



MMED 795 Project: A Correlation Study of Performance Assessment Submissions through  
SmartMusic Versus Video Camera Recordings

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**A CORRELATION STUDY OF PERFORMANCE ASSESSMENT SUBMISSIONS  
THROUGH SMARTMUSIC VERSUS VIDEO CAMERA RECORDINGS**

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## ABSTRACT

### A Correlation Study of Performance Assessment Submissions through SmartMusic Versus Video Camera Recordings (July 2014)

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The purpose of this study is to hold students accountable for their practice time at home by increasing both the amount of time spent practicing and the value of their practice sessions to better ensure that they maintain a high level of instrumental performance for band class. Throughout the 2013-2014 school year, the researcher assigned playing tests to students, which they practiced, completed, and submitted for grading from home. A correlation study was then conducted between two different electronic submission methods – the SmartMusic Program and video recordings with Edmodo – to identify the pros and cons of each. Additionally, the performance achievements and musicianship of students in grades 7, 8, and 9 were studied. The findings indicated that take home playing tests increased performance ability and musicality and impacted the students, classroom, instructor, and school district's music program.

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# **Chapter 1**

## **Introduction**

Educators strive to implement classroom practices that motivate students to learn and allow them to achieve success. Band directors employ techniques that improve both the sound of individual musicians as well as the sound of the ensemble as a whole. Music educators need to combine these aspirations in their classrooms and one way to do so is by encouraging individual practice.

While students are urged to "take their horns home and practice," many choose to leave their instruments in storage lockers at school or simply do not dedicate time to rehearsing on their own. In order to enforce the importance and significance of individual practice, students' playing ability is assessed through playing tests. In the past, these tests occurred four times a year, at the end of each marking period, and required students to perform an assigned exercise in the instructor's office during their scheduled class time. Brief feedback was provided to each student before the next was tested and the remainder of the band worked on a music theory worksheet. Although these assessments have been effective in evaluating student performance, they are too infrequent and time-consuming, students only practice immediately before the testing dates, and it is impossible to provide an adequate amount of individualized instruction to students due to the large class sizes. To resolve these issues, the researcher desired to assign playing tests more frequently and consistently and to provide students with the proper feedback that they require.

The search for a solution to these problems evolved into the purpose of this project. This study aims to hold students accountable for their practice time at home by increasing both the amount of time spent practicing and the value of their practice sessions and to better ensure that

they maintain a high level of instrumental performance for band class. Throughout the 2013-2014 school year, the researcher assigned playing tests to students, which they practiced, completed, and submitted for grading from home. He then performed a correlation study between two different electronic submission methods – the SmartMusic program and video recordings with Edmodo – to identify the pros and cons of each. Additionally, the performance achievements and musicianship of students in grades 7, 8, and 9 were studied.

## **Chapter 2**

### **Review of Research**

The study required the use of two educational tools, the SmartMusic program and Edmodo, which are explained in greater detail in the following sections. The researcher also examined works pertaining to technology in the music classroom and the benefits of student practice.

#### **The SmartMusic Program**

SmartMusic is music education software that acts as an accompanist, practice guide, and assessment tool for student musicians and music educators. It provides a library of more than 30,000 accompaniments for musicians to explore including classical, jazz, pop, folk, holiday, musical theater, movie scores, and patriotic songs. (Rudolph 12). The “Intelligent Accompaniment” feature acts almost as a live accompanist by adjusting to players’ speed throughout performances. SmartMusic also comes equipped with thousands of scales and exercises to review and perform and music from popular method books are available, as well. (Rudolph 10, 12). This program assesses players’ performances by displaying correct notes in green and incorrect notes in red. SmartMusic has a collection of fingering charts for instruments and students can simply click any note to retrieve the fingering. By providing both visual and aural feedback, the program enhances student learning. Performances can be recorded and stored for the purposes of grading and creating portfolios (Rudolph 12-16).

Getting started with and using SmartMusic is simple. The program requires a yearly subscription that can be used in a classroom or at home if students purchase their own. A CD-ROM is used to install the program and its files to a computer and the account is then activated



to allow the user to access all of SmartMusic's features (Rudolph 12). The only other equipment that is required is a microphone to record playing sessions, which may already be built-in to the computer. The "Help" menu and instructional videos make navigation simple and easily acquaints users with the program (Rudolph 12). SmartMusic is a tool that provides countless possibilities to both music students and music educators, alike.

