

Non-traditional Music Class Offerings: Integration of Music Technology
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1. Introduction to the Problem

Understanding Traditional v. Non-Traditional Music Classes

As school music programs in the United States evolve and adapt to changing demographics, the types of music courses offered have expanded as well. Presently, schools offer more courses in music than just bands, choirs, and orchestras. Music appreciation courses, music technology courses, music theory courses, guitar classes, piano classes, and music composition classes are just a few of the types of music classes that can also be found in today's American high schools. While high school music class options are becoming more diversified, there has been little research done to profile what kinds of music classes are being offered in schools and how prevalent various music courses are.

Traditional music performance programs have been the primary offerings at the high school level (Abril and Gault, 2008) and have reached between 20% and 30% of the high school population (Edwards, 2006; Elpus & Abril, 2011; Stewart, 1991; Williams, 2007). Williams (2012) has proposed a set of characteristics of the remaining nontraditional music students:

are in the 6th through 12th grades; do not participate in traditional performing ensembles; have a music life independent of school music; may sing or play an instrument (if so, likely drums, guitar, or keyboard); may or may not read music

notation; may be unmotivated academically or have a history of discipline problems; may be a special needs student; and may aspire to a career in music recording or the music industry. (p. 6)

Some music educators have created music classes at the middle and high school level in which technology is the primary medium for music instruction. In some cases, technology-based music classes (TBMC) have been designed specifically to reach nontraditional music students (those not in band, choir, or orchestra), linking these ongoing aims of the field (Dammers, 2009, 2010; Tobias, 2010; Williams, 2008, 2012).

Much of the focus of the music education technology community has been on the application of technology in traditional music instruction, and much of the research on technology in music has focused on comparing technology-based versus traditional approaches to music instruction (Webster, 2002). It appears, however, that some music educators have been taking a different approach by establishing new technology-based music classes (TBMCs). Abril and Gault (2008) found that 10% of middle and high schools offer music technology classes.

An earlier version of the current survey conducted in a state on the eastern coast of the United States found that 28% of high schools in that state offered technology-based music classes (Dammers, 2009). While the pedagogical objectives of these classes were diverse, a majority of the classes were teacher initiated and designed to reach nontraditional music students (i.e., students not in band, choir, or orchestra). Schools of higher socioeconomic status were more likely to offer TBMCs, and the classes were equally likely to be taught by a beginning, middle-, or end-of-career teacher (Dammers,

2009). These findings were confirmed and illustrated through a case study of the founding of a particular TBMC. As with many of the classes in the survey, an individual music teacher initiated this TBMC, with the intent of reaching a broader portion of the students. An administrator who valued technology and the arts supported this teacher, and together they found solutions for budget, space, and scheduling issues (Dammers, 2010). Since both of these studies were limited geographically, the purpose of this study is to examine the extent to which TBMCs are being used to broaden the reach of the music curriculum on a national level.

More often than not, music educators are being asked to teach classes beyond the traditional band program, such as required music appreciation classes for non-music students. Success teaching students who are not in class of their own volition is a challenge for even the best of us, but with the right tools, it is possible. With music technology, these situations can be turned around and you can “rock” these students with real world instruction, creating and performing music electronically.

Consider creating music with a sequencer that doesn’t require music theory or music reading skills, but does stimulate musical ears by mixing and adding creative special effects. Or how about learning performance skills on a harmonica, where “chops” aren’t a critical factor? Or perhaps studying hip-hop or pop music from the contemporary music scene rather than “ancient” music history? There are tools and resources out there waiting for you.

It is a well-known fact that most high school students are not formally involved in school music (Abril & Gault, 2008; Gerber, 1986; Hoffer, 1988; Hughes, 1992; Lehman, 1988). In 1988 Hoffer put that figure at 80% of the high school population, and over two

decades later Elpus & Abril (2011) found that figure to have remained at a fairly static 79%. Elpus & Abril (2011) further elaborated that the typical student populations enrolled in bands, orchestras, and choirs are not representative of the overall student population in American schools. Their findings were that students involved in school music programs were disproportionately white, from families with above average socioeconomic status, native speakers of English, and had parents who had completed post-secondary education. However, Elpus (2013) found that 36.4% of high school senior students involved in the Education Longitudinal Study of 2002 conducted by the National Center for Education Statistics had completed at least one music course within their high school career. While this does show an improvement in student participation in school music than other estimates and findings, it remains clear a majority of students do not participate in school music at the high school level.

VanWeelden & Walters (2004) concluded that less than 10% of the adults involved in school music continued on with their school instrument or singing into their adult lives. They determined that music educators have two approaches to make classroom music more relevant: (a) provide skills and experiences relevant and transferable into adult music making experiences, or (b) become more involved in creating community music experiences reflective of current school practices. Given these findings, many music educators have championed the expansion of musical offerings in secondary schools to create more meaningful music experiences for a greater number of students (Gerber, 1988; Hoffer, 1988; Kratus, 2007; Lehman, 1988; Palmer, Hughes, Jothen, & March, 1989; Thompson & Keister, 1997; VanWeelden & Walters, 2004).

The National Association for Music Education (NAfME, formerly known as the Music Educators National Conference [MENC]) has and continues to push for expanding curricular options available for high school music students. The Opportunity To-Learn Standards for Music Instruction (MENC, 1994), published to guide curriculum in the public schools, recommended, “one semester-length music course other than band, orchestra, and chorus is offered for each four hundred students in the school. At least one of these courses has no prerequisites” (MENC, 1994, p. 17). The last sentence in particular highlights an inherent issue besetting the typical high school music curriculum model. In many high school programs with students participating in performance ensembles such as choir, band, or orchestra the students have typically received years of prior music instruction at the elementary and middle school levels. High school students wanting to join music classes at this later point in their schooling must enter these classes several years behind in instruction and in many cases without a pathway to catch up to their peers. As Lehman (1988) noted, this effectively locks them out of participating within the high school music program. This presents a major concern to the field of music education in efforts to increase student participation in school music. Bartel (1990) wrote:

During the past several years, increased basic course requirements and mandated fine arts requirements have introduced problems for band, orchestra, and choral programs in high schools. These problems have brought into focus the need for teachers to provide music experiences for students who have had little if any consistent music education in the years preceding high school or for students who want a meaningful music experience within a single credit course. (p. 41)

While this concept of general-type music courses at the secondary level is viewed as a positive development in music education, there is not a single unified approach as to the curriculum and content of such classes. As Reimer (1989) points out, few teacher education programs offer courses in teaching secondary music classes outside of the band, choral, and orchestral mainstream. This may be because there is not a stable model of what constitutes a secondary general music course. Hoffer (1989) stated that the middle school exploratory approach towards general music is not suitable for high school students. Rather, high school students would benefit more from a goal oriented skill-developing course. In Prince George's County Public Schools Piano and Guitar instruction courses are considered apart of the traditional music curriculum because students have the ability to be adjudicated in district wide assessments similar to band, orchestra and choral courses.

