PROCEEDINGS FROM THE NINTH NATIONAL SYMPOSIUM ON MUSIC INSTRUCTION TECHNOLOGY (2007)

On the following pages you will find both complete abstracts and short descriptions of presentations from the 2007 National Symposium on Music Instruction Technology (NSMIT), held in Charlotte, North Carolina on October 19-20. Dr. Randall Haldeman (University of North Carolina at Charlotte) organized and hosted the Symposium.

The NSMIT is affiliated with the *Journal of Technology in Music Learning* (JTML). The *Journal* is committed to publishing the Proceedings of the Yearly NSMIT.

The NSMIT subscribes to (at least) three important tenants: (a) accelerating the exchange of ideas about music technology and education among practitioners and researchers, (b) encouraging appropriate uses of music technology in PreK-12 learning environments, and (c) disseminating findings to individuals who use, or want to use technology in music learning and teaching situations.

Note that abstracts are indicated with an asterisk (*) at the beginning of the title. All other entries are descriptions taken from the NSMIT 2007 program copy. Please feel free to contact the authors of these abstracts and descriptions for additional information. They will be pleased to respond to your questions. Email address for the authors may be obtained from the JTML Editor.

*KEYNOTE SPEAKER: EITARO KAWAGUCHI

Center for Music Research, Florida State University

Twenty-Five Years of Personal Computing and Music Technology

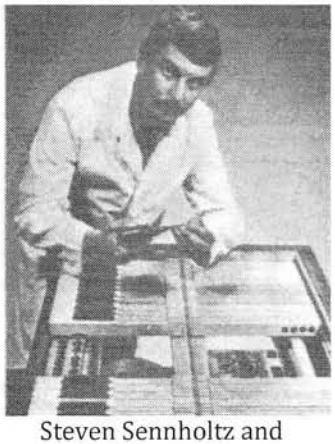
To put today's computer and music technology in perspective, the presenter looks back 25 years of his experience at the Center for Music Research. The IBM PC was just introduced, and the Mac, CD/DVD, MIDI and the Internet did not yet exist. We had to write our own programs to display music on computer screens and then print it. Owning a digital music recorder was an audiophile's dream. Having a computer play high quality video was beyond reach of casual users. We have come a long way. . .

Center for Music Research

The Center for Music Research (CMR) was established in 1980 at Florida State University by Drs. Jack A. Taylor and Steven R. Newcomb. Stimulated by the PLATO computer system they set CMR's ultimate goal to create the Integrated Cybernetic Music System (ICMS.) The ICMS would utilize computers in assisting various activities of music such as teaching, composition, printing, performance, analyses etc. to name a few.

The CMR founders
Drs. Jack Taylor & Steven Newcomb

Although they never reached the ambitious final goal, they accomplished many notable innovations in the process. Such accomplishments include the first color PLATO terminal, a fully weighted electronic Sennholtz Keyboard, an inexpensive multi-timbre digital music synthesizer (Hyasynth) for student terminals, etc. Software for music note entering, melodic dictation and counterpoint lessons, etc., and various supporting programs were written during the PLATO days. After the PLATO system was phased out due to its high running cost many efforts in software development were made to recreate a PLATO-like computing environment.



Steven Sennholtz and
the Sennholtz Keyboard

In the development effort courses in computer programming that are unique among music schools were created. CMR also developed and offered the Certificate in Computers in Music curriculum. It prepared students for the music education "digital era." Many of the students who participated in the certificate courses are now leading researchers and teachers of 21st century music education.

Research in developing music notation storage format culminated in leadership in the development of an international standard for music storage and description, the Standard Music Description Language (SMDL.)

Technology and Music: 25 Years and Running . . .

When CMR was launched in 1980 the Internet did not exist, and even the Local Area Network (LAN) was not widely used as it is today. Most consumer audio equipment was analog until the appearance of the CD in 1982. But once audio started to migrate into the digital domain, precise handling of music (or

audio in general) by computers became very easy, even for casual computer users.

Emergence of the Musical Instrument Digital Interface protocol (MIDI, 1983) and digital synthesizers (Yamaha DX7, 1983) further accelerated the computer's ability to handle music.

Advancement in very large-scale integrated circuit (VLSI) fabrication technology allowed the prices of key components of digital media processing to drop dramatically while boosting their performance and quality. High quality analog-to-digital (A/D) and digital-to-analog (D/A) audio converters occupied a full rack and cost tens of thousands of dollars, but now they are embedded on a chip and are much smaller than a fingernail—costing just a few dollars, or even less.

Digital media processing capabilities would not be as useful if one cannot store the resulting information, i.e., sound, images, and video. Hard disk capacity soared from the 10MB of the original IBM PC XT to the current capacity of many hundred gigabytes. Optical storage technologies have been quick to advance as well: CD to DVD to Blu-ray discs. Solid state storage devices now commonly known as '"flash drives" have replaced the enduring floppy disk and its cousins.

Conclusion

Today the abundant supply of digital media hardware seems to have overpowered the needs of the explorers of techno-land in music education. Teachers can accomplish so much with so little (relatively speaking) money. But advanced hardware/software is far from perfect. It may prove to be a daunting task to solve the problem when things do not work as planned. The Internet is very resourceful, but somehow it seems that it often fails to give you the answer *you* are looking for. Having your feet firmly on the ground, and knowing where all these wonderful things originated would be a strong ally in your future explorations.

In a sense, what started as the ultimate goal of CMR has transformed into an ongoing evolution on the Internet. The goal will be reached eventually, although the goal line may become more and more blurry, and the 21st century version of ICMS will be all over the world.

References

Taylor, J. A., Newcomb, S. R. (1980). The Integrated Cybernetic Music System. Center for Music Research: Report X-1.

Newcomb, S. R. et al. (1995). Standard Music Description Language. ISO/IEC 10743.

*Implementing the Instruction of Music Technology

John Allemeier, University of North Carolina, Charlotte

OK, so now you have a lab, software, and MIDI hardware. Where do you begin teaching all of this to your technology students? The author has "faced down" this challenge and now shares it with you with his usual inimitable style, and with everything from interpretive dance to sock puppets.

