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For a version with included video see: http://www.mtnlake.net/mtnlake/Mountain_Lake_Colloquium/Mountain_Lake_Reader.html

REFLECTING on Changes in Practice through Integrating Participatory Culture in Our Classrooms

Thiessen and Barrett (2002) speak to the importance of music teacher education programs supporting, partnering with, and learning from reform minded educators as they "renew their practice by engaging in cycles of inquiry, action, and reflection" (p. 776). This article is the result of such a partnership and ongoing inquiry, action, and reflection. After situating ourselves, we, a music teacher educator (Evan) and two practicing music educators (Abbie and Catherine), reflect on how our classrooms and perspectives on general music have evolved in the context of digital and participatory cultures. The following two foci guide our exploration of digital and participatory cultures' transformative potential in music education: 1) transformation in terms of the structure(s) of the music classroom and program and 2) transformation in terms of our perspectives on music teaching and learning.

Considering transformation and evolution or possible futures of music teaching and learning are recurring themes in The Mountain Lake Colloquia and *Mountain Lake Reader*. To reflect on potential transformation of secondary music education we look at how our own teaching and thinking were transformed through applying skills, principles, and practices related to digital culture and participatory culture. Participatory culture is characterized by "relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing creations, and some type of informal mentorship whereby experienced participants pass along knowledge to novices" (Jenkins, Purushotma, Weigel, Clinton, & Robison, 2009, p. xi). In a participatory culture, members also believe their contributions matter and feel some degree of social connection with one another (Jenkins et al., 2009). While participatory culture can occur in varied contexts in school music programs, we look specifically at how participatory culture might be infused with digital culture. Digital culture in this case refers to leveraging affordances of digital media and technology in ways that align with contemporary society through a range of cultural forms (Miller, 2011). We suggest that understanding the principles, practices, and ways of knowing at play in digital and participatory culture offer a way forward for updating secondary general music classrooms and programs (Tobias, 2013).

Situating Ourselves

"I'm sorry Dr. T., technology and I, we just don't get along." – Abbie, 2010

During the 2009-2010 school year Catherine and Abbie were enrolled in Evan's Digital and Participatory Culture in Music Education course at Arizona State University where we collaboratively considered ways that new technologies and media play a role in how people engage with music in contemporary society. As Abbie integrated aspects of digital and participatory culture in her own music class she witnessed a level of students'

excitement and creativity that had not surfaced in her prior classes.

Abbie:

> *When I enrolled in the Digital and Participatory Culture in Music course in the spring semester of 2010, I began reevaluating my general openness to change, especially in relation to how my students engage in music. At the beginning of the course, I frequently joked that technology and I "fought" quite a bit. I was not a "techie" and a one-semester course was not going to change my perspective on technology. Upon reflection, I was wrong and that perspective has clearly changed. Experiencing and working through projects and conceptual frameworks in the course inspired me to implement one small project: students remixing a classical music piece they studied in class. Despite encountering some challenges and obstacles while implementing the original project in my teaching, I could see an immediate value of incorporating music technology and digital culture in my classroom. Before long, this initial project began to grow into something greater.*

After Abbie began experimenting with technology in her teaching she and Evan applied for and won a ten-thousand dollar grant that funded the purchase of a portable digital music lab consisting of five MacBook laptops, MIDI keyboards, and recording devices. As part of the grant project, Catherine, who was a graduate student at the time, assisted in facilitating students' use of technology. Abbie's integration of technology in her teaching, which began with a small group of students using the school's mobile laptop lab, evolved into nearly two-hundred students, grades five through eight, engaging musically with the digital music lab.

Throughout the year we collectively planned and reflected on how principles and skills related to digital and participatory culture were supporting and impacting Abbie's teaching along with her students' learning and musicianship. While Catherine supported Abbie in the classroom, Evan supported her work from a distance. Additionally, doctoral students at Arizona State University played a critical role developing resources and infrastructure to support Abbie's and her students' use of technology.[1] At the time of writing this article Abbie continues to integrate aspects of digital and participatory culture in her program and Catherine is developing her own approach to applying these aspects of contemporary culture in her K-6 general music program. Evan continues working with students at ASU and inservice educators to develop related projects and pedagogies. In this article we draw upon our experiences with and reflection on the aforementioned collaborative pilot project that took place in Abbie's music program throughout the 2010-2011 school year, Abbie's and Catherine's teaching since the pilot project, and our collaborative efforts in transforming our practice in the context of digital and participatory culture.

Digital and Participatory Culture in Music Classrooms

The idea that people interact and engage with media beyond the role of passive consumers is neither new nor specific to contemporary technology. However, digital media and technology support broadening ways for people to engage with media. While in some cases one might interact with media individually, technology such as the Internet also allows for people to collaborate, share their creative work, and discuss their perspectives across physical locations. It is common for people to rework or modify existing music in ways that appeal to their aesthetic sensibilities. Others might enact multiple musical roles such as listening to and discussing music on a website, creating and sharing playlists, or teaching others how to perform music by recording and posting video tutorials. Addressing the types of creative engagement with media that occur in contemporary society necessitates understanding the skills

1 We specifically wish to thank Elizabeth Bucura, Lauren Kapalka Richerme, Emmett O'Leary, and Jared O'Leary for their support in assisting practicing teachers to integrate technology in their classrooms.

involved along with related principles to inform or guide practice.