Hoffer (1989) concludes that differing course offerings will likely result from each teacher seeking the best option to involve a greater percentage of the student population within their own school. Adding to the complexity of subject is the evolving nature of music itself. Bartel (1990) stated:

When the first article on guitar appeared in MEJ twenty-five years ago, few educators would have guessed how popular the idea would be a decade later. By 1973, 'guitar class' was a symbol with the music teacher's adaptation to changing times. Though many guitar programs continue to exist, the guitar has been overshadowed by the current symbol of a music teacher's contemporaneity: MIDI technology. (p. 40)

Abril & Gault (2008) found that in the United States, music courses other than bands, choirs, and orchestras in secondary schools vary from guitar classes, piano classes, general music courses, music theory courses, to composition classes. From these numerous options, single type of music class appeared in more than half of all schools surveyed. Their research showed that there is not a single standard approach to these additional secondary music classes, and these music classes other than bands, choirs, and orchestras are not even present in most American high schools. These music classes outside of the band, choir, and orchestra tradition are not only less common, but they are also less visible components of a school music program. For secondary teachers wanting to add an additional music class to their overall music program, it would be useful to know what kinds of classes are being offered in an area, and in what kinds of settings these types of classes are being offered.

With the latest tools in music technology, some music educators are finding ways to unleash the creative potential of many of these non-traditional music students. Software products designed with the music classroom in mind include the Sibelius Educational Suite, Band in a Box, Rock, Rap, n' Roll, Garage Band, Acid, Soundforge, and Audacity programs. The release of GarageBand in 2004 was as significant for music education as the release of the first Macintosh computers in 1984 with Professional Composer notation software along with personal laser printers and Postscript printing of music notation. Both events helped to democratize a music process previously reserved for the professional: the earlier, music publishing, the most recent, music composition. GarageBand and similar music technology tools empowered anyone, young and old, to create music using their ear as their guide, by shaping their expression through easy

manipulation of high quality loops, audio snippets, sounds samples, along with adding the creative potential through live recording with USB keyboards, microphones, guitars, and other devices. The impact that GarageBand has had can be seen in the overnight emergence of virtual composers sharing their GarageBand creations on the web and reaching out for comment and guidance. The software provided ways to reach those students in our schools that drop out of the traditional music programs as they progress up through the grades; the traditional programs where more and more emphasis is placed on traditional performing ensembles and performance expertise of selected repertoire (D.B. Williams, 2012). A shift of focus was based on what was termed as the "non-traditional music student (NTMs)," the other 80% of students in our school programs that are disenfranchised from music education in one way or another.

Music Creativity Through Technology is another program dedicated to music educators working with the "Other 80%" of students in our schools who do not participate in the traditional performing ensembles and music classes. Developments in music technology offer the opportunity to establish a new strand of music classes to stand alongside existing bands, orchestras, and choirs. This new branch of music classes is needed to bolster efforts to reach the "other 80%" of students who do not participate in performance-based classes.

From my experiences in initially developing such a introductory class in middle school, and from discussions with colleagues, I believe these classes are in high demand, rewarding to teach, and can effectively extend the reach of music education in our country. Reaching the 'other 80%' is essential for preparing a citizen who can fully participate in the musical and cultural life of our country.

This project seeks to describe and profile current high school music classes that fall outside of band, choral, and orchestral offerings, and to describe the experiences of music teachers who've developed such music classes in Prince George's County Public Schools. Information will be gathered informally about technology-based music classes being taught in secondary schools for the purpose of assisting traditional music teachers in the development and teaching of non-traditional music classes that focus on using technology. [A quasi mixed-method design was used.](#) The design results should be considered mixed. Therefore this project should not be considered typical descriptive or statistical research but rather informal information gathering in preparation for future curriculum. This project aims to also encourage and support high school traditional music teachers in the development of a technology-based music class such as Electronic Music, Audio Production, or Music Technology targeted at students who are not currently in traditional music classes. It presents information about various classes being taught, what type of students are taking them, and suggestions for resources to assist in the development of such a class.

Traditional instruction in PGCPS

The General Music Program of instruction in Prince George's County Public Schools provides students with the appropriate resources and opportunities to develop positive attitudes and sensitivities toward music through the development of musical skills and the learning of musical concepts. The Maryland State Curriculum, Essential Learner Outcomes and the Common Core State Standards all serve as guides for student instruction. In teaching general music units, a constructivist approach should be adopted while presenting the information in order that all three levels of Bloom's Taxonomy of Thinking are covered.

- Level I- Guided note taking for basic information relay
- Level II- Exploratory Software for Application and Synthesis
- Level III- Self and group assessment and critique of student work.

General Music assessment is accomplished through a variety of strategies including performance tasks, written assignments, and adjudication. Reading, writing and math skills are actively integrated through the general music curriculum. Activities and objectives to reach these skills include:

- Singing, playing instruments and improvising.
- Participation in individual and ensemble performances.
- Responding to writing prompts.
- Analyzing and critiquing musical scores and performances.
- Employing math skills to understand structure and patterns in music.

Sequential musical skills are implemented in relationship to diverse cultures, traditions, values and beliefs. The Program is designed to foster enjoyment and appreciation of music beyond the limits of classroom instruction. Students who wish to continue their musical training in High School may elect to take one or more of the following traditional music classes if offered at their high school.

Classes currently offered

Presently the following traditional music classes offered in PGCPS are guitar, piano, music survey, musicianship, and chorus. Descriptions of each class are detailed:

The Guitar course provides senior high students with a semester of instruction to learn techniques for playing the guitar. Emphasis is based on folk, classical, rock and blues technique styles of guitar playing. Music theory appropriate to the student's level is part of this class. During the advanced semester each student composes an original guitar piece for a theory assignment. Performance is recommended within the course as students perform for one another and more advanced students are encouraged to perform in an evening concert.

The Piano courses provide semester length course instruction designed for any senior high student who wishes to learn the fundamentals of keyboard performance, increase keyboard skills, or develop greater technical ability. Student Performance oriented goals from this course include learning to play a variety of music for self-enjoyment, development of strong independent practice skills, and performance of standard piano repertoire.