The Composer as Podcaster: Artistic, Pedagogical, and Practical Considerations

Jay C. Batzner, University of Central Florida

Podcasting has become one of the many "it" things in education due to the relative ease in creating audio content and making it available over the Internet. Most educators look at expanding their classroom through podcasting. This may be a simple recording of the day's lecture or a supplemental lecture or interview on a specific topic. The goal is always to provide more content and information to the students and provide that content in a way that is convenient to them. As a composer, I have turned to podcasting for two distinctly different reasons. While neither of these podcasts is directly related to courses that I teach, they are both excellent pedagogical tools for any musician.

There are several considerations to confront when faced with podcasting. First and foremost is the question of content. Podcasts are not successful based on their technology but rather on their content and their appropriateness to the medium. Additional considerations of time allotment and duration are important as well. Podcasts are mercurial creatures. Without regular updates of fresh content your podcast can wither on the vine. To begin, I suggest finding short and focused topics that you can easily manage with a modicum of hardware and time. The easier it is for you to create the content the more immediately useful it will be for your audience.

The first podcast is one of promotion. I manage a weekly podcast that features recordings of music by myself and the other members of a Composer's Collective. This podcast is intended to draw more interest in our music and promote our concert series. One habit that I try to instill in my composition students is the importance of self promotion and distribution of their music. Personal websites and social networking sites are great tools to use but they still require promotion and regular updates to bring visitors back to their site. The Collective's podcast (http://thepodcast.thecollected.org) is a vehicle to keep interested and curious listeners hooked into our music when the concert series is on hiatus. Just as personal websites must be marketed and advertised, podcasts work best in conjunction with audience cultivation tactics.

The second podcast grew from a desire to stay active in creative work. In early 2007, I found myself in the position of many faculty artists. Teaching and other job duties often sapped my creative juices and I barely had time and energy to devote to my passion (and one of the major factors in acquiring tenure!). I decided that the solution was to compose a new piece every week, no matter what else might be happening. But how was I to force myself? What consequences would befall me if I didn't write something? As is often used in exercise and weight-loss plans, I needed some social connection to prod me into activity when sloth and complacency were too tempting.

I needed an audience and I decided that podcasting was the best way to transmit my creations to an audience that would, each week, want a new piece from me. In late February, I began the Unsafe Bull Podcast (http://unsafepodcast.thecollected.org) in which I compose a new electroacoustic work each week.

The two podcasts that I work on have distinct extra-pedagogical uses. The promotion podcast helps my composition students see real-world networking in a digital age. Shameless self-promotion is an important facet to any composer and sometimes the shameless portions can be hidden inside something more altruistic. The Collective's podcast benefits all of the members of the group. The fact that I am a member of that group is a by-product.

The creative podcast has been of value to me as a composer and also as a composition teacher. A few of my episodes started out as in-class demonstrations of techniques. I liked what was generated in class and developed it further outside of class. Students can then tune in and hear different development possibilities. I also have created a slew of process examples and short pieces for analysis and discussion.

Student composers sometimes get caught up in the "masterpiece syndrome" in which they worry about getting everything perfect in their music for the ages. This can slow the creative process to a crawl and distract students from their primary duties as a composer: finding their own voice. I believe that student composers should write quickly and generate as much music as possible. Not every piece they write must be perfect nor does every piece have to stay in your catalog for your entire life. My weekly pieces are short, experimental, and sometimes atrocious. I learn valuable techniques and develop aesthetic choices that then impact my more time-intensive pieces. I view these works as a performer views etudes. The pieces are valuable in generating technique and you are always glad you worked on them when you tackle "real" pieces. Composers need a similar outlet to hone their craft and the forced composition of short pieces is a valuable vehicle.

Forcing inspiration each week can be quite difficult. Inspiration often comes in unusual forms and can be dictated by interesting news events, specific sound clips, or the desire to learn new software. I know that some of the pieces I create will be good and some will not. As of episode 34 I have generated over one hour of music. This would have been unthinkable under any other circumstances.

Podcasting is an excellent vehicle for moving instruction out of the classroom and into a larger world. Composers and performers alike would gain great insights to their musical natures by experiencing this technology.

Affordability, Scalability, and Implementation of a Campus-Wide Classroom Technology Integration: A Walking Tour

Steve Clark, University of North Carolina, Charlotte

How do you implement SMART classrooms in every instructional space while not breaking the budget? I discussed the issues surrounding UNC Charlotte's campus-wide technology integration and offered suggestions on how to accomplish this in one's own school.

*Absolutely Free: Addressing the Standards with Free and Open Source Software

Jay Dorfman, Kent State University
Marc Jacoby, West Chester University

A wide variety of software is available for educational use without any cost to the end user. The community of users can modify open source software. The source code is readily available and users contribute to its development. Freeware, as its name suggests, is software that is also available at no cost, but it is created and maintained by a closed set of developers who distribute it for free. Shareware, similar to freeware, is protected by the developers, but usually has a nominal fee associated with its prolonged use.

The National Standards for Music Education can be addressed using technological methods for teaching. Teachers who incorporate technology into music teaching are often faced with financial constraints that pose obstacles against rich integration of technology toward the goal of meeting local, state and national benchmarks. The purpose of this presentation was to demonstrate the uses of open source software, freeware, and shareware in the music education context. Employment of such software may allow teachers and students to reach these goals without incurring the tremendous expenses that are associated with the purchase of commercial software packages.

Critiques of Instructional DVDs for Beginning Guitar Instruction

Dianne Gregory, Florida State University

Content analysis of available commercial instructional DVDs for guitar instruction was provided and rated regarding instructional format and music education goals for middle and high school students. Applications and adaptations of content for group and individual instruction for all students, including students with disabilities were provided.

Teaching the Elements of Music Using Classroom Response Systems

James A. Grymes, University of North Carolina, Charlotte

This presentation demonstrated how Classroom Response Systems (CRSs) can be used to teach the elements of music in K-12 and/or collegiate music classrooms. By enabling students to react to guided questions via hand-held radio frequency response pads, a truly interactive environment is created that also provides real-time assessment.

