At a rather crude level,
the same could be said about
playing or singing; either you
played the correct notes at the
correct times or you didn’t. (Of
course, even this becomes
much more complicated when
we focus on more refined
aspects of music performance.)

But what about teaching?
How can we provide feedback
to aspiring teachers about the
effectiveness of their work,
especially when the effects of
..
ment of instructional skill must begin.

Although most learners share common perceptions of the most important attributes of excellent teachers—a passion for the subject, concern for their students, thorough knowledge and impeccable skill—there is less consensus concerning the means by which teachers actually bring about change in the moment. This is understandable in light of the fact that many meaningful, substantive and lasting changes that come about in the thinking, behavior and attitudes of learners develop over long time scales—over weeks, months, even years. Observing such changes as they occur is certainly difficult; defining the influences of teaching that cause them is damn near impossible.

We approach the definition of effectiveness in this article in a very specific way, namely, by examining the extent to which teachers bring about changes in learners’ behavior in the moment. We recognize that effective teaching encompasses more than making only short-term modifications to learners’ thinking, attitudes and behavior. Effective teachers also bring about changes that occur slowly, over extended periods of time. But in this study we concerned ourselves with the extent to which teachers changed learners’ music-making skills in ways that are immediately apparent to an observer.

Our observations in this investigation are organized around the rehearsal frame as a unit of analysis. Rehearsal frames were first introduced by Duke (Duke, 1994, 2000, 2009) and have since been applied in a wide range of pedagogical assessments in music (e.g., Benson & Fung, 2005; Buckner, 1998; Cavitt, 2003; Colprit, 2000; Derby, 2001; Henninger, 2002; Henninger, Flowers, & Council, 2006; Siebenaler, 1997; Taylor, 2006; Worthy, 2003, 2006; Worthy & Thompson, 2009; Younger, 1998).

Rehearsal frames are intervals of instructional time devoted to identifiable proximal performance goals and typically comprise teacher directives, modeling, questioning and feedback, alternating with student playing, answering and questioning (see Figure 1), although any combination of these elements may be present in a given rehearsal frame.

According to our coding of the lesson excerpts in this study, each rehearsal frame began at the point at which a teacher first identified a proximal performance goal (which we henceforth refer to as a target) and concluded with the final performance or verbalization prior to the teacher’s identification of a subsequent target. Note that this type of observation structure focuses on the moment-to-moment goals of instruction—the changes that teachers attempt
to bring about in their students. The advantage of this procedure is that it associates the behavior of teachers with individual instructional goals whose accomplishment can be reliably assessed in the near term. The importance of using rehearsal frames in the analysis of teaching inheres in the fact they focus attention on the extent to which learners demonstrate observable progress in meeting instructional targets.

Our goal in this article is two-fold. First, we demonstrate the application of a systematic observation procedure that describes teacher behavior in the context of accomplishing, or attempting to accomplish, proximal student performance goals. Our data juxtapose the behavior of teachers with evidence of ongoing student accomplishment. Second, we describe differences in teacher and student behavior between lessons taught by teachers whose students are mostly successful in accomplishing goals and teachers whose students are less often successful.

**Method**

We observed the lessons of 20 experienced piano teachers, all of whom at the time of the study were recognized as outstanding studio teachers in the greater Austin, Texas, metropolitan area; 12 of the teachers had won local or state teaching awards and all enjoyed excellent reputations in the field. Their teaching experience ranged from 8 to 46 years (mean teaching experience was 21.1 years).

Each teacher identified two students in her studio whose lessons would be videotaped for detailed analysis. Student participants ranged in age from 8 to 45 years old and had played piano between 1.5 and 12 years (mean piano experience was 4.4 years). All were performing intermediate-level repertoire at the time of the observations.

Forty lessons were videotaped in the teachers’ studios with a single video camera that was positioned so that both teacher and student were in view. An on-site observer (the second author) recorded notes during each lesson that outlined the course of events, including the repertoire and exercises performed, the teacher and student interactions and the rehearsal procedures employed.

For this study, we selected one excerpt from each lesson during which the teacher and student were working on refining a piece that had been introduced in a prior lesson and in which there was a high level of interaction between the teacher and student. We made these selections to observe how teachers refined already-learned behavior—pieces in which the notes and rhythms were mostly in place—rather than how they introduced new pieces or established new behavior.

