JTML, Vol. 4, No. 2, 3-15

LAPTOP BASED COMPOSING IN A MIDDLE SCHOOL BAND REHEARSAL

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This study examined the integration of laptop-based composition activities into a middle school band rehearsal as a means of broadening students' musical experiences in an ensemble. Twenty-four members of a fifty piece eighth grade band completed a composition problem, during rehearsals, over a 14-week period. The composition task was to construct a melody that mirrored specific aspects of a model composition being performed by the band. The student compositions were evaluated by a three-judge panel for craftsmanship, creativity, and evidence of understanding of concepts exemplified by the model piece. The ratings, which had an acceptable level of interjudge reliability ($r >$ .624), found modest levels of craftsmanship and creativity, and lower levels of conceptual understanding. There was a modest correlation between composing ability and performance skill.

Laptop-Based Composing in a Middle School Band Rehearsal

A divide exists between the ideal theoretical model of comprehensive performance programs and most band, orchestra, and choir programs in the United States today. Since the 1960s, calls for change and modification have been put forth and have become institutionalized within teacher education curricula and the National Standards (Consortium of National Arts Education Organizations, 1994; Gibbs, 1970; Grout, 1966; Mark, 1996; Reimer, 2000; Webster and Richardson, 1994), yet substantial change is far from being realized within performance programs (Dodson, 1989; Mark, 1996; Schmid, 2000). The advance of portable and affordable computing presents new opportunities for unifying theory and practice through in-class composition activities. This study examined the use of laptop computers as a means to infuse creative thinking and improve conceptual understanding in a middle school band class. The resulting information may offer new insights toward bridging the divide between theory and practice in performance–based music education.

This study focused on broadening performance instruction through composition. Its specific purpose was to explore the compositional abilities of middle school band students through an examination of their compositions. The feasibility portion of the study, which is reported elsewhere (Dammers, 2007), found the introduction of laptop based composition activities into the rehearsal setting to be a functional and feasible approach. The examination of the student compositions in this study addressed four research questions:

1. To what extent do students' compositions provide evidence of musical craftsmanship?
2. To what extent do students' compositions provide evidence of creativity?
3. To what extent do students' compositions provide evidence of conceptual understanding?
4. How are the ratings of craftsmanship, creativity, and conceptual understanding related?

While the primary focus of other studies has been on younger children composing either as individuals or as a group (Barrett, 1996; DeLorenzo, 1989; Gromko, 1996; Hickey, 1995; Kratus, 1989, 1991, 1994, 1995, 2001; Stauffer, 2001; Wiggins, 1994), this study focused on older students composing individually within a group performance setting. This composition problem was of a longer duration than most, yet its conceptual tie to a model piece gave this composition problem a narrower focus than those in the studies cited above. However, even with these differences, some common issues apply, particularly in areas of methodology. Similar to procedures in Kratus (1991, 1994, 1995) and Hickey (1995), independent judges utilized rating scales to quantify aspects of creativity and craftsmanship evidenced by compositional products. Like Hickey (1995), Amabile's (1996) approach to assessing creativity was employed. Amabile provides a number of criteria for the creative problem and judging procedure that should be met in order to apply her assessment technique. The task must produce an observable product, be open enough for flexible subject response, and not require prior instruction to complete the task. The judges must have experience in the field, rate the products independently, not be provided a definition of creativity, and rate the creativity of the products against each other, not against a fixed external standard. In the process, judges should also rate the products on dimensions other than creativity as well.

Conceptually, this study, like Barrett (1996), included formal structure as a central aspect of the compositional problem. Riley (2006), in a study published after the collection of data for this study, also focused on incorporating composition in a middle school band. Based on similar gains on pre- and posttest measures in aural skills, performance skills, and attitude, by both the experimental and control groups, Riley concluded that composition can be included in a band program without hindering the development of performance skills. While Riley focused on the effects of composition activities on measurements external to the student compositions, this study is descriptive, not experimental, and focuses on the student compositions as the primary data source.

