PROJECT LOVELACE: TEENAGE GIRLS AND TECHNOLOGY-BASED COMPOSITION

Mary Simoni, Ph.D.
Center for Performing Arts & Technology
msimoni@umich.edu

Betty Anne Younker, Ph.D.
Department of Music Education
younker@umich.edu

University of Michigan
School of Music, Theatre & Dance
1100 Baits Drive
Ann Arbor, MI
48109-2085
USA

ABSTRACT
This paper describes a research program that is a component of Project Lovelace – a project named in honor Ada Augusta, Countess of Lovelace (Simoni, 2003). The goal of Project Lovelace is to encourage equitable participation by males and females in music technology. This component of Project Lovelace was funded by the James A. and Faith Knight Foundation and the University of Michigan School of Music, Theatre and Dance through a grant titled "Technology-Based Musical Creativity: A Means to Improve Self-Esteem, Critical Thinking, and Cognitive Development in Teenage Girls." During the 2006-07 academic year, the project team assessed the learning needs of female only and mixed gender adolescent constituencies at a teen center and a public school in order to design, develop, and deliver learning modules that cultivate personal creativity, self-expression, and technological skills in music composition and performance. Curricula for non-credit and school-based programs, each consisting of five modules, were developed and made publicly available on a website.

1. INTRODUCTION
1.1 Purpose
The purpose of the grant program "Technology-Based Musical Creativity: A Means to Improve Self-Esteem, Critical Thinking, and Cognitive Development in Teenage Girls" was to design, develop, deliver and evaluate non-credit and credit learning modules in technology-based composition for adolescents. A key aspect of the research program was to investigate teenage girls' attitudes toward technology-based composition in both female only and mixed gender instructional settings. The non-credit curriculum was created in partnership with The Neutral Zone, a teen center located in Ann Arbor, Michigan. The credit curriculum was developed in collaboration with the Ypsilanti Public Schools located in Ypsilanti, Michigan. The research findings presented in this paper are focused on The Neutral Zone.

1.2 Literature Review
Research in gender issues in music technology draws from literature in adolescent girls' education, women and engineering, and music education. A growing body of research has uncovered a gloomy reality of life for many adolescent girls. Girls are often plagued with a notable drop in self-esteem that may be coupled with a pre-occupation with physical appearance (American Association of University Women Educational Foundation, 1992). During 2001, the National Center for Educational Statistics reported that women pursuing an engineering degree comprise 1.8% of the undergraduate student population in the United States – a percentage that has remained essentially unchanged since 1980 (National Center for Education, 2005). Another issue relevant to education is the decline in the number of students in performance-based music programs as teens progress through adolescence. Research has indicated that reasons for this decline include attitudes toward school music programs, friendship patterns, societal expectations, institutional structures, and teaching practices (O’Neill, 2002). In addition, negative attitudes about music programs evolve as a result of a mismatch between the needs of the students and the opportunities offered by the school music programs.

Males have dominated the field of music technology. A complex cascade of filters, some self-imposed, others imposed by society and quite often our schools, diminishes the number of women who pursue careers in music technology (Simoni, 1995). Effective educators must listen more closely to girls in order to mitigate the gender-technology divide (Pegley, 2007). Poised at the threshold of a new field, we are presented with a unique opportunity to address issues of gender equity. Music technology should not be plagued by a musicology of “compensatory history” (Solie, 1997), but instead be characterized by a culture of inclusion so that all voices may be heard.

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1 This research was funded in part by a grant from the James A. and Faith Knight Foundation with Institutional Review Board approval HUM00008703.
2 Project Lovelace URL: http://www.music.umich.edu/research/gender_tech/knightfoundation/lovelace/
2. CURRICULAR DEVELOPMENT

2.1 Program goals and Personnel
The research program's goals were 1) to assess the learning communities in The Neutral Zone and the Ypsilanti Public Schools to determine the most effective pedagogy to facilitate creative self-expression among female only and mixed gender classes that use music technology 2) in consultation with The Neutral Zone and the Ypsilanti Public Schools, design, develop, and deliver learning modules that foster creative expression through music technology 3) evaluate the effectiveness of the learning modules 4) revise the learning modules and disseminate them via the World-Wide Web (WWW) and 5) document the project outcomes and share these outcomes with relevant institutions and agencies as a means of promoting gender equity in music technology and other learning situations.

