Composing Possibilities:
Open Educational Resources and K-12 Music Education

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In Collaboration with Carnegie Hall's Weill Music Institute

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Executive Summary

This paper presents the results of a study conducted by the Institute for the Study of Knowledge Management in Education (ISKME) in collaboration with Carnegie Hall's Weill Music Institute, and with support from the William and Flora Hewlett Foundation. The study was conducted to examine the current state of K-12 music open educational resources (OER), with particular regard to the audiences that these resources may serve to benefit, as well as the ways in which existing music sites and collections are supporting use, reuse and implementation of music OER in the classroom. Additionally, the study sought to elucidate, for content providers, the opportunities and challenges inherent in adopting an open approach to the development of music education resources. To that end, the paper is intended for music OER providers and curriculum developers, as well as music educators and other stakeholders who may benefit from considering the potential for OER in music education.

The following research questions guided this study:

- What are the leading OER content collections and platforms serving K-12 music educators, and what are some exemplary OER in the K-12 music education field?
- What indicators point to a demand for music OER, and who are the potential end-users of music OER?
- What are possible use scenarios for music OER? What are the benefits and challenges of music OER use, and what types of support best facilitate use?
- What issues—both opportunities and challenges—are raised for content providers by adopting an open approach to music education?
- What are the broader implications of music OER for teaching, learning, and the music education field as a whole?

This study was informed by ISKME's prior research on OER and included a review of both educational literature and an exploration into the current music OER landscape. Specifically, it involved an in-depth examination of 10 music education collections, chosen for their focus on K-12 teaching and learning, and ranging from music collections housed within cross-disciplinary repositories, to repositories that host music-specific education content. Interviews were also conducted with 17 individuals working in the music education arena (music educators, music education content providers, and music education experts) to assess perceived gaps in resources in the music education space, the factors supporting the adoption and use of music OER, and the potential benefits of music OER to teaching and learning.

The survey of existing, open music education collections revealed several platforms that support teaching and learning in innovative ways through features that enable end-users as experiential learners, creators, and innovators. However, only a few of the collections support user contributions and the creation and sharing of derivative works. Furthermore, only a few of the collections that allow for use of content for educational purposes provided specific terms to guide teachers and learners in the ways that they can use the content. Additionally, few of the collections reviewed offered music content aligned to state and national music standards.

While the present-day music OER landscape is yet emerging, this study revealed several end-user markets. In particular, the study found that for music specialists and classroom teachers,

OER can serve as an attractive solution to meeting curriculum challenges—especially for educators in under-resourced schools. Teaching artists, faced with increasing expectations that accompany their role, and a possible lack of formal training in education, also constitute a key group of potential end-users for music OER. For teaching artists who are seeking curriculum materials or pedagogical solutions to meet their classroom needs, as well as those who may wish to document, contribute and share their expertise and teaching practices with their peers, OER have the potential to address currently unmet needs.

Finally, the study revealed the potential of music OER to support end-users as co-creators and innovators in the content creation process (although, as mentioned, few of the sites and collections reviewed have, to date, fully realized that potential). Producers of content can support these and other use possibilities by offering content that is modular, digestible and engaging, and that is adaptable to end-user needs, including support for multiple styles of learning. The findings further underscored the importance of providing teachers with access to material that is aligned to state and national music standards, to the Common Core State Standards, and to information about how other teachers had adapted and implemented the material before them. In terms of content creation, it was found that public domain resources or other workarounds could be used to create engaging material that supports the inclusion of performances and recordings, and licensing approaches or technology solutions could be used that enable clarity around terms of use for users.

Overall, it was found that—while music OER have the potential to engage students in new ways of knowing and learning, and to make music education accessible to student populations that have previously lacked access—incorporating open educational resources into music teaching involves exploration into creative solutions and policies to address some of the challenges and barriers to use. The following paper further outlines these challenges and solutions, in light of both the existing music OER landscape and the potential for music OER, moving forward.