Method

This study was conducted with an eighth grade band in a suburban middle school in the Midwest. The band members were presented with a composi-

tional task of creating an original melody based upon the formal characteristics of a work being performed in class. The participating students were provided with laptop computers during class, which they used to compose in rehearsal once a week over a 14-week period. The 24 members of a 50 piece eighth-grade concert band who volunteered to participate in this study composed in groups of five to seven students. Most of the students in this ensemble were in their fourth year of playing. During those years, the students had little exposure to music technology through the band program. Typically, 40% of the band in a given year would participate at the district solo and ensemble festival and five or six students would represent the band in the regional honor band, an auditioned ensemble comprised of the most advanced middle school band students in the area. The director, who had taught for 27 years, was well liked by his students and did not have particular expertise in technology or composition.

This study examined students' responses to a compositional problem: Compose an original melody/piece that reflects the formal aspects (as identified in class) of *The Cowboys* (Williams, 1988). This arrangement of *The Cowboys* followed an ABACBA form. Each section was clearly defined by contrasting melodic content. The arrangement opened in the key of E flat major, and moved through B flat major and F major before returning to E flat major. Students were asked to compose a single line melody for their instrument, using the major tonalities employed in *The Cowboys*. This assignment was designed to balance structure for students to compose successfully with leaving enough openness for the students to be creative. The procedures and materials were piloted and refined with a different middle school band prior to the commencement of this study.

The composition project began with the introduction of the piece to the band through a *PowerPoint* Listening Guide that was synchronized to a CD recording of the piece. This guide highlighted the thematic ideas, key changes, syncopation, tempo changes, and the formal structure of the piece. Students located the highlighted themes in their parts, and, during the synchronized part of the presentation, students were asked to write the formal structure in their parts (Intro, A, B, etc.). Following the introduction of *The Cowboys* to the full band, the students participating in the study were given two lessons by the researcher, one on the composition problem and one on how to use Finale Notepad (2006) during the band period in an adjacent room. Following the two introductory sessions, the students began to compose. The participants were assigned a day of the week on which they were to work on their composition. Five to seven of the participating students composed on any given day, seated in a semicircle in the right rear of the classroom (from the director's perspective) with their backs to the ensemble, utilizing headphones while the ensemble continued to rehearse. While written project instructions, harmony reference sheets, and *Finale Notepad* tutorials were distributed to the students, the researcher was no longer available to the subjects in an instructional role. The students were free to seek feedback from the band director, but rarely did so, with an average of less than one

student question per lesson. The number of composition sessions varied from student to student, according to attendance and amount of time needed to complete the assignment. On average, each student composed seven times, and all of the students were able to complete the project during the 14-week period. Early and final drafts of each student composition were collected (n = 44).

Three judges rated the compositions in three categories: craftsmanship, creativity, and conceptual understanding. These judges were middle school band directors with 12, 11, and four years of teaching experience. Prior to evaluating the compositions, the judges practiced rating similar compositions derived from a pilot study in order to familiarize themselves with the rating scales. Concurrently, the judges listened to each composition at least twice (more times if any judge felt further review was necessary for an accurate rating) and then completed their ratings. Following the judges' instructions for the rating scales, each judge recorded his or her ratings after the final playback. The ratings were not shared or discussed during the judging session. The playback was amplified through a Bose Wave radio and the score was projected with an LCD projector so that each judge could easily view the score. The compositions were labeled with student identification codes to ensure anonymity, and were presented in a random order.

On the first scale the judges rated the craftsmanship of the products. The central focus was whether students were working with music units (as opposed to individual notes) to create melodies that have structure. The specific instructions were as follows: "Examine the extent to which students have written phrases in their piece that connect to the larger structural form. Are the phrases cohesive and the piece musical?" The judges used a nine-point scale, with eight defined as "cohesive phrases" and zero defined as "unstructured." The creativity scale followed Amabile's (1996) consensual assessment technique. In this approach, the subjective judgments of independent judges were used to assess the creativity represented by an artistic product. The only instruction that was given for this rating scale was to rate the creativity of students' compositions in the context of the other compositions in the study.