The Music Survey course is a full-year or semester course for the senior high student who wishes to become a knowledgeable consumer of music. Course experiences include: choosing and caring for sound systems and recordings; learning about performing artists and composers of today; studying about and attending musical theatre; learning of Music history and appreciation literature.

The Musicianship course is a full year course for the senior high student and includes concepts of theory, ear training, dictation, sight singing and analysis of simple form and structure. Second semester musicianship instruction includes composition, aural analysis, and orchestration.

The Choral/Choir course is a full-year course that offers instruction in intermediate or advanced vocal techniques, score reading and includes study and performance of mixed chorus literature, large ensemble, chamber chorus literature, or current musical styles. The teacher selects students through prior audition. Ensembles have out-of-school performances, which may require after-school rehearsals. Three & four part medium level chorus literature is recommended.

Through these standard courses students increase their awareness and understanding of music as an art form, improve their performance skills and experience many opportunities to share their talents in various programs, and county and state festivals. Adjudicated festivals provide assessment of students' levels of development in singing, and playing keyboards and guitars.

Non-traditional instruction in PGCPs

Currently Prince Georges County only offers one non-traditional music course entitled Principles of Recording Technology. Initially a Foundations of Technology course (non-music technology course) was offered as a prerequisite to the Principles of Recording course until 2011. Descriptions of both courses are detailed.

Through the Foundations of Technology (FOT) Course students developed an understanding of the influence of technology on history by exploring how people of all times and places have increased their capability by using their unique skills to innovate, improvise, and invent. Students gained an understanding of technology innovation and the fact that it often results when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields of study. Students developed an understanding of engineering design, the formal process that transforms ideas into products or systems of the designed world. They select and use manufacturing technologies and understand that modern manufacturing technologies produce quality goods at low prices, enhancing the quality of life for many people. Students select and use construction technologies and recognize that cultural norms, environmental conditions, and the requirements of enterprises and institutions impact the design of structures. Opportunities are provided that enable students to select and use energy and

power technologies and to explore the processing and controlling of the energy resources that have been important in the development of contemporary technology. They become familiar with information and communication technologies and their role in maintaining competitive economic growth. The course concluded with the synthesizing of major ideas through an understanding of the core concepts of technology, with an emphasis on “systems thinking” and related principles.

The following description has been extracted from an authentic PGCPHS High School music grading policy:

The Principles of Recording Technology course offers students the opportunity to understand the process involved in creating high quality recordings, from both a technical and creative standpoint. Recording is a highly skilled craft combining art and science. It requires technical knowledge, as well as musical understanding and critical listening skills. By learning these skills, one can capture a musical performance and reproduce it with quality sound, for the enjoyment and inspiration of others. In addition, the technology involved in the recording process is ever changing and continues to develop at a rapid pace.

Opportunities for hardware and software applications are numerous. Additionally, concepts in signal flow provide a variety of tasks requiring critical thinking and problem-solving skills that will be useful in life beyond high school.

This course also serves as a vehicle for bringing various cultures of the school together into one class setting. The course is designed to be attractive, not only to the traditional music students in the school, but also to the non-traditional musician, students

interested in music composition, and the math and science oriented non-musician, with an interest in the technology. Students of all backgrounds may find this course valuable, and can contribute to the overall success of the class by offering their unique perspective.

The Principles of Recording course consists of eight units covering the principles of basics acoustics, techniques for live sound support and recording, techniques for MIDI sequencing, principles of multi-track recording to hard disk, and procedures for mixing and mastering. Course evaluation includes portfolio/notebook, final recording project, MIDI composition, unit exams, and class activities.

In this course, the student will learn to design a recording setup for a variety of situations, record live sound, use computer software to mix and master recorded projects, create musical compositions through a MIDI equipped keyboard and computer, and learn acoustical principles related to recording. With this acquired knowledge and these developed skills, students will be able to record, mix, and master CDs and create musical compositions via MIDI sequencing. The activities and experiences of this class will also contribute to developing students' aesthetic awareness.

Students will master skills and concepts through course projects, discussions, lectures, and assessment activities. A variety of assessment tools will be used to evaluate student progress in Principles of Recording Technology:

- Teacher-developed rubrics and performance criteria for evaluating student products
- Multiple choice exams on each unit
- Portfolio/Notebook
- Individual performances of compositions and recorded projects for class
- Essays related to unit learning
- Class assignments such as work sheets and demonstration of unit key concepts

The assessment tools will reflect the content standards and objectives as stated in this document, as well as school priorities such as those related to writing a brief and extended responses as required by the High School Assessment. The textbook for this course is *Practical Recording Techniques: The Step-By-Step Approach to Professional Audio Recording*.

Current PGCPS High Schools offering the Principles of Recording Technology are Forestville Academy, DuVal High School, Dr. Henry Wise High School and Eleanor Roosevelt High School.

Existing Non-Traditional Music Technology Programs as Models

Williams & Dammers (n.d.) maintain a website containing profiles of non-traditional music programs, their teachers, and students. These profiles have been submitted by music educators in the field who use technology-based music classes to reach non-traditional music students. At the time of this writing, there are profiles of nineteen schools from the United States that focus on electronic music production. Twelve of them call their programs “Music Technology,” and the others use “Digital Music,” “Music Technology & Composition,” “Electronic Music,” “Entertainment Technology,” “Music Through Technology,” “Music Theory & Technology,” and “Music Composition.” Nine of the programs offer semester or half year courses, eight offer full-year courses, and one offers trimester-long classes.

The equipment used includes computers, keyboards, and audio interfaces. Fifteen teachers reported using computers in Apple’s Macintosh family and four use Microsoft Windows-based computers. Brands of MIDI keyboard controllers were counted and four

use Yamaha, two use Korg, six use M-audio, and one uses Axiom. Two schools also have an electronic MIDI drum set.

These profiles also list the software used for their technology-based music classes. For sequencing, loops, and/or a digital audio workstation, all fifteen of the teachers who have Apple computers use GarageBand and eight also use Logic or Logic Express. Nine schools use ProTools, five use Ableton Live, five use Reason, and three use Acid. LMMS Studio, Cubase, Storm Music Studio, Reaper, Intuem, Digital Performer, Dreamstation, and Master Trax were each mentioned once. For music notation, eight use Sibelius, three use Finale, one uses FinaleNotepad, and one uses Noteflight. The free audio editing program Audacity is used by six of the teachers, and Sound Forge is used by one. Music theory software used includes Auralia, Practica Musica, Musition, Music Ace, and Alfred Essentials of Music Theory.