*Bringing Experts to the Music Classroom

Sara Hagen, Valley City State University, North Dakota

We've all felt at times that our skills could be stronger in some areas that our students need. That is when to call in a colleague with the skills that match the need. Sometimes it is easy, with someone just down the hall or maybe in the same district, but sometimes, it is that expert across the country. With technologies available today, it is possible to bring these experts to the classroom with just-in-time learning or with topical supplementary activities. This session described the many ways in which to bring people into the classroom via videoconferencing, a method that is becoming mainstream and accessible to many.

The session described the current uses of videoconferencing to deliver a music business seminar course at Valley City State University with Dr. Sara Hagen serving as the moderator. Each week, a national expert is brought into the classroom via videoconferencing along with a regional presenter in person.

The interaction of the two has been powerful and inspiring for the students in the class. Examples of national experts include: George Howard, former President of Rykodisc Records and currently at Loyola's School of Business; David B. Williams, co-author of *Experiencing Music Technology* and technology consultant; George Litterst, owner of TimeWarp Technologies and Yamaha representative; Henry Panion III, lead arranger and conductor for Stevie Wonder, and Dr. Victoria McArthur, keyboard editor and composer for Alfred Publishing. The regional presenters discussed the business climate and opportunities in North Dakota for the same types of jobs. Both described qualities and personal skills required for success in the business. This course was also offered as a Jump Start course for students in their junior or senior year of high school.

Additional plans using these technologies include: teaching string lessons to rural elementary children who have no opportunity for such study, delivering bassoon lessons at the collegiate level, providing continuing education opportunities for independent teachers through online piano pedagogy and technology courses, and perhaps reaching into the delivery of "core" music courses at the collegiate level.

Software included in this presentation was Apple's iChat with the iSight camera, WIMBA, iVisit, Skype, and MSN for "live" presentations. However, if necessary, asynchronous activities may be facilitated with desktop recording software such as Camtasia. This software will record whatever is happening on the teacher's desktop, which could include a videoconference as well as instructional devices such as software tutorials, remedial activities, or tests. The expert may not be available at the usual class hour, so a prerecorded session may be appropriate. Interviews or other types of expert interactions can be facilitated with Instant Messaging if critical answers are needed immediately, such as working out questions of performance in new music with the composer.

The use of technology can bring people together in much more sophisticated and powerful ways, albeit a little time-consuming at first to set up and practice. Once these technologies are in place and students and teachers become more comfortable in the environment, more imaginative ways to use it will emerge. Asking for help in the first place can be a difficult first step. We are all learners on this life's path, and we all need help once in a while. Find a partner to try the first interaction, and then build from there. Also try contacting a local university or contact Sara Hagen for further information at sara.hagen@vcsu.edu.

*What are the Most Effective Technologies in Music Instruction and Learning in Grades PreK-12, and How are They Being , or Can be Used?

Randy Haldeman, University of North Carolina, Charlotte
Scott Lipscomb, University of Minnesota
Jack Taylor, Florida State University
Kimberly C. Walls, Auburn University

The series of panel discussions on the use of technology in grades PreK-12 dates back to the Sixth Annual NSMIT held in 2003 at Valley City State University (Sara Hagen was the host and organizer). The major theme of the panels was the degree of effectiveness (or lack of effectiveness) of technology in music instruction as perceived by a panel of eminent teachers and music technologists. These panels began as a sort of "watch dog" committee on the progress and benefits of technology in music instruction and learning. However, in 2006 the panelists changed directions by discussing their visions for the future of music technology in the classroom. This 2007 panel returns with a new, yet related theme by replying to the question, "What are the most effective technologies in music instruction and learning in grades PreK-12, and how are they being used, or can be used"? Each panelist responded to this question, and the audience members were asked to contribute their comments at the end of the presentations. The following summaries by panelists **Scott Lipscomb and Kimberly Walls** are presented below. Perspectives from the remaining two panelists (Haldeman and Taylor) can be obtained by contacting them directly.

Scott Lipscomb. I would like to express my sincere appreciation to Jack Taylor for organizing this panel session and for inviting me to participate along with my esteemed colleagues from diverse regions of the United States. I have taken to heart the charge issued to each panelist for this session. First, based on my own personal experiences in partnership with K-12 schools, to identify the most effective technologies that can be useful to music educators and their students, and second, to provide examples of how such technologies are currently being used in exemplary ways.

Effective technologies

In the most general sense, though not necessarily those utilized most often and/or most effectively, the technologies that I believe hold the most promise for music teaching and learning will be identified. Without a doubt, the personal computer–followed by the laptop computer–constitutes the single most important technology for music learning since recordings of musical performances were made possible. This advance is followed closely by the presence and accessibility of the Internet. Computers and Internet connections are currently available at most schools across the nation, a trend that I hope will

continue until 100% integration is achieved. It is worth emphasizing that making these technologies available to students certainly constitutes a step in the right direction. Without adequate and recurring training opportunities for teachers, however, technology integration cannot possibly attain its greatest potential for effective learning. A related technology that is becoming more and more ubiquitous within the student population is the portable music player (iPod, iRiver, newer mobile phones, etc.). Connected to a personal computer, these units provide a powerful means of playing, organizing, and searching for musical examples for use in the music classroom.

Another type of technology that is proving extremely useful in the classroom is the course management system (CMS). Representative programs like *WebCT* and *Blackboard* have been used for over a decade at the university level, where significant technology budgets are the rule rather than the exception. The more recent arrival of open-source programs (many free, like *Moodle*) have made this technology readily accessible to teachers. In an era when most every word processing program, spreadsheet application, and database allows a menu selection to save the open file as a web page, these CMSs provide an effective way of placing course materials online, allowing students to continue topically related dialogue out-of-class (weblogs and discussion boards), and to access a variety of web resources recommended by the teacher. Another type of resource that can be posted to a CMS–or any web site–is interactive, multimedia instructional materials. Programs like Adobe's *Flash* make the development of such materials much more accessible to teachers who do not have the time or inclination to learn some of the more complex programs for interactive content creation.