The conceptual understanding scale was constructed from five subscales, each for specific concepts identified in the opening lessons. The three concepts that students were instructed to reflect in their compositions were the ABACBA form as defined by contrasting thematic material, harmonic structure that moves from E flat major through F major and B flat major and returns to E flat major, and the inclusion of at least one dotted eighth-sixteenth rhythm in each section of the piece. Two subscales were used to measure the concept of form. The first subscale, Form, evaluated the extent to which the composition displayed clear, discrete sections. The second subscale, ABACBA Form, measured the extent to which the composition followed ABACBA form. Similarly, two subscales were used to measure tonal aspects of the students' conceptual understanding. The Tonal Structure subscale examined the extent to which the composition displayed clear tonal center(s),

while the Cowboys Tonal Structure subscale measured the extent to which the composition followed the harmonic outline of *The Cowboys*: E flat major, B flat major, F major, and E flat major. Each subscale consisted of nine points, from zero: not evident, to eight: clear. The final subscale, Dotted Eighth-Sixteenth Rhythm, was an objective measurement, so only one judge measured it. Since formal structure was questionable in many of the compositions, each composition was rated as either containing dotted eighth-sixteenth rhythms or not. In order to include this binary measurement in the Conceptual Understanding scale, the presence of the rhythm was scored as an eight; the absence of the rhythm as a zero. The mean of the subscale scores served as the composite Conceptual Understanding scale.

Results

Inter-Judge Reliability

Three experienced middle school instrumental music educators reviewed an early draft and final composition ($n = 44$) created by each student in this study. Pearson correlations coefficients were calculated for each of the rating scales. The judges' ratings were highly correlated, with a majority of the correlations at .70 or higher, and a lowest correlation of .624. These correlations indicate that the judges were consistently implementing the rating scales (Table 1).

Student Compositions

The compositions were examined as evidence of the band students' craftsmanship, creativity, and conceptual understanding. The following sections will examine each of those three areas, as well as the relationship between the three rating scales.

To what extent do students' compositions provide evidence of musical craftsmanship? The mean craftsmanship score was $M = 3.62$ ($SD = 2.02$). The distribution, in addition to being wide, was also balanced, indicating a broad range of compositional skill among the students. The following three examples illustrate this range.

Example A (Figure 1) received a mean craftsmanship score of zero. In examining the composition, there is little discernable intention or structure in the relationship between notes. This composition seems to reflect an exploration of the *Finale NotePad* interface rather than musical intent. The Simple Entry Palette, which is used to select note duration in *Finale NotePad*, is a series of on/off toggle buttons. In examining the first three lines, an observer can follow the student's sequence of selecting quarter notes, sixteenth notes, half notes, flats and sharps. The consistent placement of rests at the ends of the measures is almost certainly the result of *Finale NotePad* automatically completing a measure with rests as the student clicked ahead to another measure. The extent to which it occurs could also indicate that the student has a limited understanding of the function of meter.

Table 1

Inter-Judge Reliability

Judge	Judge 1	Judge 2	Judge 3
	Craftsmanship		
Judge 1	1.00	.775*	.766*
Judge 2	.775*	1.00	.750*
Judge 3	.766*	.750	1.00
	Creativity		
Judge 1	1.00	.756*	.730*
Judge 2	.756*	1.00	.777*
Judge 3	.730*	.777*	1.00
	Form		
Judge 1	1.00	.673*	.750*
Judge 2	.673*	1.00	.634*
Judge 3	.750*	.634*	1.00
	ABACBA Form		
Judge 1	1.00	.798*	.742*
Judge 2	.798*	1.00	.830*
Judge 3	.742*	.830*	1.00
	Tonal Structure		
Judge 1	1.00	.729*	.658*
Judge 2	.729*	1.00	.624*
Judge 3	.658*	.624*	1.00
	Cowboys Tonal Structure		
Judge 1	1.00	.688*	.735*
Judge 2	.688*	1.00	.699*
Judge 3	.735*	.699*	1.00

*$p < .01$ (two tailed)

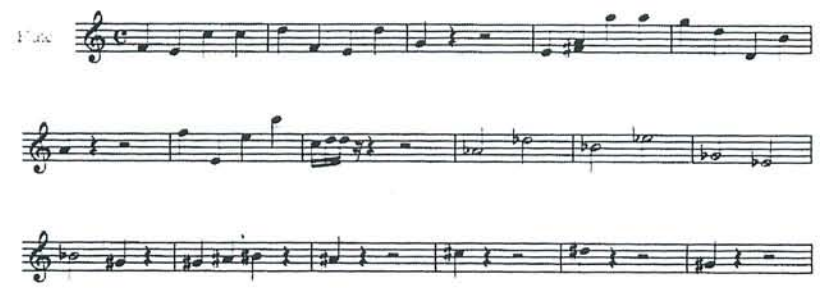

Figure 1. Sample composition A.