Jenkins, Purushotma, Clinton, Weigel, and Robison (2009) identify a set of skills they deem necessary for people to participate and engage with media in contemporary culture. These media skills might also be seen as principles to guide music teaching and learning. The following key skills and principles emerged as most relevant to the learning, doing, and teaching in Abbie's program from 2010-2011: 1) appropriation; 2) performance; 3) collective intelligence; and 4) distributed cognition. While these skills and related principles have roots and connections to other fields ranging from law to the learning sciences, when viewed from the perspective of participatory culture they offer music educators a framework for supporting students' creative musicianship and musical learning.

Appropriation

Appropriation, in the context of participatory culture, refers to the engagement with and use of existing media and content to create something new. While one can be skilled in particular types of appropriation, the notion that one may create new music from existing music can serve as a principle to inform or guide practice. Abbie and Catherine helped students engage in appropriation by explaining that they could start with an existing sound, song, or GarageBand loop and then create something new from the original content. Technology and digital media facilitated students' ability to change, extract, and manipulate audio from existing content whether in the context of isolating a single pitch from a musical theme, a particular word from a spoken phrase, or the drum track of an existing recording. As Jenkins et al. articulate (2009), "appropriation enters education when learners are encouraged to dissect, transform, or remix existing cultural materials" (p. 59). Catherine likened appropriation to a form of "musical surgery."

While the skills and understanding students developed through appropriating music forwarded their musicianship, the principle of viewing the creation of new music from existing music as a legitimate aspect of musical experience and learning informed curriculum and pedagogy. This meant moving beyond a focus on skills related to musical appropriation to encompass broader understandings of this type of musical engagement. Along with incorporating these ways of interacting with media and music, we sought to foster students' musical thinking and help them view their musical engagement in class within a larger context by facilitating related dialogue. For instance, when a student articulated a desire to remix a peer's song, he was encouraged to converse with the original composer to learn more about his peer's musical choices and associated musical meaning to inform his own musical decisions.

In a related project, sixth grade general music students worked in small groups to compose an aural painting of a film scene. They were then tasked with altering, critiquing, and "improving" a peer group's music. During this process the students were expected to analyze their peers' music critically to make informed decisions about what they would appropriate and their approach to doing so. Students in Abbie's seventh grade choir engaged in appropriation by participating in an online remix competition through indabamusic.com by manipulating and reorganizing song stems. Each recorded track such as an isolated high hat or vocal part provided students with a starting point to create their remix. In the spirit of appropriation the students used their voices to rework vocal parts they wished to improve. Many retained the original lyrics of the song but used their voices and music software to alter the pitch content or timbre of vocal parts. Through their remixing, students listened to and analyzed the original music critically; they became aware of the tone, timbre, and pitch of their own voices and how those qualities connected to and interacted with other musicians' choices and ideas.

By providing students opportunities to appropriate other's music by leveraging technology, reflect on their work, and think critically, the mu-

sic classroom connected directly to contemporary society. The ethic of participatory culture fostered in the classroom when combined with digital culture enabled students to engage in remixing as a form of musicianship, musical thinking, and learning.

Performance

In the context of participatory culture, the skill and principle of performance encompasses playing music but more broadly addresses "when students are asked to adopt fictive identities and think through scenarios from those characters' perspective" (Jenkins et al., 2009, p. 53). Given that the work of Jenkins et al. (2009) originates from media studies, this notion of performance has a different connotation than how the term is typically used by music educators. When applying the principle of performance as described by Jenkins et al. in the context of music education, students might take on multiple musical identities such as enacting the roles of composers, remixers, and songwriters, among other ways of being musical. When students perform particular musical roles they may assume associated identities, practices, and ways of thinking. Classrooms informed by this principle would include opportunities for students to engage as musicians embodying a range of musical roles. This occurred in Abbie's classroom when students worked in collaborative groups (see video below).

Though students were never assigned specific roles to perform, Abbie encouraged them to try out multiple ways of engaging in music. As students discovered and identified idiosyncratic musical strengths and interests, they developed and took on particular roles in their groups. For instance, though some students articulated feeling weak as lyricists when working on a requirement to write lyrics for an original song, at other points they flourished by adopting alternative roles in the creative process such as performing or mixing the music, altering and manipulating vocal parts performed by other group members, or developing their "band's" persona as a promoter or manager. Though students initially adopted roles with which they felt most comfortable, they explored less familiar roles over time. Through enacting particular musical roles each student played an integral part in realizing their group's creations.

Given opportunities to perform as musicians in varied ways besides singing or playing instruments, students developed different types of musical expertise. While some became experts at setting up the optimal situation for recording others were recognized for their ability to choose existing loops that blended well. By having opportunities to perform in multiple ways through different musical roles, students identified how they wished to develop their musicianship and progressed together albeit along divergent pathways.

