The Pennsylvania State University
The Graduate School
School of Music
THE EFFECT OF IMPROVISATION ON THE TRANSFER OF TECHNIQUE
A Master’s Paper
by
Sally Williams Minnich
© 2014 Sally Williams Minnich
Submitted in Partial Fulfillment
of the Requirements
for the Degree of
Master of Music Education
May 2014
The Master’s Paper of Sally Williams Minnich was reviewed and approved* by the following:

Ann Clements
Associate Professor of Music Education
Master’s Paper Adviser

Joanne Rutkowski
Professor of Music Education
Second Reader

Robert Gardner
Associate Professor of Music Education
Third Reader

*Signatures are on file in the School of Music
I grant The Pennsylvania State University the nonexclusive right to use this work for the University’s own purposes and to make single copies of the work available to the public on a not-for-profit basis if copies are not otherwise available.

Sally Williams Minnich
Abstract

Repertoire has traditionally been a primary vehicle for teaching instrumental technique and musicality to students. In addition to working on technical and musical goals, however, students may struggle with aspects of the music that do not have broad technical or musical implications but are by-products of learning repertoire. I began to wonder if improvisation could be harnessed as a vehicle for teaching technique while providing creative and musically enhancing experiences for students. Since the techniques students learn are only useful if they can transfer to other contexts, improvisation-based learning must facilitate the transfer of technique in order for it to be a viable alternative to repertoire-based learning. The purpose of this study was to compare the transfer of a technique when acquired through traditional repertoire-based methods with fixed tonal and rhythmic contexts and through improvisation, with variable tonal and rhythmic contexts. In this quantitative quasi-experimental study, I investigated the transfer of a bow technique in nine fourth grade public school string students. The participants in the repertoire-based group used a piece of music (fixed context) to learn how to play two-note slurs. The participants in the improvisation-based group used an improvisatory framework to learn how to play two-note slurs. After several weeks of practicing, the participants were presented with an unfamiliar musical excerpt containing two-note slurs and separate notes. They were given time, as needed, to practice it with help from their classroom teacher and then performed it, along with the piece they had been practicing and a familiar piece (learned previously with separate bows) with slurs. They also completed a questionnaire. The participants’ improvisations ranged in length, included a mixture of slurs and separately articulated notes, and had varying melodic contour and rhythmic content. Participants in both groups seemed to transfer their technique to both familiar and unfamiliar contexts to approximately the same degree. Improvisatory
experiences appeared to be just as effective as a more traditional repertoire approach and teachers are encouraged to provide these opportunities to students.

*Keywords*: improvisation, transfer, technique, beginning strings, bowing
Introduction

Repertoire has traditionally been used as a primary vehicle for teaching instrumental technique and musicality to students. For example, in the Suzuki repertoire, “Lightly Row,” incorporates an independent second finger, “Minuet II” introduces slurs, and “Chorus” from *Judas Maccabaeus* gives students opportunities to work on beautiful, ringing tone. In addition to working on technical and musical goals, however, students often struggle with aspects of the music that do not have broad technical or musical implications but are by-products of learning repertoire. Since an additional goal of learning repertoire is excellence in performance, my lesson agendas are often dictated by the repertoire-specific errors I witness that day (forgetting a second ending, playing a wrong note, or duplicating a rhythm from one measure in others where it does not apply). If these mistakes indicate that a student lacks harmonic understanding or has a rhythmic impairment, then they are very useful to address. However, if they are arbitrary, or even intuitive (for example, playing a “wrong” note that fits within the harmonic structure), then correction of these errors does little, if anything, to assist with students’ long-term technical and musical development.

In my own teaching, though I intended to prioritize technical and musical goals, I habitually found myself frustrated as I spent lesson time correcting repertoire-specific errors at the expense of broader concepts. These frustrations prompted me to consider whether there might be a way to teach technique and musicality without relying on repertoire and, consequently, led me to improvisation. I surmised that improvisation, for these purposes defined broadly as “the process of generating new ideas in music without any censorship or editing” (“Improvisation,” 1999) could potentially be harnessed as a vehicle for teaching technique while providing creative and musically enhancing experiences for students. Improvisation-based
learning, by leaving many parameters up to the discretion of students, could also potentially reduce the amount of time spent on repertoire-specific corrections and allow teachers to focus more on their own technical and musical goals.