Program personnel included the music director of The Neutral Zone, a music teacher in the Ypsilanti Public Schools, two University of Michigan undergraduate students (one double majoring in clarinet performance and performing arts technology and the other double majoring in computer science and music education), and the two authors of this paper. Eleven girls aged fourteen to seventeen years from The Neutral Zone and fifteen boys and girls aged twelve to fourteen years from the Ypsilanti Public Schools participated in this research program. This paper recounts our findings from experiences with the girls from The Neutral Zone.

Program planning began with a succession of individual meetings with The Neutral Zone and the Ypsilanti Public Schools. The intent of these meetings was to understand the experiences and aspirations of the teachers and their students as well as learn about the learning environment and available technological resources. The outcome of these meetings established a curricular framework that guided decisions about curricular objectives and instructional delivery.

2.2 Facilities
In music technology, curriculum development is integrally tied to facilities. The facilities of The Neutral Zone included a Macintosh OS X lab equipped with Apple's Garage Band™ and Ableton Live™. This lab was not conducive to group instruction so four of the five classes were held at the University of Michigan Music Technology Lab.

The Ypsilanti Schools had an aging PC Windows 98 lab with no funds for software. As a result, the software to support instruction was limited to the public domain audio editing software Audacity. Technological hurdles at the Ypsilanti Public Schools impeded instructional delivery, so project personnel resorted to bringing in Macintosh laptops to work with the students.

2.3 Goals and Strategies
The goals and strategies of the research program provide a methodological framework within which to evaluate, collect and analyze data from the project participants.

Goal 1: In consultation with The Neutral Zone, design, develop, and deliver learning modules that foster creative expression through music technology. Our strategies and activities for this goal included 1) design and develop a minimum of five (5) training modules each of approximately 45 minutes in duration. The training modules consist of topics such as the fundamentals of sound, fundamentals of digital audio, compositional elements, contemporary music technology repertoire, time signatures, tempo, beat making, and elements of melody and harmony and 2) train University of Michigan students to effectively deliver instruction and lead students from The Neutral Zone through the learning modules in a way that spurs creative expression that leads to increased self-esteem.

Goal 2: Evaluate the effectiveness of the learning modules. Our strategies and activities for goal two included 1) conduct interviews with students, faculty, and staff of The Neutral Zone 2) stage at least two forums showcasing student works to stimulate discussion among students about their learning and how it informs their creativity 3) encourage students to discuss problem-solving strategies they use while composing and 4) distribute the girl's compositions.

Goal 3: Revise the learning modules and disseminate via Worldwide Web (WWW). Our strategies and activities for goal three included 1) create a website describing the project including goals and outcomes 2) incorporate feedback from students, faculty and staff and prepare learning modules for delivery via the WWW and 4) create a mechanism for internet-based feedback among a geographically diverse population to extend the project to rural and under-served populations.

Goal 4: Document the project outcomes and collect data while the students compose, and share these outcomes and analysis of data with relevant institutions and agencies as a means of examining best practices for engaging young females in technology-based composition. Our strategies and activities for goal four included 1) design and administer surveys and conduct interviews with students, faculty, and staff of the Ypsilanti Public Schools and The Neutral Zone 2) educate faculty and staff of the Ypsilanti Public Schools and The Neutral Zone regarding the creative potential of music technology for middle and high-school students and 3) in cooperation with the Ypsilanti Public Schools and The Neutral Zone, develop pedagogical philosophies and practices for curricular and co-curricular programs.

The researchers completed all project goals within the project time period. The research with The Neutral Zone had Institutional Review Board (IRB) approval, so dissemination of content for the Ypsilanti Public Schools is restricted to the curriculum which is available on the Project Lovelace website.