Video of Abbie discussing students' varied musical roles in their group project

Collective Intelligence

Levy (1997) argues that collective intelligence "is a form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills" (p. 13). According to Levy, though collective intelligence is inherently collaborative in nature its "basis and goal...is the mutual recognition and enrichment of individuals" (p. 13). Such a perspective acknowledges that "no one knows everything, everyone knows something, all knowledge resides in humanity" (pp. 13-14). Jenkins et al. (2009) build on the notion of collective intelligence to describe knowledge communities in which groups collaborate to solve problems that would be difficult or impossible if attempted individually. Applying skills related to collective intelligence involve students and educators identifying how they, as individuals, might contribute to collaborative initiatives to solve problems or develop understanding. For instance, in a situation where a group of musicians are experiencing difficulty recording a vocal part, one person might research information regarding software, another person might focus on learning about how the microphone is connected to the computer, while a third collaborator determines if additional equipment is needed. While each musician is developing understanding specific to a particular aspect of the recording process, their collective and combined efforts can assist the group to move forward in ways that might be difficult for an individual.

Classrooms operating on a principle of collective intelligence include opportunities for students, educators, and knowledgeable others to collaborate on solving problems or developing knowledge and understanding. This means a shift from the educator as the sole source of information to an ethic in which a learning community acts collectively to broaden and deepen their understanding and progress. In Abbie's classroom, the combination of using new technology, learning how to use the resources at hand, and challenges in balancing full-group instruction with answering individual's questions called for collaborative efforts of students to learn together.

While integrating technology added excitement and vitality to Abbie's music program, she was quickly overwhelmed by the number of students who needed assistance using technology and in enacting forms of musicianship that were new to the classroom. Prior to adjusting her role as a music educator, Abbie and her students viewed her as the only "expert" in the classroom and sole source of assistance. The expanded opportunities for students to work with technology and experiment with new ways of being in Abbie's classroom necessitated fostering collective intelligence and a knowledge community to scaffold ongoing progress. Abbie's decision to embrace and leverage students' and her own collective intelligence supported students' collaborative work and growth as they engaged with music in new ways.

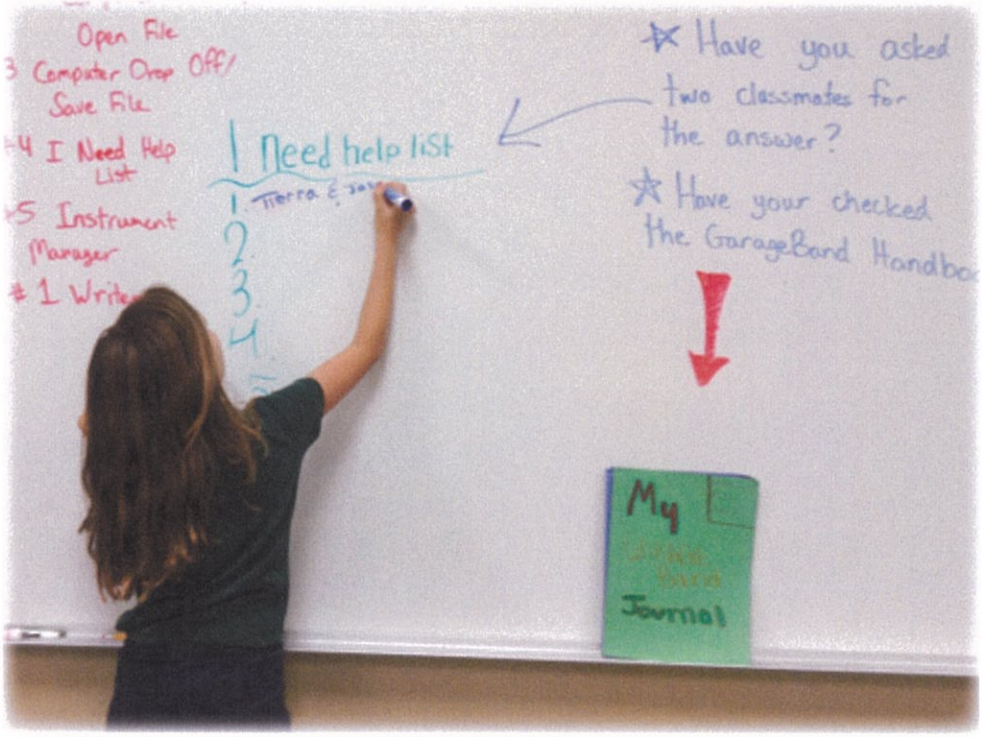
Distributed Cognition

Supporting the type of classroom environment characterized above required developing related infrastructure such as devising mechanisms for students to identify, discover, record, and share knowledge and understanding. Jenkins et al. (2009) argue that "students need to know how to think with and through their tools as much as they need to record information in their heads" (p. 66). This ability to use tools and leverage the assistance of others can be observed when students engage in distributed cognition. The concept of distributed cognition acknowledges that cognition occurs beyond an individual's brain as a part of a system in which one engages with artifacts and others (Flor & Hutchins, 1991; Hollan, Hutchins, & Kirsh, 2000; Nardi, 1996). Whereas collective intelligence explains how students can collaborate in the "social production of knowledge" (Jenkins et al. 2009, p. 68) by "pool[ing] knowledge and compar[ing] notes with others towards a common goal (p. 71), distributed cognition speaks more specifically to the ways that students leverage resources and "think with and through their tools" (p. 66) to forward their work and understanding.