Many of the profiles include advice to teachers starting a non-traditional technology based music program. Suggestions like “take your time,” “start simple,” “keep music first and the technology will follow,” and “be willing to learn from the students,” are some of the most often made suggestions. Two teachers mentioned they started in existing computer labs with a very low budget. Another teacher said they started with old iMac computers that were going to be sent to the surplus warehouse. Many of the teachers said to keep in mind that it is a music class, so keep music as the top priority, not the technology. Brian Laakso from Canton Ohio says “Music technology is the right choice for the ‘other 80%’ of your students who are not interested in band or choir, who have performance anxiety, or who are simply more interested in rock, hip hop, or dance music.” William Rank at Oak Prarie Junior High School in Lockport Illinois

said, “Many students with special needs have been especially successful in this program, as the curriculum and projects are tailored to each individual’s understanding of the music around them.” A music technology class was a solution to Jazz Band scheduling problems for David Hoffman at Pacific Grove High School in California: “It was not possible for students to take band and jazz band for four years. We moved jazz to after school club status, and created the music technology class.” Wayne Spletstoeszer at Torrington High School in Connecticut has a well-established program that has been profiled in many music, technology, and education magazines. He said, “When I started in 1996 I knew nothing about music technology. I had to search online to design and develop the classes. ...When starting be patient!... Any student can have success with music technology! It just depends on how it is presented. Teaching with technology should be fun for the students and you the teacher.” Barb Keyes at Westlane Middle School in Indianapolis Indiana has taught middle school general music since 1990 and when she brought in computers and keyboards for student use she saw an immediate change in her classes. She says, “Discipline problems were fewer and fewer. This evolved and now I have 27 iMac computers with Korg keyboards and various amounts of software. We are still evolving, but I love teaching this class. One of my students wrote poetry, put it as a rap and created his own album as his special independent project in Music Tech. He is now well known around the rap scene in Indy.”

Musical Futures (www.musicalfutures.org) is a project by the Paul Hamlyn Foundation in the United Kingdom. It seeks to develop ways to engage more young people in music education by addressing their diverse musical needs. Their website includes many case studies of successful music programs targeting non-traditional music

students through the use of popular music, personalization, world-wide collaboration, and redefining music training. There are many materials such as a teacher resource pack, curriculum ideas, teacher-submitted materials, reports and articles, and case studies that can act as model programs for designing a program targeting non-traditional music students through technology-based classes and other forms of popular music making.

The following provides detailed information about music technology high school courses from jurisdictions within the District of Columbia, Virginia, and other Maryland school systems.

Montgomery County Public Schools provides all high school students a one-semester Music Technology A/B course. This course may be repeated once. Within the course students learn the techniques of electronic sound production and manipulation, and apply them to create their own compositions. They use specialized electronic equipment and computer software to synthesize, modify, and record sounds. Students analyze and evaluate examples of electronic music, as well as works featuring electronic music sources. Career options in electronic music are explored. Current MCPS High Schools offering Music Technology A/B courses are Albert Einstein HS, Montgomery Blair HS, Richard Montgomery HS, Sherwood HS, Walt Whitman HS and Wheaton HS. If the course is currently unavailable at a student's high school students may still add and discuss the options available with their school counselor.

Howard County Public Schools offer all high school students one music technology course option for a semester where students learn basic compositional techniques and apply them using notation and sequencing software programs. Using

original compositions, students analyze, describe, and discuss the various compositional techniques. Students also develop multimedia presentations to describe/ accompany their original music compositions and participate in a “live” concert performance of their original compositions in a concert setting. Any students interested in the music technology course may participate.

Within the District of Columbia public schools system, all DCPS students are required to graduate high school with a minimum of a half credit in music. Course offerings are not detailed or offered in Music Technology.

Within Fairfax County Public schools, Music and Computer Technology 1 and 2 courses are offered to 11th and 12th grade students only. This is a dual enrollment class where students can receive college credit. The class has an articulation agreement with Northern Virginia Community College, and students could transfer the credits to a college or university in Virginia as well as any other institution that would accept the transfer credits. Students are introduced to the latest technology used by modern composers. Students create individual & group projects in a variety of musical styles & genres using a combination of MIDI & Digital Audio software. Assignments will include composition, arranging, music theory, use of MIDI & synthesizers, and recording in digital audio. All enter this class with some instrumental and/or vocal musical training, with some students also having prior music theory training. Each classroom is equipped with MIDI/Digital Audio computers, each containing the music notation software, "Sibelius", and the digital audio recording/editing software, "Pro Tools", both standards of the music industry. Students successfully completing this course will: develop an understanding of compositional practices, use the computer to compose using varied

instrumentations & electronic media, develop a fundamental understanding of the properties of musical sound & how sound is created and used synthetically, develop familiarity with music notation software as well as skill in using synthesizers, setting up and composing with MIDI, and using sequences, produce a portfolio of compositions, arrangements, and recordings representing a variety of styles and compositional situations

Baltimore County Public Schools offer a full year course entitled Foundations of Music Technology that has no prerequisite. Successful completion of this course satisfies the fine arts graduation requirement. Course content includes the latest innovations and advances in the field of music technology. Topics will include digital sampling, sequencing, original computer-generated compositions, MIDI, and multi-track recording. In a laboratory setting, students will use technology to compose, edit, arrange, perform, and record their own music. The ability to read music is not required.

2. Challenges and Benefits of implementing non-traditional music instruction

With the understanding that the majority of high school students are not exposed to any kind of music education throughout high school, is it practical or even possible to formulate an effective curriculum geared toward Non-Traditional music students? Could they be taught to write different kinds of music and critique and analyze it? What kinds of software are usable and would yield results with this population? Will using a computer to teach these concepts assist in recruiting students and motivating them? This type of task is daunting enough with students who have been playing instruments and studying music since elementary school, let alone students who haven't been exposed to it since then. Unfortunately, these are several perceived barriers preventing these students from

participating in music classes. Teachers who do not teach technology-based music classes were asked reasons these classes do not exist and ideas that would encourage them to start teaching them. Additional motives for not offering such classes were lack of funding and perceived lack of knowledge or comfort regarding technology. Teachers indicated they would be more encouraged to start technology-based classes if they had the financial resources, training, and easy-to-follow curriculum resources.