1. Introduction

Driven in part by changes in technology and student expectations, the landscape of music teaching and learning, like other disciplines, is transforming rapidly. Students well-versed in simulations, online networks, and mobile technologies are approaching learning in new ways, expecting school to be participatory, personalized, multi-modal, and media-rich. Outside of school, young people are "mashing up" each other's music and ideas, posting blogs, and reviewing each other's videos, photos, and other creations. Added to this background of rapid change is the emergence of new education standards, the Common Core State Standards, which require efforts from teachers to meet focused K-12 learning goals across the curriculum. As a national movement, the introduction of the Common Core State Standards is well-timed for altering not only *what*, but *how* students learn, by increasing focus on cross-disciplinary activities and by supporting customized learning applications alongside collaborative, technology-enabled learning.

Open educational resources, or OER, play an important role in these shifts. OER comprise a range of freely available, flexible, adaptable educational content, including lessons, exercises, textbooks, primary sources and other materials. Through alternative licensing and technology, OER can be shared and modified by educators to suit local instructional needs. Because OER invite engagement with curriculum materials, they offer opportunities for teachers to build their capacities as educators and content creators, contributing to the development of new learner-centric teaching approaches and to the alignment of curriculum with education standards. For music education, OER have the potential to fill gaps in access to instructional music resources for teachers and learners, and to support teachers and learners as content creators and collaborators in meeting educational goals.

Of late, music education has witnessed the emergence of websites that seek to support educators through freely available, sharable, and in some cases adaptable music education content. At the same time, teachers are drawing on these online resource collections to fill content gaps and facilitate learning, often in innovative ways. This paper aims to explore the current state of these music education resources, the audiences that these resources serve to benefit, and the opportunities and challenges involved in adopting an open approach to the development of music education resources. As such, the paper is intended for music OER providers and curriculum developers, as well as music educators, teaching artists, and other stakeholders who may benefit from considering the potential for OER in music education.

This paper is the result of a study conducted by the Institute for the Study of Knowledge Management in Education (ISKME) in collaboration with Carnegie Hall's Weill Music Institute, and with support from the William and Flora Hewlett Foundation. Informed by ISKME's prior research on OER, spanning nearly 10 years, the paper is based on a review of music education literature and technology, and interviews with music educators, music content providers, and music education experts. In presenting the findings from this work, the paper first provides a brief overview of public music education in the U.S., before addressing the literature on the ways that OER have supported teaching and learning. A review of the landscape of existing open music collections and a discussion of their potential audiences and benefits of use are followed by an examination of the opportunities and challenges in offering music OER. The paper

concludes with the implications of music OER for teaching, learning, and the music education field as a whole.

2. Context: Public Music Education in the U.S.

Music education is generally recognized as a powerful contribution to the intellectual and social development of children (DFE, 2011; PCAH, 2008). This general recognition is grounded in research indicating positive correlations between music education and cognitive development, verbal intelligence, creativity, reasoning, academic achievement in math and reading, overall grades, and standardized test results (Hallam, 2010; Johnson & Memmot, 2006; Moreno et al., 2011; Schellenberg, 2006; Schlaugh et al., 2005; Southgate & Roscigno, 2009; Spelke, 2008; Wetter et al., 2009). While music instruction is offered in the large majority of U.S. public schools (Parsad & Spiegelman, 2012), students attending schools with the highest poverty concentrations and students of color have less access to music instruction than other students (Parsad & Spiegelman, 2012; Rabkin et al., 2011). In recognition of such shortfalls and the potential for arts education to help reform schools, the U.S. President's Committee on the Arts and Humanities has recommended reinforced support for the arts in education at both elementary and secondary levels (PCAH, 2008).

In the United States, music education is currently guided by national and state music standards. The national standards, established in 1994 by the National Association for Music Education[1], encompass a broad array of music competencies, from notation skill acquisition and composition, to vocal and instrumental performance; from music analysis and description, to understanding music in relation to history and culture. Many states and school districts have also created and adopted their own, individual music standards. Furthermore, schools and educators across 45 states and the District of Columbia are in the process of implementing the Common Core State Standards, and are working innovatively to identify, create, or adapt content to fit the new standards—including meeting the requirements for curriculum that enables student engagement with high-quality literary and informational texts across subject areas, as well as for inquiry-based learning that supports critical thinking. Through this array of standards, music educators face a dual set of challenges: preparing some students for professional music careers, as future instrumentalists, composers, historians, or theorists, *and* providing meaningful musical experiences to enhance learning in core curricular subjects for all students in nonmusical career paths (Byo, 1999; Branscome, 2005; Williams, 2007).