In creating my personal list of "effective technologies," the items mentioned above would be included. Realizing, however, that this list does not take into consideration the very important matter of cost (i.e. economic cost of software and hardware referenced or cost in terms of the time required of a teacher), this list may indeed prove unrealistic in making a significant contribution to teachers currently in the classroom, and most importantly, the students learning within that same context. As a result, I am determined to let go of my "hi-tech geeky nature" and focus instead on utility and accessibility. Strongly influenced by David Williams' (2007) stated desire to include the "nontraditional music student (NTMS)" in the music learning context, I have chosen instead to focus on some of the most accessible and utilitarian technologies that teachers can use to further their music learning objectives. In this way, I hope to facilitate serving a much larger percentage of the secondary school student population–what Williams refers to as "the other 70%," but based on preliminary research findings appears in reality to be closer to a non-participating 80% across the nation (Edwards, 2006).

Considering the fundamental question we are addressing in this session from this altered perspective, the list of technologies changes appreciably. In fact, many of the items on the resulting list are technologies that might already exist in the majority of schools. In the remaining paragraphs, I will assemble a revised list of "effective technologies" and then provide two examples of Minneapolis public schools–one a K-8, the other a high school–that are incorporating the use of technology at varying levels of integration across their curricula.

The basic technologies that serve most effectively in K-12 classroom contexts must include portable electronic keyboards (those with built-in speakers are particularly useful). The ability to easily move this rehearsal instrument from one room to another makes it indispensable. The utility of a music notation program is difficult to overstate. The newest versions of the leading software allow both the creation of professional-looking music notation *and* the playback of the music entered using impressively high quality "instrument" sounds. For those schools that have a reasonable technology budget, purchase of laptop computers and LCD projectors to project the image from the computer onto a wall or screen can be an invaluable aid to learning. Connected to the Internet, such an arrangement provides a doorway into a world of learning possibilities for classroom exploration. Finally, a computer lab can be a wonderful supplement to the general music classroom. Music-related assignments can be made that require no specialized software or hardware. Attach a MIDI keyboard controller (available for less than $50) to each computer and you have a ready-made music creation lab. Depending on the expertise of the general music teacher and technology support staff, a variety of relatively inexpensive, academically-priced programs can prove extremely useful for music learning: QuickTime Pro (to create and/or convert media files), PowerPoint (to create reports), Dreamweaver (to create web site content), and Flash (to create interactive multimedia content). Finally, there are many free programs available to teach musical concepts. A Google search for "freeware music note reading," for example, will result in a list of free interactive software that will allow students the opportunity to practice reading notes on the musical staff. There are many other hardware and software items–some free, some very expensive–that could enhance the music learning environment. With just a couple of the items listed above, however, great strides can be made toward enhancing both the quality of learning and the level of enjoyment experienced by students during the process.

Case Studies

To demonstrate ways in which basic technologies have been used successfully in local Minneapolis Public Schools, I would like to focus on two specific schools. Ramsey International Fine Arts School (IFAC) is a K-8 fine arts magnet in a highly diverse area of south Minneapolis. Brooklyn Center High School is a 7-12 school in the equally diverse north region of Minneapolis.[1] Video excerpts of music performances were shown as part of the NSMIT panel presentation, along with a brief description of technologies used.

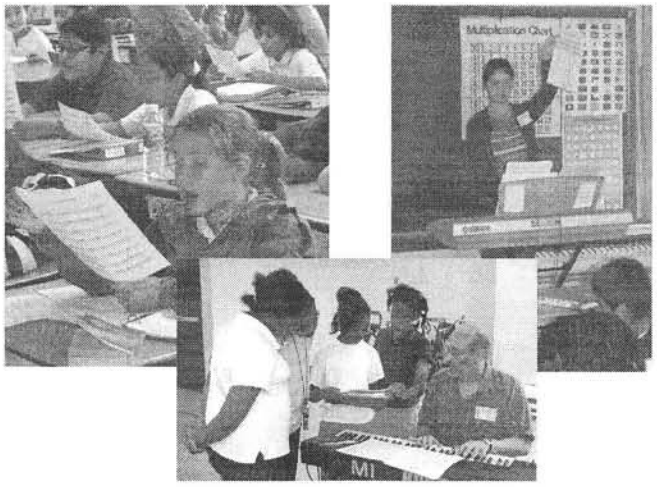
The Fourth Grade Opera at Ramsey

For the past ten years, the fourth graders at Ramsey IFAC have participated in the creation, rehearsal, artistic design, and performance of an original opera. Five years ago, a partnership was formed with the Music-in-Education National Consortium's *Learning Through Music* (LTM) program. The goal of LTM is music integration across the curriculum. As a result, in the process of creating

the opera, fourth graders learn musical skills from composition to singing to expressive performance, while at the same time utilizing skills related to literary arts, social studies, history, visual arts, and many other subject areas. The opera performed during Spring 2007 was entitled "Kenya's Hero: Wangari Maathai" and was based on the life of this Kenyan Nobel laureate.

The initial stages of opera creation were completed using a very low-tech approach. The electronic keyboard was used to facilitate the generation of melodic and rhythmic ideas from the students that would evolve into musical themes for the opera under the supervision of composer Corey Sevett. Students also determined the storyline of the opera, after studying the PeaceJam Juniors curriculum devoted to Wangari Maathai. *Finale* music notation software was used to document the musical themes as they were composed by students, and the printed notation and audio files generated by *Finale* were used in classroom rehearsals to expedite memorization and to prepare students for on-stage performance (Figure 1). This year, rehearsals were supervised by classroom

Figure 1. Photographs of technology use in preparation for the fourth grade opera: electronic keyboard and music notation software.



teachers, four student interns from the University of Minnesota (UMN), Mr. Sevett (LTM consultant and teaching artist composer), or Dr. Dee Lundell (LTM consultant and retired fourth grade teacher)The opera performance was a huge success, providing students a true sense of pride in realizing their accomplishment and their ability to use music to communicate an important message to their fellow students, parents, and community members. The message of this year's opera, readily apparent in both the libretto and,most important, in the minds of the students–as documented in their reflections on the opera performance after the event–was "the power of voice." As a result of this experience, students grew musically and realized that one person's voice *can* make a difference in the world: a very powerful message for any fourth grade student, but perhaps even more relevant for students in a diverse, urban environment like Ramsey.