Many students have developed an interest in using these software tools and programs to create music and develop their creativity but do not share an interest in the curriculum or genres included in most traditional school music courses, which in many secondary schools is limited to ensemble classes such as band, chorus, or orchestra.

Albert (2006) found that an effective means of recruiting low socioeconomic students is the use of culturally relevant ensembles. A technology-based music class focusing on creation of culturally relevant music might be a step in the right direction to recruiting the 80% of music education (Dammers, 2010; Edwards, 2006). No previous research was found that focused on recruiting non-traditional music students into technology-based music courses but many teachers may feel they do not have the knowledge or resources to teach a technology-based music class, or they may have the perception that it would be too expensive or time-consuming. Webster (2007), in a review of research on computer-based technology and music teaching and learning, concluded that

“music technology growth in the period from 1990 to 2000 demonstrated significant growth in the power and availability of hardware and software for

music teaching and learning, but in-service teachers lagged behind in their application of these resources. There seems to be no major evidence that this has changed dramatically in the recent years... We still lack real compelling evidence about how committed music teachers are in the integration of technology into music instruction (Webster, 2007, p. 1324-1325).”

While there is previous research on the use of technology in teaching music (Bauer, Reese, & McAllister, 2003; Ho, 2004; Meier, 2007; Williams & Beirne, 2005), studies on popular music pedagogy (Boespflug, 2004; Green, 2001; Green, 2008; Seifried, 2006), research in music technology (Boehm, 2007; Cain, 2004; Crow, 2006) and the popularity of music technology classes (Dammers, 2009; Dammers, 2010; Edwards, 2006, Williams, 2007), no previous research was found on technology-based music classes that use popular music to target non-traditional music students, and no previous research was found on curriculum resources used by technology-based music classes, especially those that target popular music.

Music Technology courses present many challenges in implementation but educators should also consider focusing on the numerous benefits these courses also bring. Fortunately, students are a lot more advanced than teachers might give them credit for. Their technical savvy, computer literacy, and uncanny ability to figure out software they've never seen before often exceeds that of the teacher. Recent advances in music technology particularly geared towards the educational sector have allowed us to leap over many of these barriers and allow, encourage, and even simplify the creative process with inexperienced students. Putting all this together presents a very appealing situation for a music teacher, and vast resource of musical potential in their school! The idea of

using technology to allow Non-Traditional music students to create and evaluate music is appealing on many levels: it requires the use of computers and other hardware, it provides opportunities for cross-curricular assignments, and it enables students who otherwise would not have had the opportunity to create music.

3. Current implementations of Non-traditional music instruction

Thomas Pullen introduction and example

I was a General Music specialist and Piano/Keyboard instructor for eight years at the Thomas Pullen K-8 Performing Arts School. General Music and Piano courses are considered apart of standard traditional music instruction in Prince Georges County. Kindegarden through Fifth grade students were taught the General Music curriculum while Piano/Keyboard instruction was given only to Sixth through Eighth graders. Shortly after understanding and implementing the curriculum and supporting documents, I desired to change some of the format and presentation materials for student music instruction. I desired to build my piano program through increased numbers, involvement and generate more inquiry about the program from other students. The challenge was that piano courses were not presented or taught through General Music in Grades K-5 like Suzuki Orchestra, Beginning Band or dance courses to name a few. I decided to present a beginning piano lab for Grades 3-5 for one quarter of the General Music school year. Through the introductory lab I incorporated technology utilizing the software program Sibelius Groovy Music Suite. Groovy Music is a software program that allows young students to learn about basic music concepts. In detail, the software allows students to produce music through sequencing elements such as rhythm, melodies and chords. Groovy software utilizes shapes, objects and depicted characters to represent musical

elements. Chosen characters walk across a screen as the objects play their sounds.

Groovy Music includes a library of preset music sounds that students can select and drag onto the screen to build their musical compositions. They can play back their piece, edit it or even see the elements displayed as music notation. This program was developmentally appropriate for grades K-5 as instructions and progressive exercises were guided aurally. Reading was not required by the students to use the software. Utilizing this program and introducing the Piano lab helped to build awareness of my program and provide some growth of student participation towards the Middle School Piano program.

While teaching middle school piano at Pullen, I learned early in my tenure that younger students needed multiple instructional levels to keep them eager and on the path of the program. Simply teaching piano pieces and theory was not enough for these students. I began to utilize numerous resources ranging from interactive DVDs, master class presentations, webcast/podcast presentations, and field trips to gain and keep student interest.

Two years into my tenure, a math teacher and I started an afterschool electronic music club. The math teacher was a Part time DJ and proficiently knew of multiple music software programs. We decided to create the club with simple lessons and even took the students (and my piano classes) on a field trip to Omega studios where students learned how the recording process takes place. These measures not only helped to gain some attention towards my program but also assisted the school receiving a music technology gift shortly thereafter. Midways through my tenure, Pullen was the recipient of a KORG Soundtree Music Lab which consisted of seventeen 88-key synthesizer workstations, 17 PC Computers and software bundle programs that included music theory and recording

packages. This notable experience pushed me to investigate music technology further. I delved into the software and synthesizer programs before the students could have the chance. I learned through that exploration that some of the software programs were great but not nearly functional for middle school levels. Reason recording software was one of those programs best utilized for high school level or beyond. I also made a conscious effort to present and introduce music technology programs for the middle school students but at a sampling simplistic level that they could grasp. Auralia and Musition software were perfect software programs for the middle school program as I used them to reinforce written theory units in class. Auralia is a comprehensive ear-training program with 41 levels and topics for beginners to advanced students. Topics include intervals, chords, rhythm, harmony all integrated with assessment tools. Musition is a comprehensive music theory and musicianship program with interactive drill based teaching towards achieving music fundamentals. Musition included 34 topics including notes, chords, rhythm, and terminology with integrated assessment and testing.

Initially, I allowed students to use Finale and Reason programs to create songs and had minimal success with them. This partial success was because the ease and instructions for the software programs were too much for the students to grasp. The largest success was in using my own version of Apple's Logic Music Production software. Middle school piano students could simply plug and play sounds, loops and create. The most notable contribution was creation of a new school song created by the piano, band, orchestra and choir students through using Logic software. Students composed the chords, format and lyrics of the song. The song was then mixed and

mastered by the math teacher and I for a finished recorded product. This was a remarkable and wonderful experience that I will never forget.