Challenges involved in meeting education standards may be compounded by inequitable access to "adequate" instructional resources (Parsad & Spiegelman, 2012) and to professional development to support music educators in, for example, selecting and writing curriculum and creating lessons (Byo, 1999; Rabkin et al., 2011). Scholars have long suggested that these teaching challenges may be met with interdisciplinary, collaborative approaches that draw music specialists and general educators together to share curricular responsibilities (Barry, 1992; Byo, 1999; Colwell, 2008; Conway, 2008). While much interdisciplinary collaboration may take place informally (Conway, 2008), evidence supports the idea that professional development encourages interdisciplinary approaches to music education. In the U.S., for the 2009-2010

[1] The nine National Standards for Music Education include: Singing, playing instruments, improvising, composing, reading/notating, listening/analyzing, evaluating, understanding music as it rates to other disciplines, and understanding music in relation to history and culture. See http://musiced.nafme.org/resources/national-standards-for-music-education/.

school year, 69 percent of secondary schools reported that professional development in music education was available to their classroom teachers; the two most frequently attended types of professional development for K-12 music specialists focused on connecting music learning with other subject areas and integrating educational technologies into music instruction (Parsad & Spiegelman, 2012).

As the section below begins to reveal, open educational resources have the potential to serve as an additional support to music educators in meeting the challenges they face in finding adequate teaching materials, aligning their curriculum to their local and national standards, and overall, helping students to adopt enhanced learning practices, knowledge and skills.

3. OER, Teaching and Learning

OER are defined as materials that are free and open for use and reuse in teaching, learning and research, as well as the tools and technology that support the use, creation, and dissemination of these materials (UNESCO, 2006). Examples of OER include curriculum materials such as lesson plans, student worksheets, and educational games; primary and secondary sources of information such as data sets, research reports, articles, and textbooks; and professional development materials that support teachers in creating and implementing new practices and curricula in the classroom. For educators and students, OER translate into centralized access to materials to supplement their teaching and learning needs, as well as the possibility of sharing materials, collaborating to improve upon existing materials, and creating new OER globally and across disciplines.

Rossini (2012) discusses these and other opportunities for teaching and learning through the lens of the "four freedoms" of OER. These include the right to freely use content, to adapt and modify the content, to combine the original or adapted content with other content, and to share copies of the original or adapted content with others. These freedoms, in turn, are made possible through open licensing and terms of use, such as those offered through Creative Commons, as well as through those created by organizations like WGBH for its Teachers' Domain OER collection, which allows for custom uses of its content for educational purposes.

Open licenses are a way for creators of content to grant permissions that stipulate how their resources may be used, specifically in terms of the rights that they reserve and the rights they waive. With Creative Commons licenses, for example, authors of an original work—whether educator, student, organization, artist, or other creator—can legally grant freedoms to others by choosing one of six licensing options, based on their rights preferences.[2] For example, the Creative Commons Attribution-NonCommercial-ShareAlike (CC BY-NC-SA) license is

[2] Creative Commons licenses include: 1) Attribution (CC BY), allowing others to change and share the work in any way including for commercial use, provided they attribute the work to the original author; 2) Attribution-ShareAlike (CC BY-SA), which provides similar freedoms and further stipulates that the same license be applied to derivatives; 3) Attribution-NonCommercial (CC BY-NC), which allows for the remixing of content non-commercially, but does not stipulate that the same license be applied to derivatives; 4) Attribution-NoDerivs (CC BY-ND), which allows for redistribution and commercial use, but prohibits remixing; 5) Attribution-NonCommercial-ShareAlike (CC BY-NC-SA), which grants the freedoms of reuse and redistribution but limits them to non-commercial uses, and requires the same license be applied to derivatives; and 6) Attribution-NonCommercial-NoDerivs (CC BY-NC-ND), which stipulates that others can use and share but not change the work, provided the original author receives attribution. For more information, see http://creativecommons.org/licenses/.

preferred by content providers looking to restrict commercial use while supporting educational repurposing and redistribution. The Attribution Only (CC BY) license, on the other hand, is less restrictive, and allows other users to change and share the work in any way including for commercial uses, provided they attribute the work to the original author. The multiplicity of licenses and their incompatibilities are ongoing concerns for the OER movement[3], and encompass philosophical as well as economic differences. Yet, taken together, these are new freedoms granted to content users through technical, legal, and cultural changes that have arisen through the Internet over the last decade. The Creative Commons license options are consistent in allowing a "core right" to redistribute a work for non-commercial purposes without modification, and have helped to usher in and facilitate a content remixing movement, particularly in the arts and music.