## **Edmodo**

According to its website, Edmodo is "the number one K-12 social learning network in the world" and is "dedicated to connecting all learners with the people and resources they need to reach their full potential." (Edmodo.com) The site was developed in Chicago by school district employees who wanted to better match the world of education to the way in which 21<sup>st</sup> Century students live outside of school. Over 35 million teachers and students utilize the free site as a tool to assist in enhancing curriculum (Edmodo.com). Edmodo is specifically designed for use by teachers and students, making it safer than other sites such as Facebook, Twitter, or YouTube. No user outside the class has access to the material and teachers can manage students' interactions to ensure they are appropriate (Tomaszewski "Social Media"). Tomaszewski argues that "closed sites," such as Edmodo, provide the opportunity to teach young people to use social media responsibly. Because they cannot hide their identity on these sites, any inappropriate content can be easily removed and the student made liable. Students begin to understand the seriousness of such actions and that they may have lasting consequences (Tomaszewski "Texting and Facebook). He also sites Elliot Soloway, Professor at the University of Michigan, as saying that 'closed sites fulfill an extremely important need, and that is communication. Learning is in

the conversations and facilitating the conversation is facilitating learning, so social media facilitates learning' (qtd. in Tomaszewski "Texting and Facebook).

### **Technology in the Music Classroom**

This study used technology to enhance the music curriculum in a junior high school. Students were introduced to a new form of computer software and a social media site that perhaps were unfamiliar to them. There is mounting research that supports the use of technology in all classrooms, including music education. In an article entitled, "Tune in to Technology," Patricia Bissell contends that "Electronic keyboards, music software, and computers are tools that can greatly aid students in performing, improvising, composing, reading, and notating music" (1998). Technology has a variety of implications for students and it is important that they understand technology in the context of music, just as they do in any other subject or classroom. Technology fosters active learning and increased student engagement in the music setting as students use computers to create music (Forest). In addition, as educators are encouraged to differentiate instruction to reach all types of learners, technology provides an additional strategy to accomplish this task and therefore, increase student achievement. It is important to note, however that "the teacher, not the technology, remains the key to the educational process" (Forest).

Technology has many applications for instructors, as well. One study found that only about 30% of music teachers used computers with students during class time but it indicated that this number would be much higher if teachers felt comfortable with the technology or had appropriate training on the subject. When teachers were granted this opportunity and began to

incorporate technology and computers into the classroom, they found that it assisted with classroom management and positively impacted student learning (Bauer, Reese, and McAllister).

## **Student Practice**

One objective of the study was to increase the quantity and quality of student practice in an effort to improve student musicianship. Margaret Haefner Berg and James R. Austin define practicing as “learning through systematic experience or exercise” and acknowledge that it is deemed necessary when acquiring and mastering a craft (535). The authors noted that researchers who have studied the topic over the course of 20 years indicate that practice should occur regularly for musicians because it “allows musicians to reinforce learning received from instructors, engage in self-discovery, and develop habits of minds” (Berg and Austin 535). They also contend that merely increasing the amount of practice time does not translate to an improvement in musicians’ skills because for that to occur, practice sessions must be more “efficient and effective” (Berg and Austin 538).

Alice Dade supports the opinion that the value of a practice session is determined by the methods used while rehearsing. She offers suggestions to alter practice techniques to enhance student performance. Dade indicates that students must repeat difficult sections of a piece, even though most neglect to do so, and that they decrease the tempo of pieces to review complicated rhythms or note combinations (“Practice Notebooks”). She also recommends that students begin playing new pieces slowly and gradually increase the tempo over a period of a few days until they become comfortable with it and the desired speed is reached. To truly advance practice sessions and focus students’ attention, Dade urges students to write down their thoughts, frustrations, and methods from their sessions in a journal (“Practice Notebooks”).