Eleanor Roosevelt

Kevin Hawk teaches the Principles Of Recording Technology (RecTech) course at Eleanor Roosevelt High School (ERHS) in Prince George's County Public Schools. RecTech classes are 50 minutes everyday for a full year for 11th and 12th graders only. Prerequisites include Physics or taking Physics while in Recording Technology. On average, Mr. Hawk gets a very low percentage of Band, Orchestra, and/or Choir students in the RecTech course due to scheduling. The majority of the students for RecTech are from his Piano/Guitar Classes or Drama Classes (believe it or not).

Software programs used in RecTech are Garage Band and Pro-Tools. Textbooks used for RecTech include Practical Recording Techniques by Bruce and Jenny Bartlett, Making Music with Garage Band and Mixcraft by Robin Hodson, and Using Pro Tools in Music Education by Robin Hodson. The Pro tools book has everything a teacher needs (lesson plans already are written out, sample audio, etc...) however like the Garage Band book I am slowly moving away from the book. But it (the book) provides students with all the skills they need to use Pro-Tools. It's a great book!! Additional resources for the course are found online at <http://www.soundonsound.com/>.

By the end of the RecTech course, students are able to successfully Mix, Edit, EQ (includes Compression, reverb) add auxiliary faders for vocals (reverb), Master, Use

MIDI, know how to Mic instruments, know the different types of Microphones, and the science of recording.

On Day 1 of the course I tell them (students) that we DO NOT make beats and if this is a class that you want to just “make beats” please see guidance about taking another class. The first two weeks of class is lecture/group activities based on the material in the Practical Recording Techniques book. For an example Day One-History of Recording Technology, Day Two-The Recording Chain, Day 3 & 4-Students are assigned a chapter to summarize and present to the class (usually on Equipping Your Studio) Day 5,6-Sound, Signals, and Studio Acoustics which involves Characteristics of Sound Waves, Behavior of Sound in Rooms, etc.

After the first two weeks the students start on Garage Band and also use the textbook Making Music with Garage Band and Mixcraft by Robin Hodson. The book comes with all the projects students can mix and edit. It's a great resource for teachers who want to start teaching recording. However, I am developing my own resources and will be moving away from the book within a year.

At the end of the Second Quarter we start Pro-Tools for the rest of the school year and use the book Using Pro Tools in Music Education by Robin Hodson. “Using Pro Tools in Music Education defines a six-module course (you can spend over half a year on the materials in the book) for high-school and college teachers who wish to integrate Pro Tools, the premier digital-audio application, into the classroom environment. Robin Hodson lays out direct strategies for quickly utilizing the complex software in various class programs. The book comes with a DVD-ROM featuring 41 tutorial movies (total

running time 3 hours) that cover all major aspects of learning Pro Tools. Also included on the DVD are accompanying files for use in the course modules. Voted a NAMM Best in Show by Music Inc!.”

Educator Kevin Hawk received his degree in Classical Guitar Performance and also taught elementary band and orchestra for 4 years before coming to ERHS. Mr. Hawk played in various rock bands while in high school and college. Recording Technology is something he picked up through performing experiences with different groups. Some of Mr. Hawk’s self-made materials include currently working on creating new audio tracks for students to Mix, EQ, and Master.

Mr. Hawk receives very little funding from the school for the RecTech program. The majority of the funding for RecTech comes from our Best of Coffee House Shows. Students who are in Rock Bands, musical trios, duets, or solo acts audition for BOCH. Then in October and April we put on a concert with usually around 20 acts and 500 + students attend the show. Tickets are \$5.

Overall, the ERHS students really enjoy the class because it allows them to work with technology, music, and the assignments constantly challenge them. This course also allows me to provide one on one instruction, which they might not receive in an ensemble course. Over the course of time, the class has improved as we have received better equipment, more resources, and higher enrollment rates.

Mr. Hawk believes that hands on learning, development of student creativity, developing problem-solving skills, and using technology that high school students don’t

know how to use are major reasons for educators to consider starting a music technology course at their school.

4. Rationale for Non-traditional music instruction study at Largo High School

Setting

My current educational assignment is at Largo High School where I teach Mixed Concert Choir, Basic and Intermediate Piano, and Music Survey courses. Each of these traditional music courses are mixed with all grade levels represented and with varying levels of musical experience. Largo High School serves approximately 1,100 students in grades 9-12 with specialized programs focused towards Finance, Biotechnology and AVID College Readiness. With this curricular focus in mind, the arts are often minimalized in this setting. The majority of the student population enrolls in music courses towards earning one fine arts credit/elective but do not stay within the program for more than one year at a time. It is my primary aim to sustain this program, by providing program visibility and school awareness and appreciation towards music/arts. Resources and use of technology is extremely limited or non-existent in this setting however I have been able to introduce more technology via a computer lab developed in the school this school year. The computer lab was created for testing purposes but has been available for arts classes in the school. The computer lab consists of twenty-five I Mac computers running on Mac OS X systems within the PGCPS private network. It is

my hope through this project that a course in music technology could be offered and presented for the students of Largo High School.

Sample

The sample used was fifteen high school students comprised of one sophomore, five juniors, and nine seniors. There were six females and nine males enrolled in this class and were utilized for the study. Ten of the students fell into the “Non-Traditional Music Student” category, having received no formal or informal music instruction since grade school. Four other students who participated in the lessons were enrolled in High School Band or Choir courses. The other student who participated in the lessons was an electronic music student who had a small home production studio and was interested in learning the basics of GarageBand, which he was unfamiliar with. His experience was with Apple ‘s Logic Pro music production software. This student’s work and experience was kept separate from the others. The students replaced piano instructional time during the school day for the study.

Methodology

In planning a sample unit demonstrating the benefits of such a curriculum, the abundance of beneficial software applications were considered. Although there are some outstanding products designed specifically for the classroom (such as the Sibelius Educational Suite), many software applications that would be of great value were not

developed with the classroom in mind. In developing an entire curriculum for use in a semester or year-long class, it was my desire to utilize as many different software applications as feasible, most notably Band in a Box, Rock, Rap, n' Roll, Garage Band, Acid, Soundforge, and Audacity. The primary purpose of using this software in the classroom would be to enable students to create, organize, and manipulate sounds into several logical pieces of music in a creative fashion. I selected GarageBand for a trial study because the mechanics of using the program are relatively simple, and its potential for creative output is great. It allows the user to cut and paste small snippets of music onto a grid, then repeat and manipulate the sections adnauseam. The advantage to this is that, with a few parameters, students have extensive creative leeway over their composition. The only real task they have is simple cutting and pasting. Lastly, GarageBand was the only software available to use due to limited funding from School Administration to purchase additional music software.