Researchers in the education space have begun to explore how the use of freely available, sharable, and adaptable instructional resources affect student learning. Livingston and Condie (2006) conducted a study of an online learning program in Scotland that drew on both OER and proprietary materials, and specifically sought to assess impact of the program on participating high school students. Through analysis of student test scores, as well as interviews and surveys with teachers and students, the study found that achievement improved in all subject areas for students who used OER. Livingston and Condie further found that students who accessed OER did so autonomously and engaged in self-initiated learning. Specifically, OER provided opportunities for students to engage in, interact with, and personalize their course content. Those actions, in turn, facilitated more active learning. In this sense, the study concluded, students transitioned from knowledge recipients into independent knowledge creators.

ISKME's own research on OER use builds upon these findings. Based on interviews with 27 faculty adopters of open textbooks, and focus groups with and a survey of their students, Petrides et al. (2011) found that when students accessed their open textbook to complete assignments, they clicked through embedded links to other freely available online content, including informational texts and original source materials of relevance to their assignments. In this sense, students were found to engage in more self-directed learning activities.

ISKME's work has also begun to shed light on the ways in which OER use affects teaching practice. A study by Petrides et al. (2010) sought to assess how OER use supports the role of teaching artists in particular. Based on a survey of 151 teaching artists who attended a professional development workshop on OER, the study found that 66 percent had used OER in their teaching during a six-month period following their participation in the workshop. Interviews with a subset of the teaching artists further revealed aspects of OER use that they deemed as beneficial, including the potential to gain greater exposure to lessons, and best practices and new ideas to adapt and incorporate into teaching the arts. Other effects reported by study participants included increased documentation and sharing of teaching practices through OER, and reduced isolation through the collaborative possibilities provided by OER and its associated technology.

In light of such findings, the remaining sections of this paper explore the opportunities and "freedoms" made possible through OER, specifically in K-12 music education. Music education

[3] For more information, see http://en.wikipedia.org/wiki/Creative_Commons.

brings with it a unique set of conditions and opportunities that can be (and in some cases have been) met by OER. The following section provides a snapshot of some of the open and digital music collections currently available to teachers and learners.

4. Snapshot of the Music OER Landscape

In moving toward an understanding of the ways in which OER can support music education, ISKME conducted a review of online educational music content and websites to assess current offerings. In selecting the content to review, ISKME conducted general web-based searches and explored art and music organizations' websites and literature on music education—with a specific eye toward identifying collections that support student learning progressions by, for example, bundling content into topic or knowledge areas, or offering increasingly challenging content. Consistent with this study's focus on the ways in which OER can support K-12 music education in particular, ISKME selected 10 sites that represent top tier US-based providers of K-12 music resources, comprised of at least 50 resources, and which are openly licensed through Creative Commons (CC) licensing, or whose materials are freely available for use for educational purposes.

The 10 collections reviewed ranged from music collections housed within larger, cross-disciplinary repositories, to collections offered by music and performing arts organizations and initiatives. Table 1 below presents an overview of the 10 collections, organized by key components examined as part of the review.

Table 1. Overview of music collections reviewed

Collection/Site	Number of K-12 Music Resources[4]	Terms of Use	Enables User Contributions?	Aligned to Music Standards?	Primary Audience
Connexions	673	CC BY	Yes	No	Teachers
Curriki	385	CC[5]	Yes	No	Teachers
Learn NC	500	CC BY-NC-SA	No	Yes (NC State)	Teachers
OER Commons	881	CC; Custom Licenses[6]	Yes	No	Teachers
Musictheory.net	50	CC BY	No	No	Students
Carnegie Hall's Digital Library	628	Educational Purposes	No	Yes (NYC DOE, National)	Teachers
Dallas Symphony Orchestra Kids	133	Educational Purposes	No	No	Students

[4] The number of resources listed in the table was identified through search and hand counts of the K-12 music resources on the sites under review.
[5] Curriki's resources are licensed under the full range of Creative Commons licenses. Authors and contributors to the site are free to choose their preferred CC license when posting to the site; the default license for Curriki's materials is CC BY.
[6] The majority of OER Commons resources are licensed under the full range of Creative Commons licenses; some resources are freely offered with custom permissions or may be appropriately used under Fair Use guidelines.