The lesson excerpts chosen for detailed analysis ranged in duration from 8 to 40 minutes. In each excerpt, we analyzed the timing and content of teacher and student piano playing, teacher and student verbalizations, and the success level of individual student performance trials, using rehearsal frames as the unit of analysis. Each student performance trial was evaluated in terms of whether it approached or accomplished a proximal target. Successful trials were defined as those in which student performance was accurate according to the target defined by the teacher for that trial or was a closer approximation of the target than was the immediately preceding performance trial. Unsuccessful performance trials were defined as those that were not accurate according to the target defined by the teacher and were no closer an approximation of the target than was the preceding trial (still not accurate and no more accurate than the preceding attempt).

The second author assessed a randomly selected sample of 20 percent of the performance trials on two occasions separated by several weeks, and an independent reliability observer assessed the same 20 percent of the performance trials. Reliability for the multiple assessments by the first author was .87; the reliability between the first author’s first assessment and the assessment by the second observer was .80. We used the second author’s first assessments in our analyses.

We classified rehearsal frames as successful or unsuccessful according to whether the final performance trial was accurate according to the target defined by the teacher at the beginning of the rehearsal frame. If there was insufficient student performance during a rehearsal frame to make a determination as to whether the target had been accomplished—when the teacher identified a target, but the student had little opportunity to demonstrate her performance of the target passage—the rehearsal frame was not evaluated.
Results
The 40 lesson excerpts comprised 485 minutes (approximately 8 hours) of instruction, within which we identified 1,395 student performance trials and 328 rehearsal frames. All 20 teachers had at least one successful frame, 13 teachers had at least one unsuccessful frame, and 18 teachers had at least one frame that could not be evaluated (target identified, but no opportunity for student performance).

We initially inspected the numbers of successful, unsuccessful and unevaluated rehearsal frames among the 20 teachers, looking for individual excerpts with high percentages of successful rehearsal frames and low percentages of unevaluated frames. We found five teachers whose successful rehearsal frame percentages were ≥ 67 percent and whose unevaluated rehearsal frame percentages were ≤ 26 percent. We summarize their rehearsal frame data and the data from the lesson excerpts of their 15 peers in Table 1. In our analyses that follow, we compare the data of these five teachers, whom we defined as the most successful in accomplishing the targets they identified, with the data from the remaining 15 teachers in the sample.

Table 1
Percentages of Successful, Unsuccessful, and Unevaluated Rehearsal Frames Among the 5 Teachers with the Highest Proportions of Successful Rehearsal Frames and the Remaining 15 Teachers

<table>
<thead>
<tr>
<th>Teacher Categories</th>
<th>Successful Frames</th>
<th>Unsuccessful Frames</th>
<th>Unevaluated Frames</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean %</td>
<td>Range (%)</td>
<td>Mean %</td>
</tr>
<tr>
<td>5 Most Successful</td>
<td>85</td>
<td>67-100</td>
<td>4</td>
</tr>
<tr>
<td>Remaining 15</td>
<td>39</td>
<td>14-63</td>
<td>19</td>
</tr>
</tbody>
</table>

One notable difference between the two categories of teachers is in the percentage of rehearsal frames that included so few student performance trials that accomplishment of the target could not be evaluated by the observer. This data point reflects the extent to which teachers identified targets but then provided students few opportunities to practice the target passage, perhaps assuming (hoping?) that students would remember the teachers’ comments and apply them later during home practice. In most of these instances, teachers mentioned some aspect of a preceding performance trial that was in need of attention, but then moved ahead to work on something else. This was an infrequent occurrence among the most successful teachers in the sample.