As previously discussed, SmartMusic can be a valuable practice tool for students due largely in part to the “Intelligent Accompaniment” feature. The research of Sheldon, Reese, and Grashel shows that when students perform with an accompaniment, whether it be live or digital, performance skills may improve (“Effects of Accompaniment”). Since contact with accompanists is not always available, programs equipped with “instant, high-quality, and interactive musical companionship” are viable alternatives that prove just as effective (Sheldon, Reese, and Grashel). Their research also indicates that students were more inclined to practice if a digital accompaniment was available, rather than not, and that students enjoyed practicing more when playing with a digital accompaniment versus playing alone (Sheldon, Reese, and Grashel). Tom Rudolph notes that students spend more time practicing if they use SmartMusic because of their ability to reduce the tempo and record their playing (16). These thoughts all support the notion that improved skills result not only from additional practice time but also from quality practice sessions.

## **Chapter 3**

### **Project Description and Findings**

#### **Participants**

The participants in this study were 7<sup>th</sup>, 8<sup>th</sup>, and 9<sup>th</sup> grade band students from Abington Junior High School, in Abington, Pennsylvania. Students attended band three times per week for 45 minute periods. Two of the periods were smaller heterogeneous instrumental sections and the combined ensemble rehearsed once a week. During the 2013-2014 school year, 7<sup>th</sup> grade band was comprised of 79 members, 8<sup>th</sup> grade had 68 members, and 9<sup>th</sup> grade had 61 members. Students participating in the study played brass, woodwind, and percussion instruments and ranged in years of experience from 0 to 5 years.

#### **Study Design**

The study was comprised of multiple elements, all designed to increase the frequency and quality of individual practice and in turn, increase students' performance ability and the musicianship of the bands. Students in grades 7, 8, and 9 were required to electronically submit playing assignments consisting of exercises from the *Essential Elements 2000* instrumental method books. 7<sup>th</sup> grade band students received exercises from Book 1, 8<sup>th</sup> grade students received exercises from Book 2, and 9<sup>th</sup> grade from Book 3. Assignments were due on a bi-weekly basis and students were presented with two options for submitting their work:

Option 1: SmartMusic program

Option 2: Video recording and Edmodo.com

The playing assignments were identical, regardless of the method students chose and were scored and entered as part of students' marking period grade. Student growth in the areas of tone

quality, rhythm, pitch accuracy, range, articulation, and knowledge of musical terminology was measured by the scores from SmartMusic and a rubric. In addition, growth will be evidenced by the students' improved playing ability and sound quality during band class, as well as the ability to perform a more challenging and complex repertoire. However, this introduces the limitation of the study since these conclusions are largely subjective and are based upon the instructor's perception and observations of students.

### **Explanation of Submission Process using Option 1: SmartMusic**

This option was chosen by:

- 25 of 79 students in 7<sup>th</sup> grade
  - 21 of 68 students in 8<sup>th</sup> grade
  - 9 of 61 students in 9<sup>th</sup> grade
1. Students purchased and downloaded SmartMusic to their home computer and created an individual account.
  2. Bi-weekly playing assignments were sent from the teacher to the student through the SmartMusic message system.
  3. Students opened the assignments to view the exercise and played the exercise into a microphone connected to the computer to receive immediate feedback.
    - When students played correctly, the music notation on the computer screen appeared in green.
    - When students committed either a rhythmic or tonal error, the notation appeared in red at the point of the error.

4. Upon completion of the performance, SmartMusic analyzed and assessed the recording for rhythmic and tonal accuracy and reported a grade to the student as a percentage.

Note: Students were permitted to repeat steps 3 and 4 until they were satisfied with their performance and score.

5. Students clicked “submit” which automatically sent their recordings and scores to the instructor.
6. The instructor reviewed scores from SmartMusic, converted them to a grade out of 10 points, and provided additional feedback via the SmartMusic messaging system.

### **Explanation of Submission Process using Option 2: Video Recording and Edmodo.com**

This option was chosen by:

- 54 of 79 students in 7<sup>th</sup> grade
  - 47 of 68 students in 8<sup>th</sup> grade
  - 52 of 61 students in 9<sup>th</sup> grade
1. Students created an individual account at [www.Edmodo.com](http://www.Edmodo.com).
  2. Bi-weekly playing assignments were sent from the instructor to the student through the Edmodo message system.
  3. Students used the *Essential Elements* book to practice the assigned exercise and prepare for video recording.
  4. Students recorded themselves while performing the exercise using a camcorder, cell phone, computer camera, iPad, flip camera, or any other device with video recording capability until they achieve the desired performance quality.