The Fall Concert at Brooklyn Center High School

The staff and students at Brooklyn Center High School provide an exemplar of just what can be accomplished with technology, even without a huge investment in equipment. In the days leading up to the concert described in the following paragraphs, the music teachers scrambled to borrow teacher laptops from those willing to give them up an evening, searched for speaker wire, rented a video splitter box, and utilized nearly every piece of equipment available in their classrooms. In the words of band director Chris Porter,

> I think that speaks volumes about what is possible in the classroom–even when you really don't have much to work with. The band has been doing this type of thing for years: all with little or no equipment. It really makes you think outside of the box and also realize how little actual equipment and "things" matter because it's really all about the ideas. You could have all the tools in the world, but without the work ethic, drive, and creativity, good luck. It will certainly be much easier in the future with some money and real equipment, but I truly will never, EVER forget

Figure 2. Photos taken during the preparation for the performance of the Brooklyn Center High School Fall Concert.

> what it was like to try and make something with nothing and experience great successes as a result.

Porter's reference to being "easier in the future" refers to an exciting outcome. After performing the tasks described above for a long period of time, the school recently learned that it will receive a magnet school grant and will be able to significantly upgrade some of its technology.

As a result of the training and expertise of band director Chris Porter and choir director Josh Countryman and both past and current UMN graduate students, technology is a well-utilized tool within the music program. Across the nation, evidence suggests that the area of music in which technology has been least utilized is that of ensemble rehearsals and performance. As Ms. Porter and Mr. Countryman began to prepare for the Fall Concert this year, they decided to engage their students thoroughly in the process, incorporating technology as an integral component. For this concert, utilized technologies included Macintosh computers, video editing and graphic editing software, data projectors, and the cables necessary to hook it all together. In addition, the students used other technologies available to them: the Internet, a "Wiki," and various other external resources.

The concert was conceived around a basic theme: "Time Machine." Students in the choir and band were responsible for selecting one of the pieces to be performed by the ensemble in which they were registered. During rehearsal time, they were given some time to collaboratively determine what types of information they would need to find about the pieces: background information, composer, performer, date of creation, information about society at that time, popular culture, meaning of the lyrics, etc. Each student wrote a five-paragraph essay about his or her chosen topic. Throughout the research process, students communicated both during school and outside of school hours. The latter was accomplished using a Wiki, an online, collaborative discussion board that allows any participant to add to, or edit content that is being generated. This allowed students to "get together" virtually, when meeting in the same space at the same time was not feasible. The Wiki served as a central repository for all research information that was collected, a place where students could post information that went well beyond what could be included in a five-paragraph essay. Student attitudes toward this process were extremely positive, as evident in the comments provided below.[2]

"This is so freakin cool (just like MySpace) except it involves a lot of work."
"I don't mind spending so much time on this because we're doing it for a reason."
"The wiki rocks! I wish we could do this type of thing in other classes too."

The information gathered by students as part of this research process and selected material from the Wiki were integrated into a student-created video presentation that accompanied the actual musical performance. To fit with the "Time Machine" theme, a student film provided an introduction that reveals the discovery of a time machine, then a group of students and the two ensemble directors unwittingly enter a time warp. Throughout the program, each piece is connected by a time travel sequence, transporting the travelers to the era of the next composition. A final sequence brings them all back to present time. The video included a massive number of photographs, images, sounds, and narrative, combined into segments that coordinated impressively with each piece performed on the concert. As further evidence of the degree to which student ensemble members were invested in this concert, almost *all* of them showed up

on Sunday evening, the night before the performance, for a last-minute, "optional" rehearsal (see Figure 2). Many arrived three hours early on the day of the performance to assist with set-up. A group of students even built wooden frame screens upon which the video images were projected.

Resources

Blackboard CMS. http://www.blackboard.com

Edwards, N. (2006). Non-traditional music students: A new population of music student for the 21st Century. Unpublished manuscript, Illinois State University.

Flash. http://www.adobe.com/flash/

Lipscomb, S.D. (2007). Facilitating deep learning in the music classroom: Integrating an interactive, multimedia resource for real-time collaborative musical analysis. *Journal of Technology in Music Learning*, *4*(2).

Moodle CMS. http://www.moodle.org

Music-in-Education National Consortium. http://music-in-education.org

PeaceJam. http://www.peacejam.org

WebCT CMS. http://www.webct.com

Williams, D. (2007). Reaching the other 70%: Using technology to engage "non-traditional music students" in creative activities. Paper presented at the Tanglewood II Presymposium on "The effects of technology on music learning." Minneapolis, MN, April 6-7, 2007. Retrieved on July 18, 2007 from: http://tanglewood.umn.edu/docs/tanglewood_presentation_williams.pdf.

Footnotes

1. The author would like to acknowledge the invaluable ongoing contributions of the teachers, students, and administrators at both Ramsey International Fine Arts Center and Brooklyn Center High School. Without their continuing hard work and dedication, a report would be possible. At Ramsey Fine Arts Center, I would like to thank former principal Steve Norlin-Weaver, current principal Karen Hart, members of the Learning Through Music Consulting Group (Dee Lundell, Corey Sevett, & Ken Freed), Larry Scripp of the Music-in-Education National Consortium, my four student interns (Amy Jo Johnson, Christiana Williams, Alyssa Wyatt, & Kathy Skaar) and all of the fourth grade teachers: Ann Blatti, Sally Scott, and Jennifer Vaillancourt. At Brooklyn Center High School, I would like to thank Christine Porter (director of instrumental ensembles) and Josh Countryman (director of choral ensembles).

2. I would like to thank Christine Porter for providing these students comments. Student names are not included for reasons of privacy.

Kimberly Walls. Two of the most promising technologies for changing the ways we teach and learn music are digital video and distance learning technologies. Distance learning may be defined as technology-mediated interaction of a community of learners who are separated by time and/or space. Distance education via computers takes advantage of the fusion of

computers and communications. Digital video includes DVD, interactive video, and streaming video (among others). I have chosen these technologies because of their potential to change the way music teachers and students interact.Digital video is widely available through Internet services such as YouTube. Video clips of almost any kind of music or any type of performer are on YouTube, opening a world of musical experience for music learners. For example, my senior music education students were assigned to create a lesson on Medieval and Renaissance music for a class of high school music appreciation students in a school with few resources. The lesson really came to life for the high school students when the music education students used YouTube to show video of Renaissance bands dressed in authentic costumes.