Collection/Site	Number of K-12 Music Resources[4]	Terms of Use	Enables User Contributions?	Aligned to Music Standards?	Primary Audience
Kennedy Center's ArtsEdge	679	Educational Purposes	No	Yes (National)	Teachers
Little Kids Rock	861	Educational Purposes	No	No	Students
Smithsonian Folkways	97	Educational Purposes	No	No	Students

As revealed in the table, the multi-subject repositories and collections (Connexions, Curriki, Learn NC, and OER Commons) offer music content under Creative Commons (CC) licensing. Examination of their music content revealed that they also commonly encompass pure music content, as well as integrated music content, wherein history, social studies, math or other subjects are integrated with music study. The more music-focused collections—ranging from Musictheory.net to Smithsonian Folkways in the above table—for the most part allow use of their content for educational purposes (with the exception of Musictheory.net), and the majority offer pure music content that is not integrated with other disciplines.

Very few of the collections reviewed are aligned to music standards, and only three of the collections (OER Commons, Curriki and Connexions) support users' ability to post their own resources or repost derivative works. The following section covers key insights from the review of these 10 collections.

Several collections permit sharing and remixing; however, terms of use are unclear for others

Five of the collections license their content under a Creative Commons (CC) license—with variations in the specific CC license. Nearly all of the CC licensed collections allow remixing (combining content with other content), sharing, and commercial uses of content. Learn NC, however, specifically designates that its content not be used for commercial purposes. The other five collections offer their resources for educational purposes only. In most cases, those five collections do not delineate terms of use to guide teachers and learners in *what* they can do with the content for educational purposes, so users have difficulty knowing if they are allowed to edit, remix or share the content.

Few collections support user contributions

Only three of the collections support the creation and uploading of contributions from users. OER Commons features an authoring tool that enables users to create and upload original content as well as remixed versions (derivatives) of others' work. Connexions also supports authors in the creation and sharing of original and derivative works through its authoring platform. Curriki encourages users to upload their own and derivative resources to the site for review by a quality control team. All three of these collections support co-creation and sharing of resources by encouraging collaboration around content creation; they also encourage feedback from users by providing the capability to rate and/or review the content. Although Learn NC does not allow user contributions, all resources on the site have been developed by teachers in North Carolina and vetted by the site.

Few collections are aligned to state or national music standards

Three of the ten collections align their music content to music or art standards. Learn NC provides users with an overview of the North Carolina Essential Standards, and within that section, text links to appropriate resources by standard (for example, under "Kindergarten: Music Literacy," users can choose from multiple links of aligned resources that can be found on Learn NC's site). Kennedy Center's ArtsEdge uses the National Standards for Arts Education[7], while Carnegie Hall's Digital Library aligns its music resources to the National Standards for Music Education, as well as the New York City Department of Education's *Blueprint for Teaching and Learning in Music*.

Several of the teacher-focused collections support classroom implementation

For the teacher-centered collections, lesson plans, guides, and classroom activities comprise the bulk of the content, and several of these collections are designed to help teachers implement the resources in the classroom. For example, Learn NC offers information on how to find standards-aligned resources, and the resources are presented with supplementary material such as "questions to consider" and "related topics." This additional material is intended to aid teachers in incorporating resources into a larger lesson plan.

The student-focused collections aim to support active learning and learning progressions

Little Kids Rock, which is angled toward young learners, houses visual and interactive content including videos, animations and game resources that are intended to engage children. Alongside classical compositions, the site also provides sheet music for pop music. Furthermore, content on Little Kids Rock moves from beginner to more advanced lessons, allowing students to progress through a sequential series of skills. Likewise, Dallas Symphony Orchestra Kids offers lessons ranging from basics, such as learning about the staff, to more complex subjects, such as "building Neapolitan chords"; Musictheory.net provides learners with beginning to advanced lessons on various subjects, including chords, meter, and theory.

