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Revitalizing Music Teacher Preparation with Selected "Essential Conditions"

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Abstract

The widespread adoption of technology makes it necessary to extend technological resources to the classroom to best prepare students for long-term success. While technology can improve many facets of learning and teaching, music educators have generally been hesitant to incorporate technology to its full potential. Partnerships with professional organizations, such as the International Society for Technology in Education (ISTE), can help music educators best reach students and achieve cultural relevancy in the digital age. Restructuring music education to integrate what ISTE calls "Essential Conditions" of learning with technology, such as student-centered learning, equitable access, and engaged communities, begins with undergraduate music education preparation. The purpose of this article is to identify the necessity of a synergism between music education and selected ISTE "Essential Conditions" for technology-based learning, describe implications these selected conditions have on the current state of American undergraduate music education programs, and provide recommendations for music teacher education.

Keywords: music education, music technology, technology standards, teacher education, student-centered, Essential Conditions

> Only in growth, reform, and change, paradoxically enough, is true security to be found.
>
> (Lindbergh 1940: 38)

Technology was once thought of as "the wave of the future"; however, "technology is not the future—it is the present" (Pearson and Nowlin 2011: 468). It is present all around us and pervades our lives in almost everything we do socially, leisurely, and professionally. There is no longer a question of *if* we should use technology, but *how* we should use technology in the most effective ways possible. Children reportedly describe themselves as

high users of the Internet (86%), digital music (83%), video games (76%), and cell phones (71%); however, only 14% of students regularly read books beyond the walls of school (Spires et al. 2008). The usefulness of technological advancement is visible in a variety of disciplines such as medicine, business, and education.

Despite the increased role of technology in our culture, many classrooms still do not utilize technology as robustly as it is used in areas apart from education. Music educators in particular may be even more cautious toward incorporating technology. Although research reveals growth in the availability of technological resources developed for music teaching and learning, in-service music teachers seem to be falling behind in the application of appropriate technology in the classroom (Webster 2011). While most teachers generally have a positive attitude toward technology (Teo 2014), reasons why it may not be used in American classrooms include the complex and multifaceted nature of music, a wide range of class sizes, demanding performance expectations, and expensive equipment needs.

However, incorporating appropriate technology into our music education practices may help our profession better align with the larger field of education and advocate for the inclusion of music as an integral component of the overall curriculum. Teachers can motivate students to participate by developing their courses based on the way music occurs in the world outside of school (Kratus 2007). While music is becoming increasingly more personalized in society, school music in the United States continues to operate according to the model of the large group performance (Kratus 2007). Additionally, students may have grown to see school music as being "totally out of touch with the musical needs of our society, to the point where students find us irrelevant and unconnected to their lives" (Green and Hale 2011: 47). The utilization of technology may help connect our curriculum to the way society experiences and perceives music, promoting "true security" for music's place in the schools.

Music teacher educators can benefit students by ensuring they are fully primed to navigate the current trends in policy and culture. This includes the need for them to be able to successfully select and incorporate technologies relevant to the courses and students they will teach. While students come to college better prepared to use technology in general, they are not necessarily well equipped to use tools geared toward music teaching and learning specifically (Webster 2011). Though music resources are constantly changing, this discussion will identify technology by the timeless purposes it serves (such as arranging, accessibility, and communication) as well as resources that are currently available (such as *GarageBand*, *Noteflight*, and *Edublogs*).

Because of technology's influence in our culture, there has been an expansion of professional organizations designed to promote the integration of technology in education. Among these are the Center for Children and Technology, the Department of Education's Office of Educational Technology, the National Association for Media Literacy Education, the Global SchoolNet Foundation, Technology for Music Education (TI:ME), and, of particular interest in this article, the International Society for Technology in Education (ISTE). Composed of a global community of educators, ISTE's goal is to encourage learning for all students in "an increasingly connected world" through the use of technology (2012). ISTE