5. Students logged into Edmodo and uploaded their video to the assignment tab so the instructor could access it.
6. The instructor assessed each student's performance using a rubric (see figure below). The rubric score (out of 50 points) was divided by 5 to match the scores from SmartMusic, which were given out of 10 points.
7. Additional feedback and the score was provided via the Edmodo messaging system.

### **Playing Test Rubric**

	<b>Always</b>	<b>Mostly</b>	<b>Often</b>	<b>Rarely</b>	<b>Never</b>
<b>Produces a beautiful tone</b>	5	4	3	2	1
<b>Demonstrates good intonation</b>	5	4	3	2	1
<b>Plays accurate rhythms</b>	5	4	3	2	1
<b>Plays appropriate dynamics</b>	5	4	3	2	1
<b>Plays appropriate articulation</b>	5	4	3	2	1
<b>Exhibits correct phrasing/breathing</b>	5	4	3	2	1
<b>Plays accurate pitches</b>	5	4	3	2	1
<b>Keeps steady and appropriate tempi</b>	5	4	3	2	1
<b>Keeps consistent and correct posture</b>	5	4	3	2	1
<b>Plays in the appropriate style</b>	5	4	3	2	1

Note: Accommodations were available to students with financial limitations that prevented them from purchasing the SmartMusic program, accessing a device with video recording capability, or accessing a computer with internet from home. These students were permitted to perform their playing test before or after school using a video camera located in a practice room in the classroom. After students recorded their video, the instructor uploaded it to Edmodo to allow them to view their performance and receive feedback the same way other students did.



## Study Findings

The average scores for the year (out of 10 points) are shown below by grade and submission option.

	SmartMusic	Edmodo
7 <sup>th</sup> grade	9.4	8.1
8 <sup>th</sup> grade	9.7	8.4
9 <sup>th</sup> grade	9.9	8.9

Throughout the deployment of the study, each submission option presented unique benefits and challenges. These findings are discussed in detail in the following sections.

### Benefits of the SmartMusic Program

SmartMusic offered a variety of benefits to students. It provided a recording of each exercise for students to hear exactly how it should be played. The program showed students exactly where their rhythmic and tonal mistakes occurred throughout each exercise. To facilitate learning, students were able to adjust the tempo to decrease it for a difficult exercise or accelerate it for a challenge. SmartMusic provides a metronome, chromatic tuner, and an option to perform along with a background accompaniment. The accompaniment created the sense that students were performing with an entire band, thus enhancing the practice experience. The “loop” feature permitted students to repeat a selected portion of an exercise again and again to isolate any trouble spots and fingering charts or slide positions, along with the names of notes, appeared whenever students clicked a specific note. The SmartMusic package included an extensive library of literature for students to explore including popular band method books,

advanced solos, concert and jazz band repertoire, and jazz backing tracks which offered an additional opportunity for students to learn through exploration and curiosity. Finally, SmartMusic quickly created audio mp3 files to send to the instructor for grading.

In addition to the benefits SmartMusic offered to students, the positive features were evident to the researcher, as well. The program allowed the instructor to easily create and distribute assignments to students. The user-friendly grading features included an option for SmartMusic to assess and score students or allowed the teacher to grade assignments on his own.

### **Benefits of Video Recording and Edmodo**

Edmodo presented numerous advantages to students and the instructor. Because Edmodo.com is a free website, there was no cost to students and they could utilize a recording device they already had available. This option allowed the instructor to actually see each student performing, which ensures that the student submitting the assigned exercise was indeed that student. By viewing the video, the teacher could provide students feedback regarding posture, hand position, sticking, and correct fingerings. Using video recordings and Edmodo.com encouraged students to enhance their technology skills, which can be translated to other classes and Edmodo provided user-friendly grading features.