Since the techniques students learn are ultimately only useful if they can be transferred to other contexts, improvisation-based learning must facilitate the transfer of technique in order for it to be a viable alternative to repertoire-based learning. For the purposes of this paper, the term “transfer” is used to refer to the application of a learned motor skill in another context and the word “technique” is defined as the motor skills used in playing a musical instrument. Technique acquisition through improvisation is distinct from the traditional repertoire-based model because in improvisation, students are likely to use different notes and rhythms each time they practice, producing a variable tonal and rhythmic context in which the repetitions of the technique will take place. In repertoire-based learning, the tonal and rhythmic context are fixed because students use the given notes and rhythms each time they practice. In pursuing improvisation as a vehicle for teaching technique, it therefore seemed imperative to investigate the role of fixed tonal and rhythmic context in the transfer of technique. Previous research has investigated various issues of motor transfer in experts and novices (Duke & Pierce 1991; Palmer & Meyer 2000, 2003) but there do not seem to be studies that address the role of fixed or variable context in transfer, nor are there studies that compare repertoire-based and improvisation-based learning. Therefore, the purpose of this study was to compare the transfer of a technique when acquired through traditional repertoire-based methods with fixed tonal and rhythmic contexts with transfer of a technique when acquired through improvisation with variable tonal and rhythmic contexts.
Research Questions

1. Is there a difference in positive transfer to either familiar or unfamiliar contexts between students who learned a technique through repertoire-based methods and students who learned a technique through improvisation?

2. Is there a difference in negative transfer to unfamiliar contexts between students who learned a technique through repertoire-based methods and students who learned a technique through improvisation?

3. Are there differences in how the students transferred a technique to a familiar context depending on their mode of instruction (repertoire-based vs. improvisation-based)?

4. What are the students’ overall feelings about their improvising experiences?

Literature Review

Improvisation is considered to be a valuable skill and is gradually being incorporated in the daily curriculum of music classrooms. Particularly as the need to develop student creativity garners attention from the music education community, researchers have investigated the ways in which improvisation might effectively be used in the classroom. Koutsoupidou and Hargreaves (2009) found that improvisation activities greatly increased students’ abilities in multiple creative domains (creative thinking in music, musical flexibility, musical originality, and musical syntax). In addition, this study made the discovery that students who received teacher-directed instruction that did not include improvisation made only minimal creative improvement over the course of the study and, in the domains of musical originality and musical syntax, actually scored lower on the posttest than in the pretest. The notion that the mode of instruction has the potential not only to hinder but also to inhibit students’ creative development showcases the importance of creative modes of instruction. Koutsoupidou and Hargreaves, therefore, advocate for further
research to be conducted to investigate teaching conditions which foster creative learning among students. Azzara (1993) found that fifth-grade instrumental music students who received improvisation instruction as part of their regular curriculum significantly outPerformed students who did not receive improvisation instruction when asked to play both teacher-assisted and sight-read etudes. It seems improvisational learning can heighten student achievement on other musical tasks and embedding improvisational activities into the music curriculum is beneficial. While this study showed that positive effects of improvisation transfer to other musical contexts, specific links between improvisation and the development of instrumental technique are unclear.

A considerable amount of transfer research has been conducted in the domain of music performance. Investigations by Duke & Pierce (1991) and Palmer & Meyer (2000, 2003), revealed relationships between melody/motor, rhythm/motor, and meter/motor during music performance transfer tasks. In the 2000 study, Palmer & Meyer examined differences in the abilities of expert (adult) and novice (child) pianists to transfer learned musical material when either the melodic or motor parameters were changed. The study revealed that the novice pianists were unable to transfer previously learned musical material unless the test conditions were identical to the learned conditions. Difficulty in transferring previously learned material may highlight an important developmental aspect of young novice musicians and suggest that both melodic content and motor patterns can greatly affect transfer, and that transfer may be hindered in unfamiliar contexts. The experts in this study were able to transfer the previously learned material to unfamiliar contexts but showed better transfer when the melody remained constant. Since they were less inhibited by changes in motor parameters (i.e. right hand vs. left hand), this seems to indicate that experts have more flexibility with motor domains than perceptual ones.
Even so, perfect transfer with the adult pianists only occurred when the test conditions were identical to the learned conditions.