3. INSTRUCTIONAL DELIVERY
One of the reasons non-credit curricula are challenging is because it is difficult to ensure student attendance at all classes. As a result, it was difficult to build upon concepts and techniques from one class to the next. The project team devoted the beginning of most classes to
review of previous material and encouraged students to train their peers. Our intention was to create a learning environment founded on principles of community so that the students could continue to develop their skills after conclusion of our involvement.

The Neutral Zone hosted an informal kick-off dinner so project personnel could meet the students and tour their facilities. After the kick-off dinner, students commuted to four classes that were held at the University of Michigan. The first three of these four classes were female only with an emphasis on music composition using technology. The fourth class of mixed gender introduced technology-based performance using Ableton Live™. The fifth class was intended to be mixed gender and scheduled at The Neutral Zone did not occur due to lack of attendance. All of the females who participated in the research program had had prior vocal or instrumental musical training either in school-based programs. These females all attended a school in the Ann Arbor Public School District.

3.1 The Classes

The first class was devoted to learning about the basic elements of music: loudness, pitch, duration, and timbre. Students listened to a broad repertoire of electronic music that used ostinati and were asked to discuss their impressions of the music in relation to these basic elements of music. Instructional staff noted equal participation by all females in the class. After the students demonstrated an understanding of musical elements and were familiar with ostinato as a musical construct, the instructional staff introduced the girls to the Macintosh OS. In most cases, the students were familiar with the Macintosh OS but in some cases, instructional staff provided transitional training for those students familiar with Windows. Once the girls were comfortable with the operating system, instructional staff provided an overview of GarageBand™. Basic concepts that were presented included tracks, the metronome, and the Loop Browser. Students were encouraged to discuss the relationship between ostinato and the Loop Browser. The basic differences between MIDI and digital audio was introduced as exemplified by GarageBand™’s Software Instruments (MIDI) and Real Instruments (audio). Students were invited to create an original composition that demonstrated the compositional technique of ostinato by selecting MIDI loops from the Loop Browser and layering tracks. By the end of the class, students had created and saved an original composition. Project staff created a compilation compact disc (CD) of these compositions so the girl’s could listen to each other’s work repeatedly and share it with their family and friends. This CD proved to be a powerful motivator because it boosted the girl’s self esteem and piqued their curiosity about ways to create more complex works at the next class.

During the second class, the girls focused on learning about the compositional concepts of unity and variety as well as simple and complex. Students listened to a number of acoustic and electronic works and discussed which musical elements were used to create unity or variety and if they viewed the music as simple or complex. Pop music was included in the repertoire and students were introduced to song writing form in the context of unity and variety and simple or complex. In GarageBand™, students learned how to incorporate track automation, specifically track volume and panning. Volume automation was described as a means to shape musical phrases or balance the instruments within the song. Panning automation was described as a way to emulate the physical placement of instruments in an ensemble or a way to create a sonic effect depending on how the panning occurred in time. By this time, the girls were familiar with the compositional paradigm of GarageBand™ and some students began to experiment with features that had not been presented to the class, notably the Editor, Media Browser, and incorporating digital audio. Class time was devoted to hearing works in progress and the girls learned compositional strategies and software tips from each other as well as providing feedback and encouragement.

The third class presented use of Software Instruments and recording and editing of digital audio. The girls began to use their own voices in the composition with fascinating results. In some cases, the girls focused on traditional uses of the human voice such as the singing of lyrics or rap. In other cases, the girls were more experimental and after recording their voices, played with audio editing and effects. The use of effects provided another opportunity for the students to discuss the elements of music and compositional concepts in light of these new techniques. The instructional staff noted that the girls who opted to work in pairs were more inclined to experiment with the software than those students who opted to work alone. The researchers noticed that their peers viewed the girls who engaged in experimentation beyond class expectations as leaders. By the end of the third class, the girls had completed their second composition. Because this composition had less loop-based structures and incorporated new strategies for manipulating sound, many of the students felt the composition was incomplete but understood that the technology empowered their ability to communicate their ideas through music composition.