The Lessons

The research was conducted over five class successive class periods. Class was taught on an A/B schedule with classes every other day for 90 minutes. A weekend and a day off separated the second and third class periods, but otherwise, the classes were conducted on consecutive days. The lessons were conducted in a computer lab, on I Mac based machines. A full version of the latest version of Garageband was used, which was easily downloaded and registered at no cost. The only other equipment needed in addition to standard computer accessories was a quality pair of stereo headphones for each student, which were supplied by the school. No keyboards or additional MIDI devices were utilized as students used the computer keyboard.

Students were given access to approximately 3,500 loops to select from. Loops were not included in the demo download, and were available without cost from Apple's website. The loops available for the student use were organized by style (house, acid jazz, techno, urban, etc) and various instrument loops such as guitar, bass, horn and piano which were custom recorded as GarageBand loops.

In the first lessons, students were taught the basic parameters of the program and the definitions of form and structure. Students were taught the basic "ingredients" of their piece: bass, drums, melody, accompaniment, and effects. These lessons are focused on students creating individual composition(s). The requirements for the compositions include such parameters as being at least two minutes long, contain at least seven tracks, utilize the pan and volume bands, contain at least two effects of which one must be found on the internet. The final lessons were considered the "show and tell" portion. Students will play their compositions for each other, and analyze the compositions. The objectives for the lessons are fourfold:

- Students will gain an understanding, appreciation, and firsthand knowledge of composing music with a computer program
- Students will compose a quality piece of music and will have a recorded copy,
- Students will feel more confident and less intimidated about creating artwork, regardless of their past experience
- Students will increase confidence and interest by sharing their compositions and hearing the works of others

While the first two objectives are measurable and will be assessed with this project, it is my hope that the last two objectives achieved are byproducts of this process

as well. Finally, it should be noted that this basic lesson is in direct alignment with the State of Maryland Learning Standards.

- Demonstrate the ability to organize musical ideas and sounds creatively with improvisation and current technology
- Create and perform music of challenging complexity and length with expression.

The initial lessons were spent teaching the basics of the program, and allowing students as much time as possible to familiarize themselves with as many loops as possible. Creative judgment cannot be made if there is nothing to compare, so students were initially told to listen, listen, listen. The primary approach to putting together a first tune was to assemble it in terms of its structure: a bass line, a percussion line, a melody line, and some effects and accompaniment. I explained this to the students and briefly showed them where to find these loops, and played a short demo tune I had written following the parameters given.

In addition, I gave them all a written “guide” that explained the information as well. I quickly discovered that this method was ineffective, and students were spending most of the time searching for different loops instead of starting with something and building on it. In addition, nobody was even looking at the handout I had written, and when the period was over, what handouts were not given back to me were left on the table. I changed tactics on the second day and encouraged the students to construct the tune in the same manner, but to keep their tune within the same style or genre, such as house, hip-hop or industrial. This cleared up any immediate stalling and students were churning out coherent little pieces (around 30-40 seconds of musical compositions) much more expeditiously.

Their first assignment was to create a brief, thirty-second piece effectively demonstrating their understanding of the program, and their understanding of the structure of a piece of music. Most students completed this within two days with great success. I was surprised at the variety and diversity of the music created, as well as the creative energy displayed by the supposedly “non-musical” students. One student, who seemed very quiet and almost shy, put together a very high energy, bass and drum prevalent tune reminiscent of early the 1990’s hip-hop music scene. Another student who listened to this composition remarked about its similarity to the music of Queen Latifah and the theme song to Living Single. Another student wrote a very dark, heavy tune deceptively titled “The Blue Bird’s Hibernation.” It utilized effects and guitar distortion in a very resourceful and effective way.

The second assignment was more extensive, building on the first assignment. Students were to compose a piece in binary form using the same elements used in the first piece, but with clear a introduction, A section, B section, and ending. Students were given only one full class period to complete this assignment. Watching the creative process during these two classes was very enjoyable.

Students were still learning the software and listening to new loops, but the process was certainly much quicker than during the first few days. Most of the time was spent in a “trial and error” process, with many re-do’s. Most students were present and Some students missed some instructional time (bus arriving late), and their work is indicative of this. However, as with the first tune written, I was amazed at the creative output of the students. One tune in particular, entitled “Worthy”, displayed a great deal of

creative depth as the composer changed keys within the piece and utilized enhanced audio effects on all tracks.

For this part of the lesson, students were given a checklist. This assessment technique worked well in my opinion without impeding on the creative output. Elements to be integrated in the piece included the use of certain effects such as volume, pan, or reverse, the inclusion of effects, and the adherence to specific styles based on the adaptation from the first part of the lesson.

For the final part of the lesson, the pieces were saved and converted to mp3 files. The class met in the school's choir room, which was equipped with large Yamaha BR-12 Passive speakers. All the pieces were played and opinions were anonymously shared about the music, what was good, what needed work, etc. A survey assessing student opinions about the study was also administered.

Survey Outcome and Results

The results, as expected, support the concept of a class geared solely towards students with limited musical background. Overall, the fifteen students were generally enthusiastic and excited about using the program to create music, and the compositions themselves were very interesting, diverse, and show much creative input. There were some downsides, mainly with personnel issues. Some students' attendance was inconsistent, a fact which is clear when listening to the compositions who put the time in and who did not. Time presented a major challenge as there were numerous snow days, shortened periods, and an aggressive testing schedule. The computer lab utilized was primarily created as a testing center and thus PARCC and HSA testing took priority over the music technology class study. Also in point, this study replaced or took the place of

Intermediate Piano course that students had initially enrolled in. Therefore I remained diligent to still allow students class periods to practice piano pieces for Piano Solo Festival in the spring and not partake in music technology lessons.

All students who participated were there for the majority of the time, and completed the work assigned in the study. A twelve-question survey administered to students at the end of the unit assessed four areas (See Appendix A):

- Students' general impressions of the unit
- Students impressions of a music technology class doing activities similar to this unit
- Opinions of ease of use of the ACID PRO software
- Opinions about the music they wrote.

Overall, students indicated they enjoyed themselves throughout the unit and felt it was time well spent. On questions assessing students' general impression of the unit, students reported a mean score of 4.5 on a scale of 5, with 5 being an extremely positive response. All students indicated strongly that they enjoyed writing music with a computer. One student described the unit as "awesome..." and expressed a strong preference toward participating in the study as opposed to being in his assigned piano course ("It wasn't enough time....I wish the unit would continue").