In a subsequent study (2003), Palmer & Meyer investigated additional perceptual parameters (specifically meter and rhythm) in expert pianists and found that they produced the best transfer with identical conditions, better transfer with meter changes than with motor, but had the greatest difficulty when the rhythm was changed. The differences in transfer of musical elements gives further insight to how motor and perceptual domains are represented when musicians transfer learned material to unfamiliar contexts. Palmer & Meyer’s research demonstrates a failure by novices to transfer learned musical passages to new contexts and shows that experts are better at transferring learned musical passages to new contexts that require different motor movements but retain the perceptual elements (i.e. melody, rhythm).

Duke & Pierce (1991) specifically examined how the surrounding context of a musical passage may affect the transfer of a previously learned passage when the preceding and succeeding measures are of high or low difficulty. This particular study, conducted with college-level orchestral musicians, revealed that previously learned target measures were performed less accurately when preceded by high-difficulty measures. Therefore, musical context may play a role in the transfer of learned musical material. Learning technique through improvisation, in which the musical context surrounding the iterations of the technique is variable, has the potential to either positively or negatively affect students’ ability to transfer that technique to new contexts.

The current body of music education research regarding transfer addresses the effects of melody, rhythm, meter, and contextual difficulty on the transfer of specific musical excerpts but does not address the transfer of instrumental technique. The body of research on the benefits of
improvisation does not link improvisational learning with the learning of instrumental technique, nor does it show what effect this type of learning may have on transfer of technique to new contexts. The current study attempted to combine both deficits of knowledge by examining transfer of instrumental technique when learned by both traditional and improvisational methods.

**Method**

**Design and Participants**

This study employed a quantitative quasi-experimental posttest only design. The participants of this study were nine fourth grade string students in a northeastern University town school district who had studied with a public school elementary string teacher for five months. No students had received any instruction outside of school. All students received string instruction from the same teacher, to control for a possible teacher effect. The study was approved by the Penn State IRB and the local School District. The teacher distributed information about the research study along with a permission slip to all of her fourth grade violin, viola, and cello students. The nine students from whom consent was obtained and who participated in the study were all violinists.

**Target Technique**

The target technique selected to measure transfer in this study was a two-note slur. This technique was chosen because of its ability to be applied to any tonal and rhythmic context and because it involves large muscle movement. In string playing, the technique of slurring is typically taught during the first year of instruction and is complex enough that most students do not master it immediately. Slurring accuracy is also fairly straightforward to assess, making the data easily quantifiable.
Materials

The participants received instruction in lesson groups. These lesson groups were randomly assigned to either the control condition (hereafter referred to as the RB “repertoire-based” group) or the experimental condition (hereafter referred to as the IB “improvisation-based” group). The researcher created an original excerpt, *Time to Slur!* (Figure 1), for the purpose of teaching slurs to the RB group based on pieces in standard string methods books. The excerpt includes every type of two-note slur (including all combinations of down-bow, up-bow, adjacent string crossings, and same-string slurs). The inclusion of adjacent string crossing slurs (particularly those in which the motion of the arm curves in the opposite direction of the bridge) was a departure from what is typically done in string method books. These slurs were included in the study to produce a range of difficulty in the transfer task and were therefore presented in the initial excerpt to ensure that the participants in the RB group had encountered every type of slur that was present in the transfer task. The researcher-created echo patterns and improvisation framework used to teach slurs to the IB group also included every type of two-note slur. The participants in the IB group were therefore ensured to have encountered every type of slur that was present in the transfer task. The researcher-created improvisation framework (Figure 2.1) used English words, presented the standard slur notation to allow participants to recognize the notation in other music, and gave general guidelines encouraging the use of different types of slurs while leaving much room for creative liberty in tonal and rhythmic domains. The second page of the framework (Figure 2.2) was given to students on the second week and provided even more open-ended instructions to maximize creative freedom.
Slur- a curved line connecting two or more different pitches.