When students make use of their peers' collective intelligence and resources such as laptops with Internet access that allow them to search for information or books that contain needed information, they are engaging in distributed cognition. As Jenkins et al., (2009) explain "distributed cognition is not simply about technologies; it is also about tapping social institutions and practices or remote experts whose knowledge may be useful in solving a particular problem" (p. 67). Classrooms that operate on a principle of distributed cognition provide opportunities for students to solve problems individually and collectively by leveraging resources to forward their progress and thinking.

To assist students in seeing themselves and their peers as capable of solving problems that arose, Abbie instituted a structure and system she called the "I Need Help List." The I Need Help List was a white board designated for students to record their names in an organized manner when requesting assistance. However, before adding one's name to the list students were required to speak with two peers and identify if either student could assist with the issue at hand. As the year progressed and students discovered the knowledge and understanding among their peers, their use of the I Need Help List decreased. By applying distributed cognition students leveraged their collective intelligence.

Along with forwarding students' work, this process freed Abbie to assist students with issues that were not yet addressed by students' collaborative efforts to solve problems and develop their understanding. The resources developed and used in this process of distributed cognition resulted in Abbie and her students spending less time focusing on troubleshooting technical issues and more time musicking or reflecting on their practice. The social engagement around a particular tool, in this case a white board, transformed how students developed and shared musical understanding.



A Student Using the I Need Help List

A B C D E F G H I

A Add Track

- Choose your instrument (click "Real Instrument" to use your computer's microphone)
- Click "Create" in the bottom right

B Edit Audio Region

- This will allow you to see a large version of any one track
- Once you see the large version, you can cut music by highlighting a given section and then clicking the "delete" key

C Record Button

- Click this button to record with the microphone or Midi instruments

D Play

- This button will play your song

E Cycle/Loop Song

- The yellow bar shows what part of your song will loop
- You can shorten or lengthen the yellow bar to loop more or less of your song
- Click on the arrow to turn off the loop (if the arrows are gray, your song will not loop)

F Volume

- This button controls the overall volume of your song

A page from the GarageBand Handbook

When Abbie removed herself as students' focal point for obtaining information, their ability to engage in distributed cognition and leverage technology contributed to their success in exploring, learning, and realizing music. Though Abbie shifted students' foci on obtaining answers from herself to each other and available resources, she did not abdicate her role as an educator. Abbie put structures and processes into place to facilitate and support students' ability to ask questions, seek answers, and construct understanding through distributed cognition.

Combining Collective Intelligence and Distributed Cognition

By combining distributed cognition with collective intelligence Abbie and her students were able to move forward in their work in ways that would have been difficult had they worked solely as individuals on their projects. In addition to drawing on the skills and knowledge of each other, Abbie, and Catherine, students drew upon their own experiences outside of school, tools with which they engaged in the classroom, and additional assistance from others.

Students' questions were recorded on the classroom I Need Help List and then sent to a doctoral student who would research the issues at hand and provide pertinent information and resources in a Wiki or editable hyperlinked website. The most common questions and answers were then documented and developed into a "GarageBand Handbook." Students could then refer to the GarageBand Handbook and each other as additional questions arose while working on their projects. This approach reduced the redundancy of individual students asking Abbie for assistance and amount of time that may have otherwise been spent on researching answers individually. As students acclimated to this style of learning, Abbie shifted some of the research responsibilities and resource development to the students. In this way, students' collective intelligence was enabled, facilitated, and developed through distributed cognition.

Abbie:

> *I had to change my role in the classroom and create an environment of collaboration and peer support. Through this collaborative environment, my students and I developed and applied our new skills of distributed cognition and collective intelligence. Whether students had questions regarding computer software or a musical decision that needed a second opinion, I encouraged them to look to other sources of knowledge besides the one instructor in the classroom. Over time, students realized that the larger and more distributed knowledge base (from their peers and resources) was more helpful and efficient than directing all questions towards one source (the instructor). The skills students developed through this process continue to be applied regularly as they work together to solve problems that occur within the composition setting.*

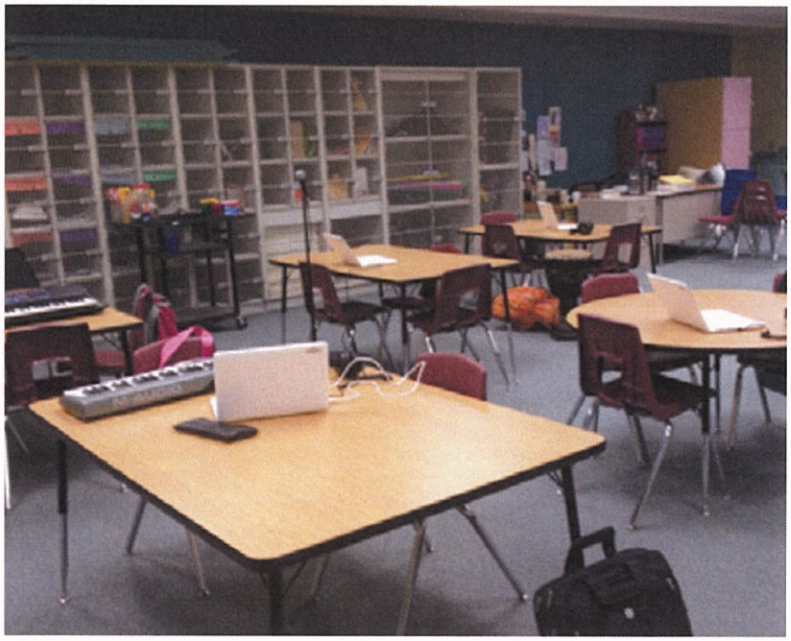
Transforming Teaching, Learning, and the Classroom

Abbie's integration of collective intelligence and distributed cognition grew out of her recognition that including technology to support new ways of engaging with music required her to restructure her room to facilitate small group collaboration. Abbie identified a need to transform how she and her students engaged as a class in order to address students' range of knowledge and adapt to an approach where she asked more questions and facilitated problem solving.