Example B (Figure 2), representing the high end of the distribution, stands in stark contrast to Example A. Example B received a mean craftsmanship score of eight. It provides clear evidence of musical craftsmanship, as defined in the current study. Well-defined four measure phrases connect to two larger ideas: a twelve-measure melody in E flat and an eight-measure melody in B flat. There is contrast in motion and clear consideration of contour. Rhythmic and motivic sequences provide a unifying strand through each of the sections, and rhythmic patterns are effectively utilized to create forward motion and resting points.

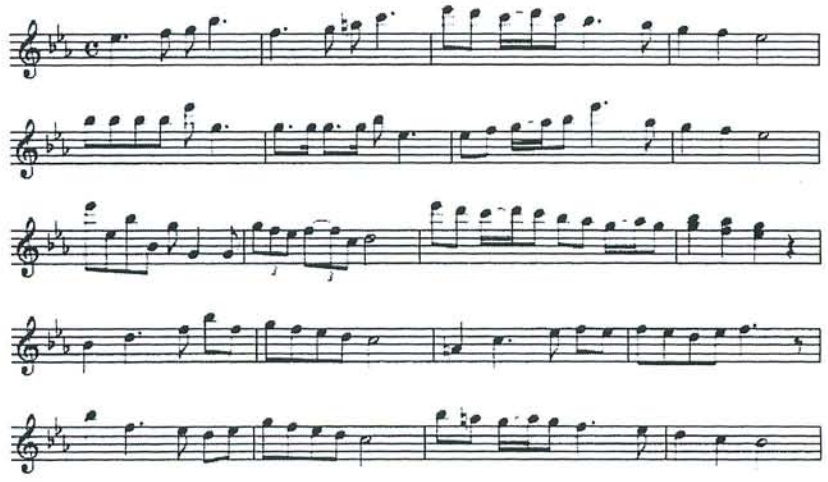

Figure 2. Sample composition B.

Example C (Figure 3), which represents the A section of this student's composition, illustrates the middle of the distribution, where most of the compositions were rated. This example received a mean craftsmanship rating of 2.67, just under the whole group mean of 3.62. There is some evidence of purposeful placement of notes, yet the ideas are not fully articulated, musical, or connected to the larger form. The first three measures exhibit a partially developed sequence with the repetition of the B-flat and C eighth notes and leap up to a half note. There is some sense of direction and contour, particularly in the third and fourth measure. However, this segment lacks connection to the tonal center (which should be E flat), connection to the meter, and coherence as a complete phrase. While this composition represents musical cognition as opposed to the seemingly random note placement of Example A, this student would need to continue to refine his or her craftsmanship skills in order to obtain mastery of constructing a well-crafted melody.

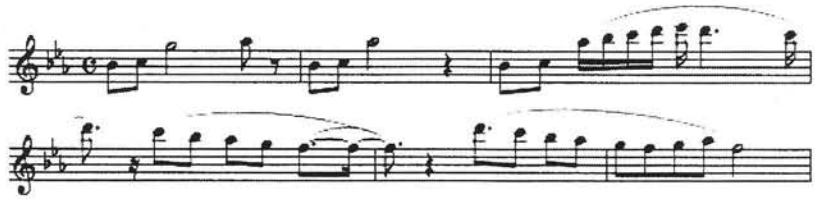

Figure 3. Sample composition C.

To what extent do students' compositions provide evidence of creativity? The mean score of 3.68 indicated a modest level of creativity among the students. This distribution was also fairly wide ($SD = 2.20$) and was slightly skewed to the lower end of the distribution. As with craftsmanship, a wide range of creativity levels was found among the students.