Keep the bow going the same direction as you play the slurred notes. This makes a smooth sound.

Figure 1

Violin

Time to Slur!
Figure 2.1

---

**Slur** - a curved line connecting two or more different pitches.

Keep the bow going the same direction as you play the slurred notes. This makes a smooth sound.

---

Start by playing this:

---

Now make up your own 2-note slur patterns

Now play this:

---

Now make up some more 2-note slur patterns

**Play Loud slurs!**  Now play soft slurs

Play up the D scale with 2-note slurs

Now play some notes with separate bows

Play more 2-note slurs... make a cool ending!
Now, rearrange the parts of the last piece or add your own new ideas—be sure to use some 2-note slurs!

Write the instructions for your piece here:
Etude (Figure 3) was designed by the researcher as the transfer task to an unfamiliar context. It utilized all types of slurs that students encountered during their learning period. It was designed to be easy to read, have equal numbers of slurs and separate bows (in order to measure both positive and negative transfer) and be melodious. It also replicated a tonal pattern from Time to Slur! with a different bowing in measures 3-4 in order to specifically test for negative transfer. It was hypothesized that some connection may exist between the hearing of tonal patterns and the execution of motor movements associated with them.

Figure 3

Violin

Etude
Procedure

The participants in the RB group were presented with a piece of music created by the researcher (Time to Slur!) containing 13 slurs and six separate-bow notes and were taught how to execute slurs using that (fixed) musical context. The participants in the IB group were taught how to execute a two-note slur through rote echo sequences with the teacher, were presented with a framework for improvisation, and were then instructed to create an improvisation using slurs. Each participant practiced two-note slurs using the given (fixed/variable) musical context in class and at home for a period of six weeks. In class, the participants were presented with an unfamiliar musical excerpt created by the researcher (Etude) that contained ten two-note slur events and ten non-slip events. They were given time, as needed, to practice it with help from their classroom teacher. The participants were then video recorded performing the following tasks for their classroom teacher:

1. The piece they used in learning the target technique (either Time to Slur! or their own improvisation)
2. An easy piece (Rolling Along) they had learned with separate bows several months earlier, using slurs
3. The unfamiliar piece (Etude)

At the conclusion of these three tasks, the participants were given a brief follow-up survey which corresponded to their mode of instruction (Figures 4 and 5).
Figure 4

Repertoire-Based Group Survey

Were you nervous when you played by yourself for Mrs. Minnich? (Check one)

☐ No, not at all!
☐ Not really
☐ A little
☐ Yes
☐ Yes, very!

When you practiced lately, how much time did you spend practicing slurs? (Check one)

☐ I almost never practiced slurs
☐ I practiced the slurs sometimes, but not a whole lot
☐ I practiced slurs about half of my practice time
☐ I practiced slurs more than half of my practice time
☐ I practiced slurs for almost my whole practice time
Improvisation-Based Group Survey

Were you nervous when you played by yourself for Mrs. Minnich? (Check one)

☐ No, not at all!
☐ Not really
☐ A little
☐ Yes
☐ Yes, very!

When you practiced lately, how much time did you spend practicing slurs? (Check one)

☐ I almost never practiced slurs
☐ I practiced the slurs sometimes, but not a whole lot
☐ I practiced slurs about half of my practice time
☐ I practiced slurs more than half of my practice time
☐ I practiced slurs for almost the whole practice time

Improvising my own piece was: (Check one)

☐ A lot less fun than playing music somebody else wrote
☐ A little less fun than playing music somebody else wrote
☐ About the same amount of fun as playing music somebody else wrote
☐ A little more fun than playing music somebody else wrote
☐ A lot more fun than playing music somebody else wrote

Why?

---

---

---

---

Was it easier or harder to use music that had words instead of notes and rhythms? (Check one)

☐ Easier
☐ Neither (about the same)
☐ Harder

Why do you think?

---

---

---

---

Figure 5

Improvisation-Based Group Survey
Analysis

Task 1

The first task, performing the piece they used in learning the target technique, provided descriptive data for the study and, in the case that a participant was unable to transfer the technique, to investigate whether they could execute the technique in the initial task, differentiating between failures to transfer and failures to acquire the technique.