As students' interaction and collaboration increased once the classroom was restructured, they began identifying how individuals could contribute to projects and tasks. Students began learning about one another in order to learn from one another. Through engaging in participatory culture and digital culture, Abbie and her students had transformed their classroom into a learning community. Students' practice of collective intelligence mediated through distributed cognition was critical to this learning community.

With Catherine's assistance Abbie worked to transform the types of musical engagement and learning that took place in her classroom. They discovered, however, that the physical and curricular structures of music programs are not necessarily conducive to the types of resources and pedagogies that connect most closely with digital and participatory culture. Through opening her classroom to new ways of teaching and learning, Abbie realized that applying digital and participatory culture in the context of music education requires examining how existing structures shape what occurs in the classroom. This includes the classroom's physical layout. To allow for a more organic collaborative learning space, individual desks were removed to make way for six large tables around which students could work in groups. Groups were formed collaboratively among students with teacher feedback.

Abbie's classroom set up prior to adjusting for collaborative work



Abbie's classroom set up after adjusting for collaborative work

While the room's structure was modified from an individual-oriented space to one where students sat and learned together, the ongoing transformation extended beyond spatial change. As Abbie's perspective toward teaching evolved, her students increasingly shifted their focus of relying on their teacher for guidance and knowledge to interacting and collaborating with each other to forward their work. By physically modifying the classroom environment Abbie was able to restructure how she thought about music teaching and learning, which translated into transforming her practice and in turn her students' engagement and learning.

While integrating technology in the classroom can greatly benefit students and educators, the tools are not necessarily transformative in and of themselves. Furthermore, simply adding technology to the classroom does not necessarily constitute embracing digital culture. For instance, Abbie could have included the use of music soft-

ware without changing her classroom structure, culture, or pedagogy. Understanding digital and participatory culture can inform one's considerations of the resources and pedagogies that are most conducive for students' long-term musical engagement. Knowing the differences between a remix and mashup (appropriation), along with the types of software and hardware that afford students access to corresponding musical practices and ways of being musical through these media (performance) is critical for assisting young people develop the skills, understandings, and dispositions to engage in contemporary digital and participatory cultures.

Blurring Boundaries

Principles and skills such as appropriation, performance, collective intelligence, and distributed cognition can occur simultaneously, particularly when one creates a classroom environment where students have opportunities to work collaboratively using technology to mediate their musical experience. Students in such classrooms might draw upon aspects of digital and participatory culture simultaneously. For example, while collaborating to solve musical problems in the process of creating an original song, one or two students may become the sound engineers, setting up equipment and consulting with the GarageBand Handbook as needed, an example of distributed cognition. A vocalist with a particular skill set from another group may be recruited to add a vocal track and attain a desired sound for the song, an example of collective intelligence. As students create, perform, and record their song from the perspectives of performers, songwriters, sound engineers, lyricists, or producers, they perform musical roles. Over the span of a year or years in a program, students might engage in multiple projects with opportunities to perform in different musical roles assuming a range of musical identities.

As students worked on projects in Abbie's classroom they often moved between groups to solicit feedback or request that peers contribute to their projects. This fluidity led to collaboration

Students discussing the relationship between their music and a film scene

among groups and added to the class's sense of community. The changes in Abbie's classroom also facilitated exciting collaborations between younger and older students outside of class time. For instance, during an after school music club a group of fifth grade general music students worked on creating a loop-based composition as eighth grade students on the other side of the room practiced a song on guitar and drums. After the fifth grade students recognized that the guitarist's chords fit in the key of their loop composition, a cross-generational project ensued with fifth and eighth grade students collaborating on a new song by recording live guitar and drum tracks over the loop-based composition. They realized music collectively that would not have occurred through individual efforts.

The fluidity and range of ways that people can interact with media along with the benefits of incorporating digital and participatory culture provide a rationale for blurring boundaries between singular musical roles or curricular offerings that are traditionally dichotomized in school music programs. If secondary general music and secondary music education as a whole are to progress, we might look to those who are in the process of making positive change and transforming their teaching.

Transforming Perspectives and Practices

In the spirit of reflexivity, considering changing perspectives, and evolving practices, we now reflect on how our own perspectives toward teaching were transformed through the integration of digital and participatory culture.

Abbie:

The initial goal of my project was to integrate technology to assist students in their composing. Sixth grade general music students and seventh grade chorus members would use programs like Audacity and GarageBand to compose original works or critique their peers' work digitally. Over a three-year span the number of students using technology increased and their music and work diversified greatly. As the project focus and integration of technology expanded, I began to see the guiding principles of digital and participatory emerge in my classroom. The greatest shift in the classroom occurred not from what we were doing but rather our thinking and being.