The fourth class was open to all youth of The Neutral Zone in the use of computers in live performance using Ableton Live™. This class was taught by a female undergraduate student to a class comprised of all males and one female in the same classroom as the previous three classes. The singular female in this class had attended all three previous classes. The age differential between the female instructor and the students ranged from five to seven years. The learning environment was unstructured and allowed for participation based on student initiative. The researchers noted a distinct change in the learning environment characterized by non-verbal communication notably eye contact and posture. The singular female student who had emerged as a leader in
the previous three classes participated very little in this class.

4. POST INSTRUCTION INTERVIEW

Following the classes, the project team hosted a pizza party at The Neutral Zone for the girls who participated in the program. After pizza, the research team engaged the girls in a videotaped interview of four of the girls. The purpose of this interview was to elicit the girls' attitudes on instructional design and delivery that may have affected self-esteem, critical thinking, and cognitive development. Additionally, the girls were asked to comment on their views on gender issues in music technology and school music programs. These interviews are available on the project website.

One of the girls, who we will call Ashleigh, remarked that she began experimenting with GarageBand™ at home after the first class "and just fooled around with it at my house and made some pretty sweet little songs." Ashleigh thought that the songs that she made during class "were just completely wrong because I was scared and kind of intimidated. I was pouring over what would sound good and not really trying anything." She suggested that she had imposed limitations on herself during the classes. When Ashleigh was asked about her involvement in school music programs, she remarked that she had practiced the flute but that she thought it was "not a good instrument to know how to play because it just seems really insignificant– flute-y and gross. It was a waste of my time and when I was ten, I gave it up." Ashleigh was motivated to continue learning an instrument and tried the guitar, but quit. She said, "I'm just not good with instruments that way."

Another student, who we will call Beth, enjoyed technology-based music composition and said, "I liked being able to use the equipment, and the lab was awesome. I'd never seen anything like that. I was really, really excited about being able to use the lab, and I guess I liked the songs I made." Beth had played trumpet in band and orchestra and sang in her school choir. Currently, Beth is in the jazz band and says she loves it "because we kind of run our own rehearsals in my own combo. We see the teacher maybe once a week. It's cool because we can kind of run our own classroom." Beth seems to really enjoy both improvisation and composition "because you can create your own thing instead of playing things that other people have written, maybe hundreds of years ago. You don't have to do anything, just be who you are." When Beth was asked about gender and music technology, she remarked that technology "could be a disadvantage for some females who are shy. It might discourage them from doing things that they want to."

The student we will call Christine expected the technology-based composition classes to be very structured. "Use this, use that," she said. To Christine's surprise, "there was so much freedom, and I really liked it. (The teachers) talked a lot about tone and sound and the aspects of music and stuff, and that was cool." Christine would have liked more structure in the composition classes, specifically in how to use the technology. She said, "I would have liked you to say, 'okay, this is Garage Band, and this is how you operate it distinctly,' and make sure everybody was on the same page." Christine said she learned in the classes to "never limit yourself and always be accepting of other types of (musical) genres and styles." Christine has been involved in school choral programs for a very long time. She branched out from what she called "the very traditional school choir" to gospel choir. Her complaint with the traditional choir program was that they don't perform modern music or "they don't sing it right." Christine feels that in gospel choir, "there's so much life, it's hyper. I didn't want to go to a class (choir) where I wanted to fall asleep. Oh my God, music time, I want to shoot myself. I want to be excited (about music) and look forward to seventh hour, which is gospel choir."