Task 2

The second task, playing a familiar piece (*Rolling Along*), using slurs indicated whether participants were able to transfer a technique to a familiar context; an aspect that was not measured by the other tasks. During the design of this study, a dilemma surfaced; is it better for students to play more slurs or is it better for them to use fewer slurs in a more musically intuitive way? Since the vagueness of the task would not provide a reliable way to score their success, it was decided that these data would not be quantized. This task, however, did provide additional data to be used in the event that a participant scored low on *Etude*. Since performing *Etude* involved music reading, it was a concern that this task might inadvertently measure reading comprehension and not slurring ability. Allowing participants time to work with the teacher on *Etude* prior to the video recording and by providing supplementary data through *Rolling Along* helped control for this variable.

Task 3

The third task, performing *Etude*, measured the participants’ abilities to transfer the technique of a two-note slur to an unfamiliar context. In this task, their slurring accuracy, as pertaining to both positive and negative transfer, was analyzed and quantized. The following errors were extrapolated from the recordings of *Etude*:
Two-note slurs played as separate bows (positive transfer)

Two-note slurs played as longer slurs (positive transfer)

Two consecutive notes without a slur played as a slur (negative transfer)

A “slurring accuracy score sheet” was designed by the researcher to assess participants’ achievement on this task. It utilized two ten-point scales, corresponding to the ten slurred events and the ten non-slurred events. An incorrect execution of any event resulted in a one-point deduction from the participant’s score. An incorrect execution of any event that was immediately recognized and corrected by the student resulted in a half-point deduction from the participant’s score. Individual participant scores (out of ten) were calculated to reflect to what extent they achieved positive transfer. Individual participant scores (out of ten) were also calculated to reflect to what extent they produced negative transfer. For the first score, 10/10 indicated 100% positive transfer. For the second score, 10/10 indicated 0% negative transfer. Thus, in either case, higher scores represented higher performances. Average scores were calculated for each group to reflect accuracy for positive transfer, negative transfer, and a composite score for positive and negative transfer combined. Due to the small sample size and the nature of the project, no attempt was made to explore statistical significance. Instead, the data was analyzed for trends through utilization of measures of central tendencies, primarily means.

Survey

The first two questions on the survey were included to control for alternative reasons a student may have performed poorly on the transfer task (nervousness and lack of practicing). The second question was phrased “when you practiced lately how much time did you spend practicing slurs?” instead of “how much time did you practice lately?” because all of the students keep information regarding total number of minutes practice was available through that source.
Since all students performed well on the transfer tasks, the information from the first two questions was not used and information from practice logs was never obtained.

The extended response section of the IB group’s survey were analyzed to provide descriptive data regarding students’ overall feelings about their improvising experiences and to reveal any relevant themes that emerged.

Results

Initial Implementation and Redesign

During the initial run of the study (with over 30 participants from three schools), it was revealed through the performances of the first task that none of the IB participants had improvised during the course of their three-week learning experience. Because of this, the data was discarded and the study was re-run with a smaller sample at one school. The entirety of this analysis and its conclusions reflects the re-run of the study with the smaller sample size. As a result of re-running the study, all participants had the materials for a period of six weeks, but the participants in the IB group only engaged in class improvisation-based learning for the final two weeks of the study. This poses an internal validity threat to the study because the IB participants likely engaged in repertoire-based learning by practicing a fixed context of the notated portions on the improvisation framework for the first four weeks of the study. Thus, their introduction and initial learning of two-note slurs may have been very similar to those in the RB group and may not be reflective of pure improvisation-based learning.

Initially, both groups were intended to receive the same weekly rote instruction, but this did not come to fruition. The presiding teacher, in part due to confusion regarding the implementation of the study and in part due to the hectic nature of the teaching day, only introduced slurs through rote echo patterns with the IB groups. Since the RB participants were
introduced to slurs in a different way, the mode of instruction (as related to rote learning- not improvisation) may have affected the outcome, causing a threat to the internal validity of the study. This was later partially corrected when the teacher engaged in rote instruction with both groups for the final two weeks of the study.