On questions assessing students' impressions about participating in a music technology class, the responses were also extremely positive with a mean score of 4.7. One student response detailed "using Music technology was....cool, exciting and something abnormal". When asked if they thought other students might be interested in a class such as this, the responses were very favorable, a 4.9 on a scale of 5. When asked if the student himself would be interested, the responses were also very positive by average,

a 4.7 on a scale of 5. I attribute these responses to the indication that students equated the study more with a fun activity than with a legitimate classroom course. (students reported a score of 4.6 on a scale of 5). One student detailed “students at Largo would love to be in that class because its better than doing book-work...”. I don’t believe the students realized just what they were doing, and how beneficial it was to them, and therefore did not equate this unit with a legitimate educational activity or course.

When asked about the software itself, its ease of use, the time it takes to learn it, and its functionality as a compositional aid, students reported positive answers of about 4.3 on a scale of 5. Most students strongly indicated that Garage Band was easy to learn, and facilitates the process of writing music. The advanced electronic music student indicated that although the process was relatively simple, it would have been easier for him if he could input music using his keyboard controller and/or Logic Software. Some students indicated and expressed that the main difficulty was in using I Mac Computers that constantly updated, shut down, logged off, froze, or slowly processed functions. One student also detailed she had “challenges because she never used it(lab) before and had no clue what I was doing”.

Although I felt the music written was of decent quality for beginners, students tended to rate the compositions of their classmates higher than their own compositions. They also indicated that others might enjoy listening to the compositions more than the composer would, which leads me to believe there is still a fair amount of creative inhibition. This may indicate that students are trying to create something that fits more into what their peers would approve of as opposed to what pleases the composer. I look at this aspect as another endorsement of this type of curriculum as a means to boost self-

confidence by fostering uninhibited creativity in students, allowing them to create something on their terms, and not have it fit into a mold.

Conclusions

This action research project began with an initial objective to measure musicianship of high school music students through integrating technology. As the project evolved I realized that the depth and diversity of this topic was more involved than measuring music theory skills. At the core of my concern and inquiry was how do we build interest and enrollment in our high school music classes. As snow days and delays piled on this school year I delved into the core topic of how music technology can build musical awareness within a high school community. In other words, how do music educators best garner attention for the smartphone, social media, and app trending high school society? This study effectively demonstrates, in my opinion, the validity of establishing a music curriculum for non-traditional music students. Emphasis on music technology courses can create a larger base of interest from students towards high school music programs. Training in music theory or a performance medium such as piano, viola or trombone is NOT synonymous with musical creativity. A performance medium simply serves as a vehicle, and a very effective vehicle at that. Participating in a performance organization has benefits far beyond musical creativity that cannot be replicated on a computer. This in no way excludes other students, who primarily comprise the vast majority of a school population, from participating in a music curriculum, and achieving the pride and sense of accomplishment which comes from creating a piece of music. This study demonstrates that students with limited musical training can, with a minimum of

instruction, create a quality piece of music. The quality of the music created coupled with the student's interest, enthusiasm, and effort for the subject matter clearly shows it would be a valuable and beneficial part of a high school music curriculum.

Appendix A-Questionnaire

INTERVIEW COVER LETTER

To: [e-mail address]

Fr: Brandon Felder:

Dear Fellow Music Educator,

My name is Brandon Felder, music teacher at Largo High School; and I am in pursuit of a Masters of Music degree at the University of Maryland. I am conducting a questionnaire on the integration of non-traditional music technology classes offered in Prince George's County high schools and I would greatly appreciate your help.

Participation in this interview that consists of answering twelve questions which will only take 10-15 minutes to complete. You will be asked a couple of demographic questions about your school and the music course offerings available to students. Your responses will make an important contribution towards understanding current trends in music education opportunities for students in the state of Maryland and Prince George's County Public Schools.

There are no risks involved in participating in this questionnaire. You are free to decide not to participate in this study. Your decision will not result in any loss of benefits to which you are otherwise entitled.

Thank you in advance for your time and assistance in this research project.

Brandon Felder

1. What is the name of the Music Technology course(s) are currently offered to students at your school? (Please Specify):
2. If you are teaching any music technology courses, what textbook(s), other curriculum materials, or training classes/workshops have helped you teach these classes? (Textbooks, Websites, Workshops, Clinics, Self-Made Materials)
3. Describe your thoughts on teaching music technology concepts to students with no previous musical experience. For example, is there a method or process you use, method books or web resources, or other ideas for developing creativity.
4. Are the students in these classes required to have any previous musical knowledge, or be previously enrolled in another music class or all classes open to all students? Please describe any other prerequisites if any:
5. On average, what percentage of students in these classes are also enrolled in band, chorus, or orchestra at your school?
6. How would you describe the culture of students in these classes compared with students in traditional music classes or ensembles?
7. If you were not hired specifically to teach these classes, what is your primary subject area? (ex. Band, guitar, etc.)
8. How did you receive funding for the equipment, staff, and/or materials for these courses?
9. What might encourage you or other teachers to start a Music Technology course at your/their school? (Please give as many reasons as possible that you can think of.)
10. What software programs are used in your course, and what are students able to do by the end of the course?
11. How long is your course? (1 hour every day, 90 mins every other day, after school, year-long, semester, elective, or quarter)
12. How has the non-traditional course changed over your time?

Appendix B- Music Technology and Composition Survey

Answer and Respond to all questions and use the scale when prompted with an asterisk *

- 1= Not at all
- 2=Slightly
- 3=Somewhat
- 4=Very Much
- 5=Extremely

General Impressions

1. Did you enjoy writing music on the computer? * Why or Why not
2. Did you enjoy participating in this music study? * Why or Why not
3. Was the unit study (5 classes) worth your time? * Why or Why not?

General Impressions of Music Technology Class

4. What were your impressions of using Music Technology at Largo?
5. Do you think other students at Largo would be interested in a class like this? * Why or Why not
6. If this music technology class were offered as a part of the music curriculum course offerings would you consider taking the class at Largo? * Why or Why not

Opinions on the use of the Garage Band Software and Mac Computer Lab

7. Garage Band was easy to learn and use. * Why or Why not
8. Garage Band facilitates the process of writing music. * Why or Why not
9. The Mac Computer Lab and Garage Band presented no or few challenges in creating your musical composition. * Why or Why not. Please Explain

Opinions about your finished musical project

10. Your final completed composed song was of adequate musical quality. * Why or Why not
11. Your classmate(s) final composed song was of adequate musical quality. * Why or Why not
12. Other individuals (not in this class) would enjoy listening to your musical composition. * Why or Why Not

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