Table 2
Numbers of Successful and Unsuccessful Student Performance Trials Per Rehearsal Frame Among the 5 Teachers with the Highest Proportions of Successful Rehearsal Frames and the Remaining 15 Teachers

<table>
<thead>
<tr>
<th>Student Performance</th>
<th>5 Most Successful Teachers</th>
<th>Remaining 15 Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial Category</td>
<td>(n = 47)</td>
<td>(n = 2)</td>
</tr>
<tr>
<td>Successful Trials</td>
<td>4.8</td>
<td>8.3</td>
</tr>
<tr>
<td>Unsuccessful Trials</td>
<td>3.1</td>
<td>6.3</td>
</tr>
<tr>
<td>All Trials</td>
<td>7.9</td>
<td>14.7</td>
</tr>
</tbody>
</table>

The data for the five most successful teachers’ unsuccessful rehearsal frames are printed in gray to highlight the fact that the means are based on only two rehearsal frames and are not representative of the five teachers in this category.
Table 2 shows the number of successful and unsuccessful performance trials within the successful and unsuccessful rehearsal frames for the five most successful teachers and the remaining 15 teachers. Perhaps the most obvious and consequential difference between the data sets for these two groups of teachers is the mean number of student performance trials per rehearsal frame. Students of the most successful teachers performed approximately 38 percent more trials per rehearsal frame than did the students of the remaining 15 teachers. There were simply more performance episodes devoted to each target among the most successful teachers. The difference between the two groups of teachers is even more striking in light of the fact that, on average, 42 percent of the rehearsal frames in the lessons of the less successful teachers included so little student performance that the success of the frame could not be evaluated. The mean percentage of unevaluated frames among the most successful teachers was 10 percent.

Table 3
Percentages, Rates, and Mean Episode Durations of Teacher and Student Behavior for the 5 Teachers with the Highest Proportions of Successful Rehearsal Frames and the Remaining 15 Teachers

<table>
<thead>
<tr>
<th>Percent (%) of Frame</th>
<th>Rate per Min</th>
<th>M Epsd Dur (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher Talk</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Frame</td>
<td>49.0 17.0</td>
<td>59.1 21.0</td>
</tr>
<tr>
<td>Rate per Min</td>
<td>9.0 3.9</td>
<td>7.6 3.2</td>
</tr>
<tr>
<td>M Epsd Dur (sec)</td>
<td>4.7 5.9</td>
<td>6.4 5.4</td>
</tr>
<tr>
<td><strong>Teacher Modeling</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Frame</td>
<td>9.9 9.8</td>
<td>17.9 18.4</td>
</tr>
<tr>
<td>Rate per Min</td>
<td>2.5 2.5</td>
<td>4.4 4.4</td>
</tr>
<tr>
<td>M Epsd Dur (sec)</td>
<td>1.8 1.9</td>
<td>2.0 3.1</td>
</tr>
<tr>
<td><strong>Student Performance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Frame</td>
<td>42.0 0.2</td>
<td>7.3 0.1</td>
</tr>
<tr>
<td>Rate per Min</td>
<td>6.3 4.5</td>
<td>1.6 3.4</td>
</tr>
<tr>
<td>M Epsd Dur (sec)</td>
<td>6.7 7.4</td>
<td>2.9 1.0</td>
</tr>
</tbody>
</table>

Percent (%) of Frame indicates the percentage of time in a given rehearsal frame devoted to each behavior category. Rate per Minute is the number of instances of a given behavior category in a rehearsal frame divided by the duration of the rehearsal frame. Mean Episode Duration is the mean of the durations of all instances of a given behavior category in a rehearsal frame. The data for the five most successful teachers’ unsuccessful rehearsal frames are printed in gray to highlight the fact that the means are based on only two rehearsal frames and are not representative of the five teachers in this category.
In Table 3 we show the differences between the two teacher categories in terms of the percentages, rates and episode durations of teacher talk, teacher modeling and student performance. Describing behavior in this multidimensional way reveals important differences among the two categories of teachers and helps explain how students of the most successful teachers performed more often in each rehearsal frame than did students of the other teachers. Looking first at the successful rehearsal frames, note the percentages of time devoted to teacher talk, teacher modeling and student performance in the successful rehearsal frames are quite similar in both teacher categories. What distinguishes the five most successful teachers from the others is the rate per minute and commensurately the mean episode duration, of each of these elements of the lessons. Episodes of teacher talk, modeling and student performance tended to be more frequent and briefer in the successful rehearsal frames of the most successful teachers. The difference is especially large in the mean durations of student performance trials, with the durations of student performance, on average, over twice as long among the less successful teachers. This may be interpreted as an indication of the most successful teachers focusing narrowly on specific aspects of student performance, having students play no longer than necessary to bring about productive change in the targets identified.