### **Challenges of the SmartMusic Program**

While the study progressed, the SmartMusic program presented various problems and areas of concern. The cost of this program was \$40 for a yearly student subscription and \$140 for a yearly educator subscription, in addition to the cost of an external microphone (\$20 - \$30) if the computer does not contain the device. Since no video of the performance was submitted,

students could cheat on the assignments by having another person perform the exercises, instead of themselves. SmartMusic did not accurately assess snare drum performances as it had difficulty differentiating between rolls, flams, accents, and other sticking techniques, especially at faster tempos. The program did not distinguish between instrument timbre or tone quality very well. For example, one participant sang an exercise instead of playing her trumpet and SmartMusic scored her at 100%. Her ability to sing the exercise perfectly does not translate to her aptitude on the trumpet. The “My Part” setting of the program interfered with accurate grading of the assignments. “My Part” is a feature that allowed students to perform along with a piano recording of the exercise, but in some cases, SmartMusic assessed the piano recording rather than the student’s performance. Additionally, “My Part” was only performed by the piano, but if students had the ability to select an instrument timbre to match that of their instrument, they could focus more on their tone quality as they played.

### **Challenges of Video Recording and Edmodo**

Despite the fact that the majority of participants utilized this method, numerous disadvantages arose throughout the course of the study. Many performances were rhythmically and tonally inaccurate since students did not receive any feedback while practicing. Students were unaware when they played a wrong pitch or rhythm. Only Book 1 of the *Essential Elements 2000* series includes a CD containing recordings of the exercises, meaning that only the 7<sup>th</sup> grade students had an example of each assignment. Students experienced difficulty while learning to upload their performance videos and many students regularly forgot their usernames and passwords which required the instructor to reset their accounts. The video files students created consisted varied greatly including .mov files, .mp4 files, .wmv files, .flv files, among others.

This required the researcher to convert many videos into a different format in order to view them. Students often forgot to attach their videos when they submitted assignments and may not have realized their mistake until after the assignment deadline had passed, which delayed the grading process. Certain recordings were difficult to assess and grade due the poor audio quality. Edmodo.com frequently operated slowly and often required a restart of the computer and the video files took a great deal of time to upload to the website.

## **Chapter 4**

### **Conclusion**

#### **Study Impacts**

The findings of this study have impacted the classroom, the students, the instrumental music program in Abington School District, as well as the researcher.

As a result of the study, rehearsal time within the classroom has both increased and improved. Previously, as individual students performed live playing tests during class time, the remainder of the students participated in small group sectionals or completed a music theory worksheet. While these activities proved to be beneficial to some students who made appropriate use of the small group setting and gained valuable knowledge of musical theory and terms, the issue of classroom management outweighed these positives. The lack of constant supervision lead to off-task behavior and discipline problems. By conducting the study and eliminating these in-class tests by requiring students to complete them from home, discipline problems decreased while rehearsal time increased. Disruptions to the everyday schedule were minimized and rehearsals were more consistent throughout the year. Douglas Akey, an accomplished middle school teacher, concurs that middle school students require consistency during band rehearsals. He states that when class time is structured the same way day after day, and students know what to expect, more can be accomplished during a session. He also argues that the key to preventing middle school students from misbehaving is to keep them constantly engaged (qtd. in Thomson). The increased and more structured rehearsal time when combined with the additional practice by students at home, contributed to stronger performances at both the winter and spring concerts for all the ensembles.

The researcher maintains that students gained a great deal as a result of participating in this study. Not only did their performance ability improve, but they have developed new technological skills as they worked with one of two new programs. They needed to explore their chosen method and solve any issues that arose. Students who wish to be members of the All-State Jazz Ensemble are now required by PMEA to submit auditions via video recordings. Many collegiate music programs require video auditions, too, so as a result of this study, many students now have the skills necessary to complete a quality audition video. Those students who worked with SmartMusic, especially, participated in more focused practice sessions, which is essential to improving playing ability (Dade; Berg and Austin; Sheldon, Reese, and Grashel). At the conclusion of the study, students were left with a video timeline and digital portfolio which documented their progress throughout the year. Many participants expressed that they enjoyed viewing the collection of videos and that they felt a sense of pride and accomplishment in their musical capabilities.