also contributes to the standards that the Council for the Accreditation of Educator Preparation (CAEP, previously NCATE) uses to accredit education colleges throughout the United States (ISTE 2012). Along with separate standards for students, teachers, administrators, and coaches, fourteen "Essential Conditions" are deemed necessary by ISTE to successfully infuse learning with technology (see http://goo.gl/zIzpth). Although each of the fourteen conditions can easily coincide with practices in music education, three have been chosen for discussion in order to adhere to size limitations of the article, and also because they provide a solid foundation upon which other changes can be built. Three conditions—student-centered learning, equitable access, and engaged communities—are presented in this article along with their implications for music education and teacher preparation. The purpose of this article is to identify the necessity of a synergism between music education and selected ISTE "Essential Conditions" for technology-based learning, describe implications these selected conditions have on the current state of American undergraduate music education programs, and provide recommendations for a revitalization of music teacher education. See Tables 1 and 2 for suggested technologies and activities music educators can use when applying the "Essential Conditions."

"Essential Condition" #1: Student-Centered Learning

Student-centered learning will be the first "Essential Condition" addressed, as this condition appears to be an appropriate backdrop that facilitates the adoption of each consecutive condition discussed. ISTE defines *student-centered learning* as the planning, teaching, and assessment centered around the needs and abilities of students (ISTE 2012). Student-centered learning is not a new concept in music education but one that may need to be reexamined through the lens of technology integration. Using technology to enable students to select appropriate material, compose, arrange, listen, and evaluate are ways in which music educators can create a student-centered learning environment.

The need for student-centered learning in music education
Most American music programs operate under a strict teacher-centered model. This is due in part to the traditional archetype of the full classical ensemble as well as the military-style leadership of bands following World War II that continues to serve as a model for band directors across the country. Large student enrolment numbers may also limit the extent to which teachers feel they can allow students to independently contribute to lessons. Teachers in most music classrooms in the United States are responsible for every component of the program's success or failure. Although enrollment in music classes is mostly elective, with the exception of general elementary music, teachers typically do not solicit much input from students.

Table 1. Suggested technologies for use within selected ISTE "Essential Conditions"

"Essential Condition"	Suggested technologies for use in music education

Student-centered learning	* Allow students to compose and arrange their own music:
	    Finale/Finale NotePad
	    Sibelius
	    Noteflight (www.noteflight.com)
	    MuseScore (http://musescore.org)
	* Student selection of repertoire:
	    The Habits of Musicianship by Robert A. Duke and James L. Byo (free online method book: https://goo.gl/sFFg5w)
	    PDF Band Music (http://www.pdfbandmusic.com)
	    Customizable method books (*Sound Innovations*, Alfred Music Publishing)
	* Tools for listening & self-assessment:
	    SmartMusic (www.smartmusic.com)
	    GarageBand (http://www.apple.com/ilife/garageband/)
	    Mixcraft (http://www.acoustica.com/mixcraft/)
	    Audacity (http://audacity.sourceforge.net/)
	    Digital audio recorders
	    Interactive Practice Studio
	    LOOPS Project (http://concord.org/projects/loops)

Equitable access	* Digital media allows students to simultaneously see (notation, text, video, images), hear (audio) and interact with material * School website with separate class pages (e.g., author's cite provided upon acceptance) * Modified instruments * Universal Design for Learning (UDL) implementation examples can be found at: (www.udlcenter.org/implementation/examples)

Engaged communities	* Foster collaboration and community:
	    Skype: http://www.skype.com/en/
	    Skype in the Classroom: (http://education.skype.com)
	    ePals: http://www.epals.com/groups/about/pages/ epals-overview.aspx
	    Classroom informances: http://goo.gl/N5yO1z
	    Website developer (*Edublogs* example: author's cite provided upon acceptance)
	    Videoconferencing
	    YouTube
	    Wiki sites
	    Social networking sites (e.g., Facebook; Twitter; The Educator's PLN: http://edupln.ning.com/; Twiducate: http://www.twiducate.com/)

Table 2. Sample activities and resources within selected ISTE "Essential Conditions"