The original timeline of the study was three weeks. This timeline was chosen because it provided ample time for participants to learn two-note slurs (especially if lessons were canceled one day due to weather or a participant was absent) while limiting the timeline enough to expect a reasonable amount of difference in mastery. As a result of the study being re-run with a subset of the original sample (a new sample was not attainable) the time frame had to be extended by a period of three weeks. This extension may have caused all participants’ scores to be higher and differences between the two groups minimized.

As a result of the re-run, the sample size was reduced from 42 to nine. Of the nine participants, six were randomly assigned to the IB group and three were randomly assigned to the RB group. Such a small sample size in quantitative research renders statistical conclusions very unreliable, particularly those pertaining to the RB group.

**Task 1**

The IRB participants’ improvisations ranged in length from 6 to 57 seconds, with the majority of them being between 6 and 28 seconds. Several participants reported that they did not make up a piece (most likely referring to the second page of the improvisation framework). All but one played an improvisation for the first task. Three participants used a mixture of slurs and separately articulated notes while two students used exclusively two-note slurs. They also differed in their use of melodic contour and rhythmic content. (Table 1).
Table 1

Characteristics of Student Improvisations (Task 1)

<table>
<thead>
<tr>
<th>Length (seconds)</th>
<th>Slurs/ Separate</th>
<th>Melodic Contour</th>
<th>Rhythmic Content</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Both</td>
<td>Stepwise motion and leaps (using open strings)</td>
<td>2 different note durations used (approx. quarter notes and half notes)</td>
<td>Didn’t make up a piece</td>
</tr>
<tr>
<td>6</td>
<td>Only slurs</td>
<td>Stepwise motion and skips</td>
<td>All notes same duration</td>
<td>Didn’t make up a piece</td>
</tr>
<tr>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>57</td>
<td>Both</td>
<td>Predominantly leaps (many 6ths) and occasional stepwise motion/repeated notes</td>
<td>Utilized different rhythms: these rhythms corresponded to particular melodic aspects and were repeated</td>
<td>Many slurs were to non-adjacent strings. Also used pizzicato. This student-made piece repeated musical ideas and had the clearest form</td>
</tr>
<tr>
<td>15</td>
<td>Only slurs</td>
<td>Stepwise motion and repeated notes (approximated the D Major scale with several notes repeated)</td>
<td>2 different note durations used (approx. quarter notes and half notes). One half note was used for the top note of the scale</td>
<td>Didn’t make up a piece</td>
</tr>
<tr>
<td>28</td>
<td>Both</td>
<td>Stepwise motion, skips, and leaps</td>
<td>2 note durations used; half notes for beginning and ending sections and quarter notes for middle section; also used rests (during bow retakes)</td>
<td>Used almost exclusively down-bow slurs; facilitated by many bow retakes</td>
</tr>
</tbody>
</table>

**Task 2**

Participants used slurs in a number of different ways in *Rolling Along*. Most of the participants chose to use two note slurs at the beginning and then diverged; some used exclusively two-note slurs for consecutive notes that changed pitch and slurred on-the-beat, others employed off-the-beat two note slurs, and still others used longer (3- or 4-note) slurs and hooked bows. The average number of slurs used in the RB group was 3.3 and the average
The number of slurs used in the IB group was 4.6. The most common number of slurs used in the RB group was 3 and the most common number of slurs used in the IB group was 5. The lowest number of slurs used was 3 indicating that all of the participants were able to produce transfer to the familiar context. See Figures 6.1-6.4 for transcriptions of student performances of *Rolling Along* with slurs.

Figure 6.1

*Rolling Along*

Transcription A

Figure 6.2

*Rolling Along*

Transcription B
Task 3

All performances of Etude demonstrated transfer of the technique of the two-note slur.

The RB participants scored an average of 7.66 out of 10 for positive transfer (with a range of 5) and an average of 9.66 out of 10 for negative transfer (with a range of 1). The IB participants scored an average of 8.83 out of 10 for positive transfer (with a range of 3.5) and 7.58 out of 10 for negative transfer (with a range of 8). Assuming equal weighting of positive and negative transfer, composite scores were calculated as 8.66 for the RB group and 8.21 for the IB group. (Table 2).
One participant (who did not perform an improvisation for task 1) scored a 2/10 on negative transfer for the performance of *Etude*. Otherwise, the lowest score on negative transfer in either group was a 6/10, with the majority scoring 8 and above. Assuming this participant to be an outlier and removing their data adjusted the IB participants’ average score to 8.8 for positive transfer, 8.7 for negative transfer, and 8.75 for composite (Table 3).
With all participants included there appears to be an anomaly in the data with negative transfer. Once the outlier was removed, the numbers began to equalize. This would be an interesting aspect to investigate in further research.