Interactive digital video is becoming increasingly important in synchronous distance learning. By using programs such as iChat, Trillian, iVisit, or SightSpeed, music students can take lessons from master teachers who may be located on the other side of the planet. Ensemble directors can afford to have renowned conductors clinic their bands, choirs, or orchestras in real time through interactive video.

Distance learning and digital video cannot replace the music teacher. Instead, the music teacher has a new set of resources to select from and to manage. The technology-savvy teacher will be a producer and educator; a master of motivation in new social environments; and a manager of interactions between teacher and student, among students, between learners and content, and between learners and technology. Teachers will be able to serve multiple locations and their skill in diagnosis/prescription of learning problems will be valued.

*Facilitating Deep Learning in the Music Classroom: Integrating an Interactive, Multimedia Resource for Real-Time Collaborative Musical Analysis

Scott Lipscomb, University of Minnesota

The purpose of this presentation–a demonstration-workshop–was multi-fold. First, the role of the teacher was discussed, along with the type of learning desired. Then, an interactive multimedia program developed by the author and available for free download to teachers was introduced. Finally, attendees were given a task to accomplish during a 20-minute workshop session, while the presenter acted as facilitator and technical support resource.

Background and foundation

During our own K-12 educational experiences–oh, so many years ago and in a very different era of teaching methods–many of us sat passively as our instructors (the "experts") communicated to us (the "uninformed") the information we "needed to know." Students were expected to diligently take notes and regurgitate appropriate responses when tested on our level of understanding. I refer to this approach as the "empty vessel" model, in which the student is represented as a passive vessel "to be filled" by the instructor. A number of research studies undertaken during the past two decades (Michaelsen, 1992; Michaelsen, 1994; Michaelsen, Black, & Fink, 1996; Michaelsen, Watson, Cragin, & Fink, 1982; Michaelsen, Watson, & Schraeder, 1985; Watson, Michaelsen, & Sharp, 1991) has revealed that active learning and group activities can significantly enhance both the level of understanding attained and the quality of the learning experience for the student. This kind of "deep learning" is distinguished by a high level of engagement, active learning environment, collaboration, and often group learning.

A systematic delineation of levels of learning was proposed by Benjamin Bloom (1956). In an effort to explicate the specific intentions of our educational system, he and his colleagues published a "taxonomy of educational objectives in the cognitive domain." According to Bloom, the taxonomy "is designed to be a classification of the student behaviors which represent the intended outcomes of the educational process" (p. 12). His taxonomy consists of six major classes and their associated subclasses (see Table 1). These classes are arranged in hierarchical order from simple to complex. The most basic level, *knowledge*, is exemplified by the simple recall of information (e.g. specific facts, universals, methods, etc.). According to Bloom, this process "involves little more than bringing to mind the appropriate material" (p. 201). At this level, the taxonomy refers only to the knowledge itself, not the utilization or application of this knowledge for an intended purpose.

The other levels in the taxonomy are distinguished from the first level as "intellectual abilities and skills." In other words, levels 2.00 to 6.20 require "organized modes of operation and generalized techniques for dealing with materials and problems" (Bloom, 1956, p. 204). Such abilities and skills involve the mental processes of organization and reorganization in order to accomplish an intended goal. *Comprehension* is the lowest level of intellectual ability and requires only that the student knows what is being communicated. With this fundamental understanding, the student is able to translate or rearrange the information without distorting its original meaning. In order to attain the next level, the student must be able to *apply* the appropriate abstraction (i.e. theory, principle, idea, or method) without being prompted. In order to correctly solve a problem of this nature, the student must be able to identify familiar elements in an initially unfamiliar context, using these elements as a guide in restructuring the problem within a familiar context (see Bloom, 1956, p. 121). *Analysis* implies the ability of a student to break down information into its constituent elements and to explicate the relationships between the various components. This process is divided into three parts: analysis of elements, analysis of

relationships, and analysis of organizational principles. In contrast to analysis, *synthesis* involves the process of putting together parts in order to form a whole, i.e. creating a novel pattern or structure. At this level, the student moves into the role of a "producer" (Jones, 1990, p. 268). The highest level within the cognitive domain, *evaluation*, requires that the student make both quantitative and qualitative judgments concerning the extent to which criteria are satisfied by certain materials or methods. Such evaluations are made on the basis of internal evidence (i.e. logical accuracy and consistency) or in terms of external criteria (i.e. a comparative process).

Table 1. Bloom's taxonomy of educational objectives in the cognitive domain.

1.00 KNOWLEDGE
- 1.10 Knowledge of specifics
  - 1.11 Knowledge of terminology
  - 1.12 Knowledge of specific facts
- 1.20 Knowledge of ways and means of dealing with specifics
  - 1.21 Knowledge of conventions
  - 1.22 Knowledge of trends and sequences
  - 1.23 Knowledge of classifications and categories
  - 1.24 Knowledge of criteria
- 1.25 Knowledge of methodology
- 1.30 Knowledge of the universals and abstractions in a field
  - 1.31 Knowledge of principles and generalizations
  - 1.32 Knowledge of theories and structures

2.00 COMPREHENSION
- 2.10 Translation
- 2.20 Interpretation
- 2.30 Extrapolation

3.00 APPLICATION

4.00 ANALYSIS
- 4.10 Analysis of elements
- 4.20 Analysis of relationships
- 4.30 Analysis of organizational principles

5.00 SYNTHESIS
- 5.10 Production of a unique communication
- 5.20 Production of a plan or proposed set of operations
- 5.30 Derivation of a set of abstract relations

6.00 EVALUATION
- 6.10 Judgments in terms of internal evidence
- 6.20 Judgments in terms of external criteria

The educational objectives most relevant to the present paper are application (3.00), analysis, (4.00 to 4.30), and synthesis (5.00 to 5.30), i.e., utilizing the students' higher-level skills. The software application described below is intended to facilitate student understanding of musical form. In this sense the student would be required to apply understanding of concepts learned in class to a new piece of music (application), divide the composition into meaningful units based on this knowledge (analysis), and–using the user-friendly software–create their own interactive listening guide for the piece (synthesis).