"Essential Condition"	Setting	Sample activities and resources
Student-centered learning	Middle school band (6th Grade)	* Students are allowed input for selection of materials based on preference and skill-level (e.g., Customizable method books, *Sound Innovations*, Alfred Music Publishing). * Given first measure of "Twinkle, Twinkle Little Star," students are asked to arrange the remainder of the song using the first six notes they have learned. Students use free online notation software (such as *Noteflight*: www.noteflight. com) to complete activity. Students can listen to their arrangement on *Noteflight* to check for accuracy. * Students record themselves performing their arrangement on *GarageBand* (http://www .apple.com/ilife/garageband/) and select loops or *arrange* accompaniment. Students can listen to their performance and *arrangement*. * Students upload recording of performance to class website (e.g., edublogs.org, author's cite provided upon acceptance) where they *listen* to themselves as well as other recordings. * Students *evaluate* their performance as well as other performances and leave comments on the class website (e.g., edublogs.org). * A comprehensive example is available on the author's website (provided upon acceptance).
Equitable access	High school choir	* Use of school website with separate class pages to provide *access* to resources, plans, information and materials for all stakeholders (e.g., edublogs.org; author's cite provided upon acceptance). * Teacher uses microphone in class to all students to *hear* instruction. * Written score/parts are projected on-screen or Smart Board for all students to *see* material. Can be magnified or highlighted. * Recordings of student and demonstration performances can be played on sound system for all students to *hear*. * Digital media allows all learners to *see and hear* material. For example, notation is projected using *SmartMusic* from computer, laptop or tablet, while simultaneously listening to recording of piece. Video and images can also be projected to correspond with repertoire to provide deeper understanding. * Use of *SmartMusic* allows for *individualized assessment* of students and can also allow students to separate their individual parts from the score. * *GarageBand*, Audacity, or handheld recording devices can be used to create recordings of parts for students. Notation software (e.g., *Noteflight*, www.noteflight .com) can be used to *adapt* notation or parts for students, if needed.

Table 2. *Continued*

"Essential Condition"	Setting	Sample activities and resources
Engaged Communities	Elementary general music (4th Grade)	* Teacher uses social networking sites to create *partnership* and *collaborate* with other teachers/classes on unit (e.g., *Twiducate*, http://twiducate.com/)
		* Students form *partnerships* with other students or musicians from different locations to learn about folk or multicultural music. Participants from both settings *communicate* with each other during class via *Skype* (http://education.skype.com).
		* Teachers and students from both settings *collaborate* and *share* with each other through wiki sites (e.g., author's cite provided upon acceptance).
		* Teacher *organizes visits* for classroom "informances" and posts dates on class website (ex: edublogs.org). See http://goo.gl/N5yO1z for a great example. Teacher *involves others* by asking parents/audience members to participate in day-to-day class activities during "informance."
		* "Informances" are *broadcast as podcasts* using iTunes on class website for stakeholders to hear and see (if allowed by district policy).

When students are subjected to a teacher-centered approach, they cannot grow as independent musicians and often have no outlet to continue with musical experiences outside of school (Shuler 2011). In order to help students achieve musical independence, music educators can shift the responsibility of learning to the students, allowing them to make decisions, create and select the music they perform, and self-diagnose their weaknesses in order to improve. Incorporating instructional technology in the classroom can help to "democratize" the creative process by providing opportunities for students to participate in activities such as composition (Ward 2009). Giving students occasions to develop independence and responsibility for their learning, rather than keeping all authority in the hands of the teacher, can motivate students to learn (Green and Hale 2011). Providing students with chances to help in the decision-making aspects of the class will also increase the probability that they will continue participating in music courses.

The current state of undergraduate music education programs
Evidence of the overwhelming format of music classrooms developed in a teacher-centered approach does not end with high school. Unfortunately, teacher-centered models not only exist in undergraduate music teacher preparation programs, but it seems as though college is the outlet through which such a design is perpetuated in the United States. Collegiate music programs substantially emphasize participation in performance-based coursework and large ensembles. Undergraduate music students may not have many opportunities to develop their own creativity in college through activities such as composition, improvisation, arranging or songwriting (students specializing in jazz of course being an exception).