Comparisons between the two groups’ unsuccessful rehearsal frames are not possible, since the 10 lesson excerpts of the five most successful teachers included only two unsuccessful rehearsal frames. Note that among the less successful teachers, however, their episodes of teacher talk were over twice the duration in the unsuccessful frames as were the talk episodes in the same teachers’ successful frames. The unevaluated rehearsal frames are, unsurprisingly, dominated by teacher talking and modeling. The few student performance episodes that did occur in these frames were insufficient for an observer to judge whether the target for a given frame had been accomplished.

With regard to teacher talking and student performance, and short mean episode durations. The mean rate of modeling in successful rehearsal frames is lower among the five most successful teachers than among the remaining 15, and the mean episode duration for teacher modeling is half the duration of the modeling by the remaining 15 teachers. These data demonstrate that the pace of the most effective teachers’ lessons was faster and the interactions between student and teacher were more frequent than they were among the less successful teachers in our sample. Even among the rehearsal frames that included little or no student performance, the five most successful teachers evinced a faster pace by alternating between brief talk episodes and brief episodes of modeling.

“Episodes of teacher talk, modeling and student performance tended to be more frequent and briefer in the successful rehearsal frames of the most successful teachers.”
### Table 4

**Teacher Verbalization Rates per Minute for the 5 Teachers with the Highest Proportions of Successful Rehearsal Frames and the Remaining 15 Teachers**

<table>
<thead>
<tr>
<th>Observation Category</th>
<th>5 Most Successful Teachers</th>
<th>Remaining 15 Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Succ. Frames (n = 47)</td>
<td>Unsucc. Frames (n = 2)</td>
</tr>
<tr>
<td>Directives</td>
<td>2.6 (M), 2.1 (SD)</td>
<td>4.3 (M), 3.5 (SD)</td>
</tr>
<tr>
<td>Information</td>
<td>.8 (M), 1.2 (SD)</td>
<td>.9 (M), 1.4 (SD)</td>
</tr>
<tr>
<td>Negative Feedback</td>
<td>1.7 (M), 2.2 (SD)</td>
<td>1.3 (M), 2.9 (SD)</td>
</tr>
<tr>
<td>Positive Feedback</td>
<td>1.7 (M), 1.3 (SD)</td>
<td>.7 (M), .6 (SD)</td>
</tr>
<tr>
<td>Questions</td>
<td>.7 (M), 1.3 (SD)</td>
<td>.2 (M), .2 (SD)</td>
</tr>
</tbody>
</table>

**Operational Definitions of Behavior Categories. Directives.** Statements that indicate to the student that she should do something. Directives may indicate simply where to begin (like, “Let’s start the piece again.”), may describe fundamental aspects of playing (such as, “Curve your fingers.”), or may describe a specific element in the piece being played (for example, “Get ready for the c-sharp!”).

**Information statements.** Any verbalizations by the teacher that convey information about the subject matter (statement of fact or explanation of an idea), but does not direct the student to perform a specific action. “When your muscles are tense, the sound of your playing changes,” is an example of an information statement, even though the statement may be interpreted as an implicit call to action, because there is no clear direction to take action.

**Questions.** Any question posed by the teacher to which the teacher expects the student to respond. This does not include rhetorical questions (such as, “Can you believe it?” or “Not very good, huh?”) and questions that are not germane to the task at hand (like, “Are we meeting for a lesson next week?”).

**Positive Feedback.** Positive evaluations of what the student has done in a previous performance trial. Positive feedback statements may be specific (“The chord in the second measure was perfectly voiced that time.”) or general (“That was great!”). If a general statement or word precedes a more specific direction (like, “Terrific. You took just the right amount of time before beginning that phrase.”), only one positive feedback statement is recorded. If multiple evaluative statements are included in a single utterance and each statement pertains to a different aspect of the student’s playing or response to a question (for example, “The top note of the last chord sounded beautiful, and the slur in measure three was beautifully done.”), then each evaluative statement is recorded as an instance of positive feedback.