The study has extended far beyond the walls of the instructor's classroom and reached other professionals within Abington School District. The researcher has spent a significant amount of time discussing the process and findings of this study with colleagues. Music educators at the elementary level and high school level have expressed interest in implementing at home playing tests using methods that were introduced in this study. They have also expressed interest in incorporating SmartMusic into their classrooms as part of the curriculum. They believe these methods have value and can improve the music program throughout the district, on every level.

The effects of the study on the researcher are notable, as well. A significant amount of time outside of the regular work day was required to set up assignments, view videos, evaluate

student performances, provide constructive feedback, and determine and enter grades. However, the loss of personal time pales in comparison to the other positive impacts of the study. The instructor valued the opportunity to watch the growth of students and hear the improved musicality of the ensembles, in addition to watching students take pride in their work. Conducting this study laid the foundation for future years and allowed the researcher to determine where improvements can be made to better help students and to become a more effective educator.

### **Extensions and Further Research**

The process by which this study was carried out will be modified and revised for the coming school year to allow for more efficiency and student growth. Throughout the study, students exhibited a number of poor practice and performance techniques in their videos and recordings. These oversights included playing incorrect notes or rhythms, playing with an inconsistent tempo, using incorrect hand positions, and sitting with poor posture. The researcher hopes to correct many of these technical mistakes by dedicating additional classroom instruction at the beginning of the school year to discussing and modeling proper practice habits. These habits should include repeating challenging excerpts, practicing with a metronome, slowing down the tempo of a piece when first learning it, and taking the time to ensure proper notes and rhythms are being played (Dade). Another strategy may be to introduce new practice strategies each week for students to focus on breathing, tone production, and articulation, among other skills. Band director Lisa Martin states that “By demystifying the art of practice, directors can help young musicians develop habits that will greatly benefit their musical progress over time” (“Best Practices”). Middle school students often do not know how to practice effectively, so by

spending additional time on the subject, their performance videos and performance ability should improve.

The instructor may also institute the use of practice notebooks as a way to improve upon this study. These journals could include the amount of time students spent rehearsing, what pieces or exercises they practiced, any frustrations they experienced, or other thoughts they had while playing. The journals may also contain goals for the week and the steps needed to achieve the goals (Dade). These notebooks may help to focus students and to structure their practice sessions so that they can maximize their time and become more productive.

As discussed previously, one of the disadvantages of submitting performance videos via Edmodo is that most students do not have a recording of the specific exercise to be submitted. This proved to be problematic because students were unaware of their mistakes in terms of rhythms and pitch accuracy like they would be if they had used SmartMusic. Moving forward, the instructor will attach a sound or video file of himself performing each assigned exercise so students know how the piece should sound and may spend additional time practicing and correcting their mistakes.

A number of adjustments can be made to make the process more effective and run more efficiently for the instructor. First, it would be beneficial to spend more time in the computer lab giving instructions for uploading videos so students feel more comfortable with the task. Students had difficulty with this and the instructor spent much time answering questions and contacting students via the message system due to incomplete submissions. A written set of instructions will also be provided to students for them to refer to in case they have questions at home. Next year, students' will follow a template to create their usernames and passwords. For example, their username will be the initial of their first name, followed by their last name and



their password will be their student ID number. This should reduce the amount of times accounts will need to be reset as the teacher can simply remind students of the generic formula. The type of video format to be used will be specified to ensure compatibility, saving time converting numerous files week after week and all assignments for the marking period will be posted at once to reduce set up time. For students using SmartMusic, the option to record assignments with the “My Part” feature playing will be disabled to better ensure that students’ performances are being assessed and not the computer. Finally, to create a more uniform submission process, the instructor will continue to petition Abington School District to choose a music vendor. This vendor may be able to provide a SmartMusic subscription to each student which would eliminate all costs for parents, allow all students the same opportunity to access this practice tool, and standardize the grading process.

The results of this study were very encouraging. Students were held accountable for their practice time at home and for maintaining a high level of performance for band. They successfully used the SmartMusic program or video recordings and Edmodo to submit assessments for evaluation. Both methods presented pros and cons but ultimately proved to be effective in administering assignments. With additional modifications and improvements, this study can be used to establish a productive and successful music education classroom.

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