Furthermore, despite the increase of state and national policies that ask teachers to demonstrate that their students are developing as digital learners, collegiate music education programs are alarmingly inconsistent when it comes to requiring coursework in twenty-first-century areas such as instructional technology fit for a music classroom. Undergraduate music majors receive a very limited exposure to instructional technology, if they receive any formal training in teaching with technology at all. Few colleges offer or require instructional technology specifically designed for music education students. For example, the University of California, Los Angeles, offers a Bachelor of Arts degree in music education that requires students to take two, three-hour credit courses in Technology in Music Education (UCLA Herb Alpert School of Music: Department of Music 2009). In these courses, students learn about computer hardware and software appropriate for music sequencing, arranging and scoring as well as classroom instruction techniques that can be used in K–12 schools and higher education. Some schools offer an instructional technology course designed for all education majors, but many times the resources presented are not directly applicable in the music classroom. For example, the University of Tennessee–Knoxville offers a Bachelor of Music degree in music education that requires fourth-year students to take a course entitled Integrating Technology into the Curriculum (University of Tennessee-Knoxville (UTK) School of Music 2013). However, this is taken by all education students and is not *music* education specific. Other schools may incorporate instructional technology to some extent as a secondary outcome to classes with other primary purposes, such as composition methods. Still other schools neglect the subject entirely, probably because of the limited space for credits in the student's overall program of studies. The University of Nebraska–Lincoln offers a Bachelor of Music Education degree that does not require any specific coursework in instructional technology whatsoever (University of Nebraska–Lincoln (UNL) Glenn Korff School of Music 2013). The use of digital media and instructional technology can help transform the classroom from a teacher-centered to a student-centered environment.

"Essential Condition" #2: Equitable Access

The International Society for Technology Education (ISTE) describes *equitable access* as robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders (2012). As inclusive practices become more prominent in all of education, music teachers are increasingly seeing a more diversified body of students enrolled in their courses (Hammel and Hourigan 2011). Since the passing of the Education for All Handicapped Children Act in 1975 (which has been amended several times since and is now commonly known as the Individuals with Disabilities Education Act, or IDEA), all children in the United States are legally entitled to a free appropriate public education that must take place in the least restrictive environment (Damer 2001). Students who were once prohibited from music participation because of physical or cognitive impairments are now finding themselves not only able to participate but able to serve as essential members of music classrooms. Assistive technology and instructional materials that are becoming more accessible in the digital age contribute to more students receiving the benefits of music education than ever before.

The need for equitable access in music education

With a broader range of learners also comes the responsibility of music educators to diversify instruction, consider varying approaches to delivering material, and adapt resources to meet the needs of all students (Abramo 2012). Contemplating the individual needs of students by structuring teaching and learning practices based on their unique capabilities also promotes a student-centered learning environment. Rather than focusing solely on the teacher's predetermined goals, students are able to best learn and demonstrate their knowledge according to their own specific strengths and weaknesses. "Barriers to access" are created when teachers fail to adapt instruction based on the individual differences of students and instead teach with a one-size-fits-all approach (Abramo 2012). To provide the best opportunities for all of our students to learn, we must ensure that we are allowing them equitable access to the resources we have available.

The concept of Universal Design for Learning (UDL), when applied to music education, can also ensure equitable access to technological resources for all students. UDL, developed by David H. Rose from the Center for Applied Special Technology (CAST), is based on the premise that curriculum should be comprised of alternatives that make it accessible and appropriate for individuals with varying backgrounds and strengths (Rose and Meyer 2002). Three central, underlying principles of UDL include providing: multiple means of representation, multiple means of action and expression, and multiple means of engagement. Applying digital technology to the curriculum using UDL principles can help to individualize content for students in ways that are effective as well as budget and time friendly for the teacher designing the course materials (National Center on Universal Design for Learning 2013).

Many traditional materials used in the music classroom such as textbooks and written notation may not be the best method to reach all students. The rise of digital media makes it possible to see, hear and interact with material simultaneously, reaching students with multiple learning styles (Rose and Meyer 2002). Notation, text, audio, images, and video used in a music classroom could be combined digitally and projected for all students to see and hear using equipment such as a Smart Board, projection screen, computer, or laptop. The use of printed text and notation assumes that students can see and read proficiently, which may not always be the case for all students. Using a variety of materials and methods can reach more learners because students will be able to become acquainted with the material visually, aurally, and kinesthetically. The benefits of using flexible instructional media are that the materials can be better organized, displayed, and archived, making the content more readily accessible for the teacher and students alike. Teachers can save valuable class time and improve classroom management. In addition, students can draw upon various resources in order to understand the content being taught.