**Negative Feedback.** Negative evaluations of what the student has done in a previous performance trial. Negative feedback statements may be specific (“That triplet is still uneven.”) or general (“That was awful!”). If a general statement or word precedes a more specific direction (“Ick. I could hardly hear the melody in that passage over all that banging in your left hand.”), only one negative feedback statement is recorded. If multiple evaluative statements are included in a single utterance and each statement pertains to a different aspect of the student’s playing or response to a question (“You rushed the tempo at the end of the phrase, and the downbeat in the fifth measure still sounds late.”), then each evaluative statement is recorded as an instance of negative feedback.
In Table 4 we present the rates per minute of five categories of teacher verbalization: directives, information statements, negative feedback, positive feedback and questions. (Over years of using these observation procedures, we have determined that the duration of individual statements is not a meaningful variable in assessing teaching. It is meaningful, however, to describe the rates of statement categories, for example, how frequently teachers give directions or feedback.) Most notable in these data are the differences in the rates of feedback statements in the two teacher categories. In the successful rehearsal frames, the most successful teachers gave positive and negative feedback at equal rates, totaling approximately 3.4 feedback statements per minute. These rates are much higher than the rates of feedback, especially negative feedback, given by the remaining 15 teachers.

Viewed together, Tables 2–4 illustrate a number of important differences between the rehearsal frames of the five most successful teachers and the remaining 15 teachers. Again, caution is warranted regarding comparisons of data for the unsuccessful rehearsal frames due to the small number of unsuccessful frames among the five most successful teachers.

Regarding the content of teacher verbalizations, the five most successful teachers give both positive and negative feedback at higher rates than do the remaining 15 teachers. Even more notably, the five most successful teachers’ mean rate of negative feedback is more than three times greater than the rate of negative feedback among the remaining teachers. This result is particularly interesting in light of the higher rates of successful performance trials in the lessons of the most successful teachers. Taken together, these data indicate that the most successful teachers in this study are able to structure frequent, successful performance among their students and, at the same time, are highly discriminating and demanding of increasingly greater levels of performance skill.

Discussion

As we noted previously, the nature of expertise in teaching extends well beyond the data reported here. Many of the most meaningful, substantive and lasting accomplishments in the thinking, behavior and attitudes of learners seldom take place in a single lesson, but develop over weeks, months and years. Teachers who can nurture focused, sustained attention in their students facilitate both short-term accomplishments and changes that extend beyond the time scale assessed in our investigation.

But just as it is difficult to observe the long-term effects of systematically structured, guided learning experiences, it is nearly impossible to teach novice teachers explicitly how to develop such skills in their own teaching. Thus the value of devoting novices’ attention to the initiation of behavior change that is discernible in the moment.

Just as the successful music teachers described in our observations make small changes through the assignment, pursuit and accomplishment of goals that are achievable in the short-term, so do successful teachers of pedagogy bring about meaningful changes in teaching skills. It is difficult if not impossible to make such changes if there is no mechanism by which to practice, observe and evaluate teaching behavior in relation to student accomplishment. Rehearsal frames provide such a mechanism in that they focus attention on the accomplishment of definable goals within brief instructional intervals that contain the functional components of teaching and learning interactions.

Looking at teaching and learning through such a lens connects the two sides of instructional interactions in ways that illuminate more clearly the relationships between what teachers do and what students learn—relationships that may be invisible
over longer time scales. Even if the more short-term changes that come about are fundamentally different than those that require extended periods of time to develop, they nevertheless are a part of the process of skill development and are thus inherently meaningful as a focus in teacher assessment and training.

We illustrate in this paper differences in the content of rehearsal frames taught by teachers whose students most often accomplish short-term instructional goals and the rehearsal frames of teachers whose students are less often successful. Given the fact that the likelihood of a student accomplishing a performance goal has as much to do with the nature and timing of the goals themselves as it has to do with individual students’ ability and effort, it is clear that skillful teachers can determine the probability of successful student accomplishment moment to moment through strategic goal setting.

One could argue that differences in students’ successful performance observed in our study, and in teacher observation in general, are as much a result of differences in the abilities and efforts of students as they are the result of differences among teachers, and this is undeniably true to some extent. Yet, in multiple observations across a wide range of student age, experience and ability, the most successful teachers are those whose rates of student accomplishment are high within each instructional period (such as lesson, class, rehearsal). The success that skillful teachers’ students enjoy is not solely a result of variables inherent in the students themselves, but are as much a part of the teachers’ skillful arrangement of experiences that provide learners—whether the learners are performers learning to play or teachers learning to teach—frequent opportunities to try things out and obtain feedback that reveals gaps between what learners intend and what actually takes place.