Having assisted in Abbie's classroom, Catherine sought to build upon her experiences in her own K-6 general music classroom. However, Catherine did not have access to the technology or resources that played such an important role in mediating students' experiences in Abbie's program.

Catherine:

During my first year of teaching K-6 elementary general music I had the opportunity to reflect on how my participation in the aforementioned project impacted my perspectives on music education. Prior to accepting my current position, I was interested in teaching orchestra and general music classes in a way that would "blur the boundaries" between the two programs as well as simulate the ways that students informally create and interact with music. Once I started my first year of teaching, however, I shifted my focus to re-envision the structure of my classroom environment. I specifically tried to create a "participatory culture" within my classroom. I was most interested in re-structuring how students sought information and assistance in the classroom. Just as we did in Abbie's classroom, I worked to shift from an exclusive focus on me, the teacher, as the ultimate source of information and assistance, to a more distributed approach where students could rely on each other and available resources. For guidance, I looked to my experiences working on the pilot project with Abbie, specifically the use of a class WIKI and 'I Need Help' list. I used a system similar to the "I Need Help" list, which encouraged students to seek assistance from one another during group work.

Similar to Abbie's experience, Catherine's process of transforming her classroom took time and began with a range of cultural and pedagogical changes needed to facilitate the type of learning and being she envisioned for her students.

Catherine:

I am still working towards my goal of creating a music education version of "participatory culture" due to the prolonged duration needed to develop my students' interpersonal skills. In order to create an environment with "strong support for creating and sharing creations" (Jenkins, et al., 2009, p. 5), I found that I first needed to provide frequent opportunities for students to practice communicating and cooperating as part of a collaborative group. Students also needed to learn strategies for giving and receiving constructive feedback. My first year was spent developing my students' interpersonal skills and building a safe learning environment where they could feel comfortable enough with their peers and me to take risks.

For both Abbie and Catherine, new types of music projects were the impetus for larger transformation in their programs, however, deep cultural changes were necessary in terms of what it meant to be a student, learner, and musician. When guided by principles and skills of appropriation, performance, collective intelligence, and distributed cognition the integration of technology can assist in this process and contribute to students' musicianship and learning. Abbie's access to technology and Catherine's lack of access to resources in their classrooms speak to the potential relationships between digital culture, participatory culture, and musical experiences.

Abbie:

Now, in the third year of the project, students' problem solving is almost completely digitally mediated. Students access a class website to discuss issues that arise. Whereas at first the use of technology to support students' progress was teacher facilitated, the majority of students now embrace digital culture and the use of technology to interact with and support one another.

As Abbie became more comfortable with how her pedagogy and students' learning evolved, her classroom's transformation expanded beyond ways of accessing information to include collective and collaborative decision making of her curriculum.

Abbie:

In the initial stages of this project, I created the assignments and scenarios that would lead to using the new literacies and skills indicative of digital and participatory culture. As the projects progressed and evolved, so too did my perspective and mindset in terms of how students might develop these literacies and skills. While I had created an environment where I was no longer the sole expert in terms of solving students' problems, I still viewed myself as the sole expert in regards to planning. Recently, I have opened my mind to how students wish to engage with music when planning projects.

As Abbie allowed participatory culture and digital culture to flourish in her classroom she began noticing how students' musical interests and ways of being musical were evolving in ways similar to how people engage with technology and digital media in society.

Abbie:

Students do not want to perform for their peers in the school cafeteria; they want to appropriate the music they hear on the radio and post it on Soundcloud.com. Students do not want written comments from a judge at a festival; they want to post their performances on YouTube to see how many views and comments they can receive. As I continue to transform my classroom, I hope to incorporate students' natural interest in digital culture in ways that are even more student-driven and connected to life outside of the school music program.

In blurring boundaries between taken-for-granted ways students engage with music in school music programs and the types of musicianship involved in digital and participatory cultures, Abbie continues to transform her thinking and practice as to how best serve her students and prepare them to engage as musical people in their worlds. Catherine, who lacked the types of technological infrastructure that Abbie relied on to support students' collaborative work, faced a dilemma of how to foster digital and participatory culture in a classroom without technology.

Catherine:

In a participatory music class that aims to reflect the ways that students experience and interact with music outside of school, certain technologies are critical. For example, audio recording equipment is necessary for creating and sharing student creations, particularly for students who do not read and write music in traditional notation fluently. My students lack fluency in reading or writing music in traditional notation and do not have the means to edit or distribute their creations digitally for feedback or remixing. Though students would often write lyrics to their songs, they would often forget melodies or other musical elements because they did not know how to transcribe those ideas from sound to notation. Often their melodies and rhythms were more sophisticated and advanced than concepts covered in the fifth and sixth grade curriculum. As a result, students' practicing, sharing, editing, and soliciting of feedback occurred exclusively through live performance. This lack of audio recording technology affected the level of support in my classroom for students to create and share their music. As an alternative to using technology, I worked to create a safe and inviting classroom environment to encourage their creating and sharing of music.