The participants in the RB group outperformed the researcher’s expectations for negative transfer. It was hypothesized that the third and fourth separate bow events in *Etude* would produce more negative transfer in the RB participants because the music used the tonal pattern from *Time to Slur!* with a different bowing. However, none of the three participants produced any negative transfer on either of those separate-bow events.

**Survey**

Due to the high performances of all participants, data pertaining to the first two questions on the survey were not used. The remaining data from the IB participants’ surveys provided additional insight into their improvising experiences.

Answers were evenly split between improvising my own piece was “a little less fun than playing music somebody else wrote” and “a lot more fun than playing music somebody else wrote.” Four of the students rated using music that had words instead of notes and rhythms as harder and two rated it as easier. The three students who rated improvising as “a little less fun...” also rated it as “harder.” Vice versa, two of the students who rated it “a lot more fun...” also rated it as “easier.” Only one student who rated it as “harder” also selected the response that it was “a lot more fun.” This indicates a possible connection between students viewing an activity as fun when it is easy and less fun when it is hard. See Table 4.
<table>
<thead>
<tr>
<th>Response to “Why was it (more/less fun to make up your own piece?)”</th>
<th>Response to “Why was it (harder/easier) to use music that had words instead of notes and rhythms?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>[A little less fun] “It is harder to make a fun song.”</td>
<td>[Harder] “If it had words I would not keep track of the notes but I would keep track of the words.”</td>
</tr>
<tr>
<td>[A lot more fun] “Because it makes me feel good when I accomplish a music piece and then reading it and then playing it.”</td>
<td>[Easier] “Because it tells you what to play and what the note is.”</td>
</tr>
<tr>
<td>[A little less fun] “Improvising my own piece was a little less fun than playing music that somebody else wrote is because I like the sound and beats of someone else’s music.”</td>
<td>[Harder] “Because it is hard for me to come up with my own music.”</td>
</tr>
<tr>
<td>[A lot more fun] “Because I like making my own music”</td>
<td>[Easier] “Because it is easier than notes to me.”</td>
</tr>
<tr>
<td>[A lot more fun] “Because it was very fun writing, then playing it, and adding the slurs was fun too! I enjoyed improvising, and hope I can do it later again.”</td>
<td>[Harder] “Because I am used to seeing notes instead of the words, and it was harder because I was not used to it. I would rather play notes than words.”</td>
</tr>
<tr>
<td>[A little less fun] “I don’t really like making up my own songs because I really like seeing what other people write and I knew it will be better than mine. It will sound much better.”</td>
<td>[Harder] “I think because I play better looking at the notes than making them up in my head. Because I can see the notes I have to play.”</td>
</tr>
</tbody>
</table>

**Discussion**

The fact that all participants, regardless of the mode of instruction, were able to produce transfer to both familiar and unfamiliar contexts is promising for string education. It also validates improvisation as an alternative or supplement to teaching technique to students. The variable context produced by improvisation did not hinder students’ development of the technique, nor did it, in any way, prohibit transfer to other contexts. Improvisation was not shown to facilitate transfer more than repertoire. Due to the erroneous nature of the execution of
the study and the low number of participants, however, it cannot be eliminated as a possibility. A replication of this study with a larger number of students and proper execution is recommended.