This is the essential component of effective learning experiences: multiple repetitions that reveal to the teacher and

“... skillful teachers can determine the probability of successful student accomplishment moment to moment through strategic goal setting.”
class or rehearsal are multiple mini-lessons, each of which is directed toward an identifiable goal. When the success of these mini-lessons is assessed, learners recognize that the extent of accomplishment varies with the target and that a given teacher, within a given lesson, demonstrates more and less skillful teaching behavior, which leads, typically, to more and less successful student behavior.

This variability in accomplishment across multiple targets in an instructional period presents an opportunity to the teacher and student of pedagogy, in that it highlights the reality that success in teaching is not monolithic. Individual teachers are more or less successful depending on the circumstances surrounding each instructional goal. Within a given lesson, an aspiring teacher may skillfully elicit productive behavior change in one instance and may fail miserably to do so in another. Devoting time to understanding the differences between instances of varying success within one’s own teaching is remarkably productive in that it illustrates to learners that they are in fact capable of varying degrees of skillfulness. No longer limited to comparing their own teaching to that of expert models or to abstract notions of effective teaching, novices are thus enabled to compare their more and less successful rehearsal frames, and devise, in collaboration with their pedagogy teachers, courses of action to make their less successful teaching look more like their most successful.

Of course, this approach to change occurs routinely when performers work to master repertoire. Every part of the piece doesn’t improve in synchrony. We master a little section here, a transition there and phrase ending over here. It’s well recognized that the entire piece won’t get better all at once. And we recognize that the piece is a collection of motives, and phrases and sections, which provides a framework in which to practice and refine our performance.

Rehearsal frames reveal to novice teachers that their teaching is likewise made up of smaller sections and that it’s possible, even necessary, to address the problems encountered in each section as a way of building a repertoire of skills that are broadly applicable and generalizable. Much of the complexity of great teaching is unimaginable to novices, even those who have been the fortunate beneficiaries of great teaching. It’s fair to say that much of the complexity of great teaching is inarticulable by most great teachers, even though they demonstrate remarkably skillful behavior seemingly effortlessly.

We offer here a mechanism for managing the complications of observing, evaluating and practicing the skills of teaching in context in ways that connect the behavior of teachers with the accomplishments of their students. And of course, student accomplishment is the point of it all.

References


Robert Duke is the Marlene and Morton Meyerson Centennial Professor in Music and Human Learning, University Distinguished Teaching Professor, Elizabeth Shatto Massey Distinguished Fellow in Teacher Education, and Director of the Center for Music Learning. He is the founder of the National Forum on Research in Motor Learning and Music, a research collaborative devoted to the study of motor skill development and procedural memory consolidation. A former studio musician and public school music teacher, he has worked closely with children at-risk, both in the public schools and through the juvenile court system, and he directs an active research program in motor skill learning and procedural memory at UT. Duke has served on the editorial boards of the Journal of Research in Music Education, the Bulletin of the Council for Research in Music Education, Psychomusicology, and other publications, and he has directed national research efforts under the sponsorship of such organizations as the National Piano Foundation and the International Suzuki Institute. He lectures frequently on the topics of human learning, systematic observation and evaluation, and behavior management, presenting workshops and teaching demonstrations throughout North America. He is the author of Scribe 4 behavioral analysis software, and his most recent books are *Intelligent Music Teaching: Essays on the Core Principles of Effective Instruction* and *The Habits of Musicianship: A Radical Approach to Beginning Band*, which he co-authored with Jim Byo of Louisiana State University. The Habits of Musicianship, released in the spring of 2007, is distributed online cost-free through the Center for Music Learning.

Janice Buckner teaches part-time at Campbell University while maintaining a thriving piano studio in Cary, North Carolina. She also serves as organist and middle school choir director at First Baptist Church in Cary. Buckner holds a bachelor of music degree in piano performance from the North Carolina School of the Arts, a master of music degree in piano performance from James Madison University and a doctor of musical arts degree in music education from the University of Texas at Austin.