"These students are creative individuals capable of performing many musical roles, demonstrating a wide range of skills and abilities, and embodying what it means to be a musician from a holistic perspective."

-Abbie

Having witnessed the benefits of allowing students to collaborate across grade levels and varied skill sets, Catherine sought to develop a mentorship system in and between her classes to allow more experienced students assist their peers. At the time of writing this article, Catherine is experimenting with structural changes to her program to foster collaborative and social aspects of participatory culture within the school environment.

Catherine:

I have not yet created a mentorship system in my classes or between class sections that would allow more experienced students to share information with less experienced students. This year, I will experiment with creating mentorship systems in a variety of contexts, such as after school clubs and student-created sources of information to be shared with general music programs at other schools.

Most recently Catherine applied for and won a grant to fund the integration of technology and recording equipment in an after-school songwriting club. She continues adapting her program to incorporate aspects of digital and participatory culture in ways that acknowledge her student population, available resources, and teaching experiences.

While a lack of access to technology served as an obstacle for Catherine to overcome in her process to transform her teaching and classroom, Abbie recently experienced challenges spurring from a mandated curricular change that forced her to rethink the structure of her music program and how she might continue to foster digital and participatory culture in her teaching.

Abbie:

As I continue developing my own thinking and perspectives in embracing digital and participatory culture throughout my program, factors beyond my control have caused me to think about these new skills, principles, and literacies in a different light. At the beginning of the 2012-2013 school year, the middle school general music courses I facilitated were eliminated as an option for students. Students' music course options are now limited to one of two performing ensembles (chorus or band). Secondary students in my school will have access to music education only if they enroll in chorus or band. Faced with this mandated curriculum change, I was challenged to once again consider my perspective and philosophical positions on the type of music education I might provide students. I began to think, "What kind of environment, regardless of its label, creates the most well-rounded music student?"

Reform-minded music educators (Thiessen & Barrett, 2002) such as Catherine and Abbie view obstacles as challenges rather than impediments to transforming their programs to best fit the needs of their students. Many of Abbie's students who had started as elementary general music students elected to continue their music education in the middle school chorus. Upon reflecting on her students' skills and interests Abbie recognized their desire and ability to engage musically in ways that extend beyond what is typically prescribed by the traditional choir label and structure. If the traditional structure of choir did not allow for the types of digital and participatory cultures that students found meaningful in her general music courses she was determined to re-structure "choir" to foster the principles, skills, literacies, and ways of being musical that she and her students valued.

Abbie:

In designing my curriculum for the chorus and the current school year, I posed the following question to myself, "What would these students be capable of musically if offered a course that encompassed strong performance standards while allowing flexibility for composition, arranging, and analysis with music technology?" I believe these students should not simply fit or be molded into limited conceptions of what it means to be labeled a "singer" or "general music student." These students are creative individuals capable of performing many musical roles, demonstrating a wide range of skills and abilities, and embodying what it means to be a musician from a holistic perspective.

Though technology played a key role in enabling Abbie to transform her classroom, her students' and own experiences of engaging in digital and participatory culture encompassed far more than a focus on technology in and of itself. Digital and participatory culture allowed Abbie to challenge her own thinking about her role in the classroom, the skills she enabled her students to apply in their learning, and the ways they could enact musicianship. Along with experiencing an evolution in her own dispositions towards what it means to teach music, Abbie was able to transform her classroom to create a more collaborative learning environment that challenged students to apply new skills and ways of knowing while performing multiple musical roles. By fostering digital and participatory culture in her music classroom, Abbie provided students opportunities to redefine their music education experience. As Catherine continues assisting her students to communicate, work collaboratively, and most recently to leverage technology, she too is transforming her practice and in turn how her students learn music.

Fostering Transformation Through Music Teacher Education

Both Abbie and Catherine discovered that the rate of change in one's practice does not necessarily match the transformation of how one conceptualizes music teaching and learning. Soon into our pilot project in 2010, Abbie realized that both she and her students would need a full year to focus on developing the skills, dispositions, and ways of being in a classroom that incorporated:

technology, newer forms of musical engagement such as appropriation, students performing multiple musical roles, collective intelligence, and distributed cognition. Catherine also discovered that helping her students communicate and collaborate in ways that varied from their prior experiences in the school music program required at least an entire school year. Our collective efforts in envisioning new possibilities rather than referring to pre-existing models sometimes resulted in struggle to articulate and enact curricular frameworks unconstrained by traditional labels and structures. As educators, we needed time to think through and try out pedagogical approaches and curricular structures that expanded beyond the status quo.

While the courses and conversations in which Abbie and Catherine engaged as graduate students helped catalyze and propel their work, the type of transformations they were enacting called for additional support beyond their graduation; a type of informal post-masters-pre-doctoral support system. Through our conversations and collaborative efforts it was clear that transforming a program requires resources, support, guidance, and opportunities for reflection and discussion. Our pilot project and ongoing work made clear the value of music teacher educators working closely and negotiating transformative practices with graduate students and practicing teachers.