The girl who emerged as a natural leader during the technology-based composition classes was Debbie. Debbie is the student who initiated working in a group with Beth to create music. She described this group as a band, and they released their music on MySpace. When Debbie talked about her experience in school music programs, she said, "I think my (band) teacher was kind of a meanie. Actually in both my programs, my teachers were kind of mean." Aside from the teachers, Debbie felt that "band is a really awesome way to meet people and become comfortable with yourself because you have to perform in front of people." Debbie said that she "gets bored with instruments really easily. I learn them to a standard level. Then I get bored and want to move on." Debbie wondered aloud about school music programs and electronic music and remarked that there may be a time in the future when people will not play instruments. She said, "It's totally sad, but it's possible. Everybody would resort to using GarageBand™. Debbie noted, "It's completely impossible to capture the passion that goes into playing an instrument using a computer." Even still, she indicated that people will probably be less motivated to study traditional instruments "because it's all in my GarageBand." The researchers asked Debbie about her views on gender issues in music technology and she noted that "everybody that you listen to is male and that everybody that you see on TV who performs on shows and commercials (are) almost all guys. The only female artists I grew up with were Janis Joplin and Ella Fitzgerald: the classics. When you hear people talk about bands, they (talk about) the guy bands." She noted that the big bands "like Led Zeppelin, the Rolling Stones, and Pink Floyd, are all guys." Debbie wondered if girls are "bred to believe that the only people who can succeed in the music industry are male." Debbie asserted that females can succeed (in the music industry), but that girls aren't taught that." She also went on to say, "Society preaches to women to achieve something different. Turn of the century women are getting good jobs, having kids,
and supporting families. When you think of a successful woman, most people think she’s got a job, she’s got kids, and she’s married.” Implicit in her remarks is that society views male success differently. Debbie felt that the music industry could change if there were more music programs geared toward women with classes directed towards their needs. She recalled when she took a music theory class at her school that introduced GarageBand™, she was the only girl in the class. She recounted the experience saying, “it was weird, I was like, whoa, I’m the only girl here.” But when she talked about her capacity to function as a member of the class, she did not see a gender difference because she felt comfortable to express herself just like her male peers. The researchers note that Debbie is the student whose participation declined noticeably when comparing the all female classes with the mixed gender class where she was the only female.

5. BEST PRACTICES

By observing and listening to the girls, we derived a list of best practices that could encourage participation in music programs and technology-based composition and performance. These best practices include:

1. Keep the girls motivated by making their works heard by and shared with family, friends, and others.

2. Participation by adolescent girls in music technology seems more likely in exclusively female learning environments.

3. Make repertoire selections that are aligned with the interests of the students.

4. Vary teaching methodologies to include both structured and unstructured learning activities to accommodate different learning styles and student expectations.

5. Consider encouraging students to work in groups to promote experimentation and growth.

6. Showcase the accomplishments of both men and women so that girls have a variety of role models to choose from.

7. Pay careful attention to both non-verbal and verbal communication in the classroom to ensure an optimal learning environment.

8. Listen to the students’ views of their own behaviour in relation to the behaviour of others. As appropriate, challenge these views with an impartial assessment. Not all students view inconsistencies or incongruities in their behaviour so discussing differences advances self-awareness and tolerance.

9. Consider providing both female only and mixed gender learning environments so that students can understand and develop their own gender identity in the context of various learning environments.

10. Be aware that the gender of the instructor may have an effect on the learning environment.

These best practices can easily be applied to a variety of learning environments. The goal of the best practices is to keep students motivated and actively participating in their own education by celebrating their achievements and minimizing any possible negative influences.

6. CONCLUSIONS

It was much easier to introduce new curricula at The Neutral Zone than at the Ypsilanti Public Schools because The Neutral Zone programs are intended to be flexible and immediately responsive to the needs and interests of their constituency. Issues of student discipline and classroom management mired by rigorous local and national standards overshadowed the curriculum of the Ypsilanti Schools. The fluid nature of educational programs at The Neutral Zone made it difficult to predict which students might attend any particular class making it challenging to deliver a curriculum that increased in complexity over multiple classes. Although the project team was reasonably assured that students would attend class at the Ypsilanti Public Schools, the learning environment was fraught with issues of student discipline and aging technology that made it difficult to deliver basic instruction much less cultivate intrinsic motivation to be creative with technology.

There is much work to be done to level the playing field for females in music technology. The authors intend to continue their work by reaching out to other institutions and promoting the use of web-based instruction, particularly for those girls who are not allied with an institution that offers instruction in music technology. If educators consider the best practices learned through this research program, the field holds the promise to break free from a compensatory history fraught with gender bias.

7. REFERENCES