To what extent do students' compositions provide evidence of conceptual understanding? Three concepts: form, tonal structure, and dotted eighth-sixteenth rhythm, were emphasized in the project. The compositions exhibited a moderate degree of formal structure, as indicated by the mean rating for Form of 3.9 ($SD = 2.25$). These structures did not necessarily reflect the model composition, however, as indicated by the lower mean score for ABACBA Form of $M = 2.8$ ($SD = 2.36$). As with the other indices, a wide range of results was indicated by the large standard deviations.

The students were less successful in creating tonal centers ($M = 2.7$, $SD = 1.91$). As with the formal structures, the tonal centers that were created did not necessarily reflect the tonal centers of the model piece ($M = 1.1$, $SD = 1.57$). The smaller standard deviations indicated that the students were more consistent in these lower ratings than on the other scales.

Somewhat surprisingly, the rating for dotted eighth-sixteenth rhythms was also low. Although the assignment asked for the rhythm to be used once per section, this rating does not measure the extent to which the rhythm was used. Since the compositions were not consistent in demonstrating multiple sections, this scale only reflects whether dotted eighth-sixteenth note rhythms were used anywhere in the composition. Slightly over one-third (35%) of the students utilized the rhythm.

A composite Conceptual Understanding Scale was created to summarize these subscales. To be consistent with the other conceptual understanding subscales, the rhythm subscale was implemented with the value of zero (no dotted eighth-sixteenth) or eight (included dotted eighth-sixteenth). A mean of the five subscales was used for the composite scale. The Conceptual Understanding Scale was lower than the Craftsmanship and Creativity scales with a mean score of $M = 2.66$ ($SD = 1.92$).

How are the ratings of Craftsmanship, Creativity, and Conceptual Understanding related? After determining that the relationship between each of the scales was linear by visually examining the scatterplots, a Pearson correlation coefficient was computed for the three composition rating scales. The Craftsmanship ($M = 3.62$) and Creativity ($M = 3.68$) ratings were very similar, both in terms of means and correlation ($r = .954$). Conceptual Understanding ($M = 2.66$) was highly correlated to the other scales as well (Table 2).

Table 2

Ratings Correlations

Scale	Craftsmanship	Creativity	Conceptual Understanding
Craftsmanship	1.00	.954**	.817**
Creativity	.954**	1.00	.855**
Conceptual Understanding	.817**	.855**	1.00

Note. Final compositions (N = 23).
** $p < 0.01$, two-tailed.

In broad terms, the compositions reflected a moderate level of craftsmanship and creativity. The level of conceptual understanding reflected by the compositions was low. The scales were highly correlated, with similar

scores for craftsmanship and creativity and consistently lower scores for conceptual understanding.

Discussion

The Craftsmanship Scale ratings (M = 3.62, *SD* = 2.02) revealed a modest level of musical craftsmanship, with a wide variation of ability between students. The level of creativity displayed by the compositions (M = 3.62, *SD* = 2.20) closely mirrored the level of craftsmanship. The similar means and high correlation (r = .954) between craftsmanship and creativity could indicate that craftsmanship ratings were masking the creativity ratings. Amabile notes that tasks used for the consensual assessment technique should not require the prior development of a skill, since a range of skill levels could impact the creativity ratings (1996). The wide range of craftsmanship skills indicated that this task required prior skill development, which may have impacted the creativity ratings. While this relationship lessens the creativity ratings' usefulness as an indicator of an individual student's creativity, this finding has practical significance for music educators. Educators utilizing performance based composition activities of this type should be mindful that, at least until a basic level of compositional skill is established, evaluations of creativity are likely to be masked by craftsmanship. These ratings would become more informative if applied in a longitudinal manner. It could be that as craftsmanship ratings improve, and perhaps become more uniform, creativity ratings become more independent and therefore an accurate reflection of creativity. Such research would provide important and practical knowledge for practicing music educators.