In discussing professional development for reform minded music educators, Barrett (2006) suggests that among avenues such as graduate school, short courses and workshops, and themed tracks during conferences; networks and institutes might provide educators with ongoing development and support as they enact change in their professional lives. Just as collective intelligence and distributed cognition played important roles in Abbie's classroom, these principles and approaches might be applied in supporting the work of music educators. The development of networks consisting of music educators, music teacher educators, students and the resources they create collaboratively is a starting point for fostering transformation within and across music programs. Leveraging digital media and the Internet, music educators and their students might collaborate on developing resources ranging from blogs and wikis to tutorials and websites that address common issues encountered when one integrates technology.

Informal networks ranging from Monday evening music education twitter meet ups to music education-focused Facebook groups exist and can be helpful to music educators moving beyond their comfort levels when enacting change in their classrooms. However, the development of networks that can support sustained self-directed inquiry, a high degree of disciplinary fit, and support for collegial learning (Barrett, 2006) as well as link global and local concerns and maintain the level of deep and critical thinking characteristic of graduate programs is necessary to support the work of reform minded educators such as Abbie and Catherine who act as change agents in their local teaching contexts.

When Abbie began adopting new practices and restructuring her classroom she had a support system to which she could turn for assistance. In this case, the Consortium for Digital, Popular, and Participatory Culture in Music Education at ASU connected Abbie to other music educators and doctoral students who could assist her. Having colleagues such as Catherine assist in the classroom or provide resources from afar helped support Abbie's students as they developed new skills and ways of being. However, given that those assisting Abbie were simultaneously learning how to integrate digital and participatory culture, her peers were unable to assess or offer guidance related to her pedagogy. Reflecting on her experiences of transforming her teaching and classroom, Abbie expressed a desire for having a mentor present in her classroom on a monthly or bi-monthly basis to observe her teaching and provide feedback. When teaching in her own program, Catherine drew upon the skills and perspectives on teaching she honed while assisting Abbie, however, starting a process of change in her first year of teaching within a different context presented an additional set of challenges.

Teachers engaging in new types of projects and transforming their practice would benefit from consistent and concrete feedback from those with expertise. Given that the aforementioned consortium was in its beginning stages of developing as a network, support for Abbie's change agentry and pedagogical development was just as diffused and emergent as the network forming to support such work or the domain of digital and participatory cultures within music education. While educators such as Abbie and Catherine might eventually serve as experts and mentors to peers who wish to foster digital and participatory cultures in their classrooms, they are forging ways forward as pioneers in this area with a degree of support.

Just as Abbie and Catherine articulated challenges in transforming their programs, Evan identified challenges in supporting such work ranging from scheduling in-class observations or regular discussions with practicing educators no longer in the graduate program to developing resources specific to and at a rate of their needs. Developing a network of in-service music educators, graduate students to support such work, and relevant materials that are dynamic in nature to evolve along with digital and participatory culture takes a great deal of time, energy, and resources. How might music teacher educators support the work of reform-minded educators who are enacting change, struggling to put theory to practice, and negotiating a range of obstacles and challenges? Furthermore, what are the implications for music teacher educators who wish to support this work when a number of music educators are attempting to transform their practice simultaneously across a wide geographic area? The challenges of such work are amplified in the context of new and emerging approaches to teaching or being musical.

Collective intelligence and distributed cognition might be applied in these situations, however, continuous and concrete support in educators' classrooms by those with a degree of experience or expertise is equally important. While ongoing dialogue and technology such as video conferencing or viewing and responding to video footage of an educator in action might facilitate music teacher educators or peers providing educators with feedback, in-class assistance and mentorship may prove valuable though challenging.

Furthermore, fostering digital and participatory culture in K-12 classrooms such as students engaging in appropriation or performing multiple musical identities necessitates transforming music teacher education programs. It means opening curricular structures to embrace the types of collaboration and multifaceted musicianship that teachers such as Abbie and Catherine foster among their students. This includes leveraging technology in ways that align with how musicians are expanding musicianship and musical experience in a range of cultural contexts. How might music teacher education programs reflect the types of digital and participatory cultures prevalent in contemporary society and support music educators in transforming their practice to align more closely with related ways of being musical? Boardman (1992) suggests that:

> We must remember that learning is a spiral that never ends for anyone. We must therefore be willing to discard familiar practices, search for new processes, and consider implications of new information. In other words, we must be brave enough to continue to alter, expand, and refine our personal teaching schema. (p. 42)

One needs not experience this process alone. Just as K-12 music educators can benefit from a network and support system in transforming their practice, so too can music teacher educators seeking to foster such work. Transforming music education through digital and participatory culture requires a collective effort of music teacher educators, graduate students, pre-service, and in-service music educators sharing experiences, expertise, struggles, and success with each other. As Boardman (1992) recognizes:

> If we are ready to implement that [generative] principle in our own lives, to be open to the generation of new ideas and thus to regeneration, and to continual learning on our own part, then the

difference we make will be positive. Together we can create an environment for music teacher education that will indeed prepare future teachers for the challenges they will face in the next century. (p. 43)

As music teacher educators and in-service music educators reflect and act on changing perspectives and evolving practices they might look to how contemporary culture relates to music classrooms and vice versa. Whether in new types of courses, traditional curricular structures, K-12 music programs, or music teacher education programs, integrating digital and participatory cultures in music classrooms embraces and fosters a collaborative process of transformation and regeneration for ourselves and our students.

Evan S. Tobias,
Abigail Van Klompenberg, and
Catherine Reid

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