The current state of undergraduate music education programs

Unfortunately, many undergraduate music education programs neither model nor adequately prepare students for working in an inclusive environment with a variety of accessible technologies. Most performing ensembles still function under the tradition of reading music from printed notation. Technology is rarely, if ever, incorporated in large ensemble classrooms except to perhaps play recorded musical examples from the classroom's sound

system. While students may hear their own performance through recordings done in studio lessons or for recital recordings, many students are never given the chance to try recording themselves or others, particularly in an instructional setting. When designing lesson plans, preservice teachers may inconsistently indicate what adaptations or accommodations they might make, how they will represent multiple modes of learning, or how they might incorporate digital or assistive technologies.

Classes that prepare preservice teachers for working with students with special needs or individual differences are often very limited in undergraduate coursework. While most college music education programs require students to take at least one class regarding students with special needs, colleges are inconsistent about whether these courses are designed specifically for music education students or for education students in general. Because of the unique environments and larger class sizes with which music teachers are often faced, it may be more beneficial for undergraduate music education majors to gather knowledge and skills specific to their field. Although training related to the differentiation of instruction and learning may be more visible in elementary general music methods courses, areas such as instrumental music methods aimed at secondary ensemble students, warrant improvement in working with students with individual differences.

"Essential Condition" #3: Engaged Communities

The final "Essential Condition" discussed in this article is *engaged communities*, or the partnerships and collaboration within communities to support and fund the use of Information and Communications Technology (ICT) and digital learning resources (ISTE 2012). If music educators can support student-centered learning and equitable access of resources, then we may be in a better position to include, connect, and cooperate with a broader population of people. Harnessing the capabilities of technology can facilitate the creation and sharing of music with others, strengthening community support, and engagement.

The need for engaged communities in music education
Music educators may sometimes come across as inflexible in their agendas, particularly when they are given the label of "specialists." This perception may cause others to feel they are unable to contribute to the creating and sharing of music. However, to maintain our relevance as a school subject in this digital world, it may be wise not only to infuse technology into our teaching and learning but also to advocate its use to other stakeholders who, in seeing through the lens of traditional school music practices, may not be able to envision the need for technology within the walls of the music classroom. Ways in which ISTE recommends involving and informing stakeholders include: organizing classroom visits or technology showcases, attending board meetings, bringing community and business leaders into the goal-setting process, engaging all stakeholders in the development plan prior to investing in new technology, and exploring alternative methods to ensure equity of access, such as writing grants or having students bring their own devices to school for classroom use (ISTE 2012). Music educators who are able to effectively involve others within the community in the processes of teaching and learning will also be able to strengthen the value of their programs and encourage support.

The current state of undergraduate music education programs

Many undergraduate music teacher programs seem to operate within their own walls, despite the prevalence and accessibility of technologies that can extend musical communities across geographic space. While distance learning and online classes are rising in popularity, these courses tend to not offer many more resources than can be assimilated in a traditional brick-and-mortar atmosphere. Collegiate performances generate few concert attendees other than individuals associated with the music program itself, many of whom may attend concerts only because of course obligations and requirements. Using technology to broadcast college concert performances can build a larger audience of listeners as well as a network to a more expansive community of people. Because interest in the sophisticated level of music that college programs produce may be dwindling, "musical communities can be formed by musical interest rather than acquaintance or physical proximity" (Kratus 2007: 6). Technologies such as the Internet have changed the ways in which music is distributed as well the ways in which musical communities, comprised of individuals across distances, are formed. Videoconferencing (using applications such as *Skype*, *FaceTime*, and *Google Hangouts*) and web-based instruction can also help reach a broader audience of learners and listeners.

Recommendations for Music Teacher Education

Although there are many factors that contribute to a college or university's decision on what to include in the curriculum for a music education degree, some training in instructional technology is essential in order to best equip preservice teachers to enter the workforce with the skills and tools necessary to apply appropriate technological resources in their own classrooms. While many undergraduate music students may have had previous personal experience with *using* technology designed for music, it is doubtful that they have had any experience outside of their coursework with making decisions about how to *implement* music technology into a comprehensive curriculum. Students can benefit from guided experiences in an instructional setting that give them opportunities to create, compose, select, and arrange with the use of technology—activities that will be expected of their own students in our digital age—as well as opportunities to craft learning experiences for their students in student-centered environments.