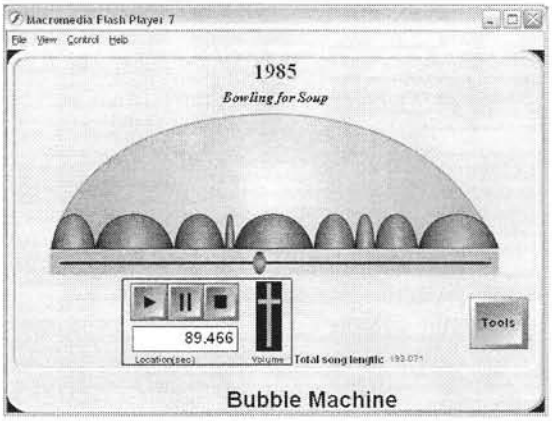


Figure 1. Screenshot of *BubbleMachine*.

The software

The software used to accomplish this task is called *BubbleMachine*, created by the author with the assistance of Marc Jacoby. This software is available to any teacher as a free download from http://lipscomb.umn.edu/bubblemachine/. The next part of the conference demonstration was intended to instruct attendees in the use of *BubbleMachine*, but providing step-by-step instructions for its use is beyond the scope of the present brief report. On the web site mentioned above, along with the *BubbleMachine* program, you will find an interactive online example and a detailed tutorial for using the program. Output from the program provides an interactive listening guide that allows point-and-click navigation to any location in the piece that has been identified as a sectional boundary (Figure 1). Click on any "bubble" representing a section of the composition and playback is initiated immediately from the beginning of that section. This makes the comparison of sections within a piece easy to accomplish–no matter how distant in time.

The workshop

At this point in the presentation, the presenter modeled a middle school general music classroom lesson plan. The purpose of this lesson was to introduce the concept of musical form, specifically the structure of a typical verse-chorus song form. After listening to a couple of musical examples to illustrate verse-chorus structure ("Night Fever" by the Bee Gees and "Spinning Wheel" by Blood, Sweat, & Tears), attendees (acting as students in the "classroom") were asked to distinguish between what constitutes a "verse" and a "chorus." Through this process, an appropriate definition of each term was determined collaboratively by the "students" under the guidance of the instructor, fulfilling Bloom's "Knowledge"-level educational objective. The instructor then introduced the concept of a "bridge" section (a contrasting musical section commonly found within verse-chorus forms) so that this aspect

would not prove confusing to "students" as the next phase of the lesson was initiated.

After completing the instructional component of the lesson, the class was "moved" to a "virtual computer lab" in which attendees were provided laptops in groups of four to five to accomplish the assigned task. Students were asked to select any one of nine MP3 sound files provided on the laptops. Using this song, each group was instructed to create a BubbleChart, using *BubbleMachine*, to identify sectional boundaries within the piece, fulfilling (at least) the following levels of Bloom's taxonomy: Application, Analysis, and Synthesis. Though most musical examples fit the verse-chorus form, there were others, for variety, given the diverse backgrounds of the attendees, that exemplified sonata form and through-composed forms. The remainder of the presentation was a hands-on workshop with the presenter acting as facilitator.

Conclusion

In the secondary-level general music classroom, use of a computer lab and *BubbleMachine* can provide an engaging, interactive means of involving students in the process of exploring and understanding musical sound. Please download the free software and communicate directly with the author about uses of the software and/or suggestions for improvement.

References

Bloom, B. S. (1956). Taxonomy of educational objectives: The classification of educational goals, Handbook I: Cognitive Domain. NY: David McKay Co.

Jones, T. (1990). Towards a typology of educational uses of hypermedia. In D. H. Norrie & H. W. Six (Eds.) *Lecture Notes in Computer Science. Proceedings of the 3rd International Conference on Computer Assisted Learning* (pp. 265-76). Hagen: FRG.

Michaelsen, L. K. (1992). Team learning: A comprehensive approach for harnessing the power of small groups in higher education. In D. H. Wulff & J. D. Nyquist (Eds.), *To improve the academy: Resources for faculty, instructional and organizational development*. Stillwater, OK: New Forums Press Co.

Michaelsen, L. K. (1994). Classroom organization and management: Making a case for the small-group option. In K. W. Prichard & R. M. Sawyer (Eds.), *Handbook of college teaching: Theory and applications*. Westport, CT: Greenwood Publishing Group, Inc.

Michaelsen, L. K., Black, R. H., & Fink, L. D. (1996). What every faculty developer needs to know about learning groups. In L. Richlin (Ed.), *To improve the academy: Resources for faculty, instructional and organizational development*. Stillwater, OK: New Forums Press Co.

Michaelsen, L. K., Watson, W. E., Cragin, J. P., & Fink, L. D. (1982). Team learning: A potential solution to the problems of large classes. *Exchange: The Organizational Behavior Teaching Journal*, *7*(1), 13-22.

Michaelsen, L. K., Watson, W. E., & Schraeder, C. B. (1985). Informative teaching: A practical approach for tutoring with groups. *The Organizational Behavior Teaching Review*, *9*(4), 18-33.

Watson, W. E., Michaelsen, L. K., & Sharp, W. (1991). Member competence, group interaction and group decision-making: A longitudinal study. *Journal of Applied Psychology*, *76*, 801-809.

Panel Discussion: The Current State and Future of Education and Music Education in Second Life

Tim Thomson (moderator), Palm Beach Atlantic University
David Schwartz, Music Academy Online
Beth Ritter-Guth, Lehigh-Carbon Community College
Joe Sanchez, University of Texas, Austin
Barbara Payne McLain, University of Hawaii, Manoa
Ian Bennett, Open University, United Kingdom

Second Life is an online virtual world operated by Linden Labs. The platform has seen rapid growth in the last couple of years, both in numbers of users and in richness of features. Second life presently offers some advantages over other multi-user virtual environments for music educators: It is an open system available from anywhere with an internet connection with clients for Windows, Macintosh, and Linux; it boasts a worldwide user base in the millions, with around 40,000 users online at any given time from a variety of cultures; it has gained wide acceptance in the education and music communities, and has hundreds of educators and musicians actively involved in moving parts of their professional lives into the virtual world; it is completely constructed by its inhabitants, and is already full of wonderful educational and inspiring simulations; it features easy-to-use tools; it offers a certain degree of security for students with age restrictions; and Linden Labs is committed to providing great services to education and communities at reduced prices.