The high score (and thereby low rate) of negative transfer showcased in the performances by the RB participants is intriguing and merits further investigation. As a Suzuki teacher, I have often witnessed occurrences of negative transfer where tonal patterns are repeated but a different motor movement is required. The fact that this study showed no instances of negative transfer when these conditions were present in *Etude* may indicate that no such connection between aural and motor memory exists, or that there are fundamental differences between public school beginning string students and Suzuki students. One possible hypothesis is that typical Suzuki students engage in more repetitive practice than typical public school students and may therefore ingrain motor and tonal patterns more deeply, possibly forging a connection between the two, while the practice habits of public school students do not necessarily create such a connection. Another hypothesis is that the reading ability of typical first-year public school students is more advanced than their Suzuki counterparts, allowing the public school students to override any aural-motor connection by accurately reading the music. Still another hypothesis is that the participants may have been focused on correctly reading and executing *Etude* to the point that their active listening was reduced and they did not recognize the tonal pattern in the transfer task.

The student responses to the survey seem to indicate generally favorable opinions towards improvisation. In the cases where the students rated as improvising as “*a little less fun*” than playing music somebody else wrote” they generally mentioned preferring the sound of music that other people write. This indicates they were actively listening while improvising and had an awareness of the sounds they were making it (as opposed to focusing solely on the execution of playing). It also indicates that they have musical preferences they were not able to
satisfy with the music they created on their own. Presumably, with continued improvisation instruction these issues would diminish, as students would develop their musicality and improvisation skills, allowing them to minimize the difference between what they want to hear and what they are able to produce. In addition, as students develop their technique, they would likely increase their ability to produce the desired sounds, thus raising their level of personal satisfaction when improvising.

Two common errors that students produced in *Etude* were performing slur events numbers 6 and 7 either as separate bows or correcting the bow direction in such a way that it produced the same type of slur found in the previous measure. Slur events 6 and 7 consisted of an adjacent string crossing in which the curvature of the arm motion is opposite of the direction of the curve in the bridge. This suggests that this type of slur is intrinsically more difficult to execute than the other types (i.e. adjacent string crossings in the same direction as the curve of the bridge or same-string slurs). Unlike the repertoire example in this study, this type of slur is typically sequenced later in string method books. It is, however, the second type of slur sequenced in the Suzuki violin method (occurring first as a down-bow in Minuet II and second as an up-bow in Minuet III). String music educators may wish to be mindful of this finding when teaching this type of slur to students.

**Future Research**

In addition to replicating the current study, it is recommended that future research investigate negative transfer in instances where a student is presented with a previously learned tonal pattern that requires a different motor movement. Comparing this phenomenon between students who study lessons at school in a group setting with students who study privately (particularly those studying under the Suzuki method) could provide useful insight about how
such connections (if they exist) are formed. To contribute to the body of improvisation research, it would be helpful to conduct a longitudinal study tracking students’ feelings regarding improvising as they develop on their instrument and as musicians. Such a study might be able to reveal whether the responses from the surveys in this study would be likely to change over time with long-term improvisation instruction. After replicating the current study, a subsequent research project might take a longitudinal approach to the transfer of technique when students use improvisation as their primary mode of instruction compared to repertoire.

Conclusion

Issues that surfaced during the initial implementation of the study revealed that teachers might not be entirely comfortable with teaching technique through an improvisatory approach. It is also possible that string teachers may tend to be uncomfortable with improvisation instruction in general. In this study, even when specific materials and instructions were provided to the presiding teacher, she failed to incorporate any improvisation instruction until the re-run. Therefore, it may be useful to explore how often strings teachers use improvisation in their classrooms and what their overall feelings about improvising are. It may be helpful to introduce pre-service music teachers to instructional methods in improvisation in order to give them the confidence necessary to incorporate it. Over the course of this study, I discovered some issues with the improvising materials that I want to revise. For example, students fixated almost exclusively on the notated portions of the framework even though these portions amounted to only 25% of the total framework. Student responses to the questionnaires also led me to believe that they were not very comfortable reading words and translating them into musical instructions. Placing words on a musical staff, for example, may help students to understand how to execute the instructions in a musical manner. The observation of student improvisations showcased how
diverse students’ creative thinking can be. Some students stayed safely in the box, executing only a few two-note slurs while other students were adventurous and explored other musical material such as pizzicato and slurring to non-adjacent strings. In Task 2, the extent to which I observed students attempt to slur two consecutive notes of the same pitch or use hooked bows indicates that students may conceive of slurs as a bow direction, rather than an articulation concept. All of these ideas provide fodder for future teaching in private and group settings, using both traditional and improvisatory methods.
References