Undergraduate music education courses must also demonstrate how to effectively work with learners of *all* styles in a comprehensive manner, infused within *all* music education coursework, throughout *all* four years of study. For equitable access to technology and resources for students to be achieved in music education classrooms, preservice music teachers may benefit from exposure to teaching strategies that follow the UDL model throughout their college experiences. Using a versatile toolbox of digital multimedia resources can help our students become comfortable with applying these means when they are responsible for their own students.

Furthermore, a variety of digital media resources could be applied to all undergraduate music courses, not solely those involved with music education. Since such a large portion of coursework for the undergraduate music education student is composed of performance-based ensembles and studio lessons, a wider array of resources may also be used in those

settings. Classrooms typically use only about 10 percent of the technological capabilities available to them, leaving behind a vast potential of unused resources that can enhance learning and ideas for all students (Rubenstein 2006). Preservice teachers that experience how to use existing and emerging technologies can effectively strategize ways to create more inclusive classroom environments, establishing equitable access to resources for everyone.

Creating educational environments that engage the larger community may begin with a restructuring of the large ensemble, traditional performance model currently in use by a majority of music programs in the United States. Music teachers may wish to educate and *inform* those who will be in attendance (parents, administrators, and community members) by shifting the focus from a performance to an *informance*. By using concert atmospheres as a place to demonstrate what students are working on in class and how they are using technologies, educators can better *inform* and enlighten stakeholders about how music is evolving as a twenty-first-century subject that belongs in the curriculum. Teachers can alleviate some of the pressure they may feel about performances by putting concerts in students' hands. Allowing students to perform selections they have created or arranged can also generate more of a student-learning environment. *Informances* can be done more often by incorporating technology and offering a recording or video as a podcast on the class's website or blog space. See the author's sample website (author's cite provided upon acceptance) as well as http://goo.gl/N5yO1z for examples of how this may be accomplished. If music educators can shift the focus to demonstrate more of the process of what students are learning in class rather than the product, community members may be more likely to understand the need for incorporating new technological resources in music programs as well as more eager to support and fund technology's role in music education.

Technology makes it possible to bring together varying cultures of music and performance groups from around the world into a college-learning environment. Rather than continuing with the tradition of requiring undergraduate students to predominately participate in large western-influenced ensembles, technology can provide students with the opportunity to explore participating in musical groups from other cultures and styles such as ethnic ensembles, popular music ensembles, and songwriting and composition classes (Kratus 2007). Once employed in the schools, an important role for music educators is to be able to network with community members. Therefore, preservice teachers may benefit from participation in musical communities beyond those found in their formal training. Participation in virtual ensembles through outlets such as YouTube and wiki sites, for example, can help undergraduate students obtain the knowledge and skills of other musical traditions external to the geographic boundaries of their institutions (Waldron and Veblen 2008).

Informal social sharing sites and online learning communities can be powerful tools for learning and connecting with others (Salavuo 2008). Social networking and Internet capabilities can be harnessed to provide exchanges and partnerships with outside universities and organizations. Preservice teachers could expand their knowledge base by interacting virtually with professional ensembles and educational associations that might not otherwise be accessible due to physical location. Furthermore, undergraduate students may

benefit from a team-teaching or learning approach that utilizes cooperation among professors from different universities and institutions through web-based sharing and videoconferencing. Incorporating technology to create more personalized, less formal learning exchanges among musicians across varying ability levels can enrich the experiences of preservice teachers, better preparing them for success as music educators in a global community.

Conclusion

The widespread adoption of technology in the lives of people both at work and at home make it necessary to extend technological resources to the classroom to best prepare students to succeed beyond school. While technology can improve many facets of learning and teaching, music educators have generally been hesitant to incorporate instructional technology to its full potential. Partnerships with outside professional organizations, such as the ISTE, can help music educators best reach students and achieve cultural relevancy in the digital age. Restructuring music education to integrate what ISTE calls "Essential Conditions" of learning with technology, such as student-centered learning, equitable access, and engaged communities, begins with undergraduate music education preparation programs. Designing a more comprehensive approach to coursework that includes the use of digital media in learning and instruction can best meet the needs of music education both at present as well as in the future.

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