The conceptual understanding scores (M = 2.66, *SD* = 1.92) were lower than the other scales and indicate a generally low level of understanding of the highlighted concepts in the model piece. It is possible that lack of compositional ability (craftsmanship) masked students' conceptual understanding. It would be interesting in a future study to compare conceptual understanding ratings from students' written explanations of a musical concept to ratings based on applications of these understandings in a composition. This comparison could shed light on how much of this rating scale reflects conceptual understanding and how much reflects application within a composition task.

In any music class, however, it is important that we expect our students to reflect their understandings in a musical fashion. These low scores could indicate that unless broad musical concepts are regularly emphasized in rehearsal, students will not transfer these understandings from their experience of simply performing in the ensemble to their compositions. In this case, the ensemble had covered each of the major scales utilized as tonal centers in the composition assignment. The Tonal Structure and *Cowboys* Tonal Structure subscales indicate that the knowledge of how to play these scales did not translate into an ability to create music with a tonal center. This highlights the limited conceptual transfer that results from narrowly

conceived performance skills. These results also raise troubling questions about the transfer of musical knowledge between the musical modes of performing, creating, and listening. Perhaps students were aware of the concepts of tonal center, form, and dotted eighth-sixteenth rhythms, but they were not able to apply these concepts in the compositional mode. This fragility of transfer is troubling not only if it exists between the performance and creation, but also especially if it extends to transfer between the performance and listening modes. The prospect of musical understandings being lost to our students beyond the context of the ensemble setting should be an issue of concern for music educators.

Since this study is descriptive in design, it did not address whether or not the project improved students' compositional skills, creativity, musical independence, or conceptual understanding. The lower composition ratings affirm concerns of limited transfer of understanding from performance instruction, while the observations of the rehearsal conditions indicate that, on a surface level, this type of activity is feasible within the rehearsal context. In doing so, this study lays the foundation for future experimental research that would address the effectiveness of in-rehearsal composing toward realizing the broader goals of comprehensive musical instruction to inform student performance, creation, and listening.

Future Research

The results of this study lead to multiple avenues of further inquiry. Broadly grouped, areas in need of further inquiry include exploration of students' compositional processes, curricular development, preservice teachers and composing, and transfer in musical learning. Further exploration of several aspects of student composition in the rehearsal setting would aid the development and refinement of ensemble composition activities. In the current study, the ratings for Craftsmanship and Creativity were widely distributed. A qualitative case study, which would contrast students at either end of the distribution, could uncover strategies and problems that would inform the construction of effective differentiated assignments. Such a case study could also aid the development of strategies to support broader student revision and to connect composing and performing more closely.

One of the most pressing questions that arose from this study is *will students' compositional abilities and conceptual understanding improve with sustained compositional activities*? The composition rating scales used in this study could be utilized in an experimental study that would rate a series of students' compositions through a sustained period of compositional activity. In addition to measuring the effect of such composing activities, such a study could explore the impact of composition upon student motivation and issues with transfer of learning as well.

Ensemble rehearsal based composition in the United States will largely remain hypothetical unless teachers begin to implement these activities within their performance programs. Any effort toward this end would benefit from

baseline information provided by a series of survey studies. A survey of in-service band and orchestra teachers' attitudes about and experiences with composition would be useful in designing in-service opportunities. A similar survey designed for pre-service teachers would aid in integrating composition into the teacher education curriculum. A survey of teacher education programs regarding the level of composition instruction would also provide useful information, and the results could serve as a focal point for this issue among teacher educators.

The apparently low level of conceptual transfer that was found in this study raises a troubling question that extends beyond composition: *What learning transfers beyond the performance ensemble context?* In a field where success is often judged by the quality of a concert (or by number of trophies won), this question is too often overlooked. A broad case study of an ensemble program could provide a comprehensive examination of what students do and do not gain from their ensemble experience. The answers from this study could help to shift our profession's focus from the trophy case to individual student learning. An important related study could follow up with participants from the case study program to gauge the residual strength of the band experience after most of them have left a school based ensemble experience behind. If such a study found that musical learning in performance settings does not resiliently transfer beyond the ensemble context, it could be a source of soul searching for music educators in our country. While the current study confirms concerns regarding transfer of learning, it also provides a hopeful suggestion for positive change in performance-based music education.

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