The in-world panel was moderated by Joskie Despres (Tim Thompson, Palm Beach Atlantic University). North Lamar (Joe Sanchez, University of Texas, Austin, Sanchez Social Media) talked about his research on bringing student success in the SL environment and on providing collaborative environments for educators. Benton Wunderlich (David Schwartz, President, MusicAcademyOnline.com) introduced the Music Academy and the Music Academy Online website, and talked about his philosophy about music education and how the Music Academy is designed around it. Sage Duncan (Stacy Fox, composer, percussionist, filmmaker, Technical Director of Film Studies at the University of Kansas) demonstrated how performance in Second Life works and how virtual instruments can be used in music education. Desideria Stockton (Beth Ritter-Guth, Lehigh-Carbon Community College, DeSales University, Literature Alive! project, OpenSLEDware project)

introduced the many projects that she has led students in completing in second life, and also talked about the teen grid. The presentations were followed by questions for the panel from both the in-world and live audiences.

*Collaborative Music History and Performance Projects that Promote Multi-Layered Engagement and Deep Learning using Multi-User Virtual Environments (MUVEs)

Tim Thomson, Palm Beach Atlantic University

This presentation introduced the types of student learning-oriented projects using MUVEs like Second Life that we have begun to undertake in the music department at Palm Beach Atlantic University. Background concepts are covered such as defining MUVEs, differentiating Second Life from other non-game MUVEs such as Croquet, addressing some of the basic caveats of Second Life in particular, and the promise of such environments to education.

The PBA SL Music Project is a student driven pilot project using Second Life that is supported with university student research grants. The students work collaboratively in a group, researching a particular historical performance space, composer, or performer. The group would build the venue with time-specific detail, and originate or arrange a performance there that is either a recreation of an historical performance, or a representation of a typical performance for venue at the time. The build would remain for later use and as an educational tool for other music or humanities courses. The objectives are to determine the usefulness of the project (or parts of it) as a group research project in a music history class, to determine the usefulness of the completed project for other classes and uses, and to evaluate the impact on student learning as opposed to other research activities around the same content.

Some potential projects were reviewed, and some existing examples of historic builds and other resources in Second Life also were reviewed (Sistine Chapel, Globe Theatre, 15th-cent. Siena, basilicas such as Sant'Andrea, San Marco, San Francesco, etc.). Finally, a list of technical challenges was presented with strategies for approaching them, including land acquisition, building expertise, instruments, performance animations, audio issues, live vs. recorded performance, and simulator load.

*Multimedia Listening Guides and Digital Video

Kimberly C. Walls, Auburn University

In this workshop, participants used iMovie HD to create a multimedia listening guide combining still images and pre-recorded music. iMovie is digital video editing software for the Macintosh platform and is part of the iLife package. Operations in iMovie are similar to those in the free Windows-based software MovieMaker. The three basic steps to creating a digital movie is to (a) import (or capture) video footage and other media into the project file, (b) edit the media, and (c) export (or render or share) the edited movie as a digital video in the desired format.

The first step in planning a project is to gather and import the media that will be included in the project. Video clips can be captured live from either a digital camcorder connected to the computer via firewire or from a web cam, such as the Mac's built-in iSight camera. Sources for digital still images include digital photography (which is often organized in a photo gallery program such as iPhoto), scanned images, and computer generated graphics such as music notation or drawings. Music for video projects is available by ripping tracks from CDs, downloading music from sources such as iTunes, recording performances using a digital audio program such as Audacity or GarageBand, and composing music using programs such as GarageBand, Acid, Band-in-a-Box, notation programs, or sequencing programs. Narration may be added to a project by recording directly into iMovie, importing from a program such as Audacity, or adding narration to an existing movie in GarageBand. Digital video editing opens possibilities for a number of projects that are useful to music teachers: slide shows with music, karaoke, music videos, and narrated productions.

In this workshop, participants first created a new iMovie project in the DV format and saved it to the computer's desktop. An audio track was dragged from an audio CD into the iMovie timeline, importing the track at the beginning of the movie. Participants clicked the play button to preview the track and pressed Shift-Apple-M to place markers along the track where the images should change. Image files were imported by dragging them from a Finder window to the Clips Window in iMovie. Each image clip was dragged separately to the timeline and the photo settings for each image was set to the desired duration and visual effects. Clips that were too long were cropped. The extra audio was split into a separate section that was deleted. Titles were added and the final production was exported as a digital video.

*It's All About Mi, Mi, Mi! Using Pro Tools in the Choral Rehearsal

John Wilborn, Bremen High School and the University of West Georgia

When it comes to harnessing student motivation, if you can't beat 'em...then join 'em. At the pinnacle of ego-centricity and self-centered focus, high school students explode with enthusiasm when it's ALL ABOUT MI, MI, MI. Beginning choral students through moderately-advanced choral students in his small, 1A high school have discovered that singing is motivating especially when THEY are the center of attention. By audio recording their singing, students get almost giddy over the fact that they are the next Idol star—at least in the classroom. These students don't see what we're doing as a "test" of their performance. To them, it is the highlight of their day! "We get to record today." Who doesn't love a microphone? "Is this thing on?" "Are we recording yet?" "Everybody focus, we're recording now!" These phrases emanate frequently as students strive to perform to their potential during ProTools recording sessions. As an intro into the real world of music, students realize how "now" DAW's and audio recording truly are. Student work resides on personal CD's, Ipods and the web just minutes after their performance. They also learn how challenging performance and recording can be. The artistic-creative process is encountered first hand. . . in the classroom. True story. Auditions were held one afternoon at separate times. Student performances were presented via CD to administrators and other school staff to determine who the "special" musicians would be—just one week later! What a morale booster for music education and the power of music technology. Why? If a picture paints a thousand words, real-time audio paves the road to authentic, artistic excellence in music. ProTools LE systems, although not inexpensive, have become affordable for even small schools like our 1A school. Through creative use of this software, both students and teachers find the end result of rehearsals to be both rewarding and far superior to the "old days." ProTools power in action in the 21st century classroom constructs the foundation for Music Technology in the world where we live. It is well worth sharing the excitement and passion of teaching in a digital-audio based class with other professionals who dream of harnessing student interest and talent. We've found jewels in ProTools!