Summary of the Music OER Landscape Snapshot

The survey of the music OER landscape revealed several collections that support the use and implementation of digital music resources. However, only a few of the collections and sites support user contributions and the creation and sharing of derivative works. Furthermore, only a few of the collections that allow for use of content for educational purposes provided specific terms to guide teachers and learners in the ways that they can use the content. Additionally, few of the collections offer music OER and music content aligned to state and national music standards.

[7] The standards were developed in 1994 by the Consortium of National Arts Education Associations. They are voluntary national standards for grades K-12 in music, visual arts, theatre, and dance, and they describe the knowledge, skills, and understanding that students should acquire in these subjects.

5. Defining the End-Users for Music OER

The prior section sheds light on some of the ways that existing platforms and collections can support teaching and learning by providing access to resources, and in some cases, innovative technology and tools. This section addresses the potential end-users of music OER, in terms of their interest in and demand for these resources, and who might best be served by music OER. The discussion reveals that while music specialists and classroom teachers are likely key end-users of music OER, teaching artists and independent and formal learners are also critical end-users.

Music Specialists and Classroom Teachers

According to a report from the National Center for Education Statistics (NCES) on arts education in the United States, 94 percent of public elementary schools and 91 percent of secondary schools offered music instruction in 2009-2010 (Parsad & Spiegelman, 2012). The report further estimates that there are approximately 65,900 music specialists teaching at the elementary school level, and 61,430 music specialists teaching at the secondary school level. Classroom teachers were also found to play a vital role in music instruction at the elementary and secondary level, with the report indicating that 92 percent of elementary and 64 percent of secondary classroom teachers had incorporated music into other subject areas during the 2009-2010 school year (Parsad & Spiegelman, 2012).

The NCES report also indicates that access to public school music education is lower for some demographic groups. Specifically, 89 percent of elementary schools and 81 percent of secondary schools with high poverty concentrations were able to offer music instruction in 2009-2010, compared to 97 percent and 96 percent for their wealthier counterparts, respectively (Parsad & Spiegelman, 2012; cf. Rabkin et al., 2011). However, based on a survey of music specialists across the United States, the NCES report also indicates that teachers in higher poverty concentration schools were more likely to teach music through virtual field trips involving technology. Similarly, among secondary school music specialists, those who taught in high poverty concentration schools and schools with higher enrollment numbers of African American and Hispanic students were more likely to participate in professional development activities focused on integrating educational technologies into music instruction (Parsad & Spiegelman, 2012).

The NCES report further highlights that there are significant gaps in access to instructional resources considered "adequate" for public school music education. Specifically, the data collected as part of the study reveal that 31 percent of the public elementary school music specialists surveyed by NCES in 2009 rated instructional resources (textbooks, DVDs, software, subscriptions, etc.) as minimally adequate or not at all adequate (Parsad & Spiegelman, 2012). At the secondary level, 36 percent of the public school music specialists surveyed rated instructional resources as minimally adequate or not at all adequate (Ibid.).

These resource needs are potentially exacerbated by challenges associated with aligning current teaching materials and practices to national or state music standards. A study by Byo (1999) reveals insights on classroom teachers' and music specialists' ability to implement the National Standards for Music Education, in particular. The study—based on a survey of 177 teachers—

revealed "an almost complete rejection" of the music standards by classroom teachers due to perceived limitations in terms of time, resources, training, skill, and interest.

Furthermore, Byo's study found that some of the standards were only deemed feasible to implement by music specialists, and that classroom teachers were dependent on music specialists to implement most standards. Music specialists, on the whole, were found to be more comfortable than classroom teachers with the standards related to singing, listening, analyzing, and evaluating music. Both groups of teachers surveyed rated their ability to relate music to other subjects as low; however, classroom teachers rated themselves slightly higher on this standard than their music specialist counterparts. Byo concludes by arguing for an integrated design of curriculum delivery—involving shared responsibility with teacher leadership roles for specific standards based on interest, knowledge, and skill, and for an integrated approach toward relating music to other subjects. The latter is especially critical in light of the Common Core State Standards, released in 2010 and being implemented across 45 states, which call for educators to teach interdisciplinary thinking and to, therefore, bridge disciplines through classroom material.

In light of the above challenges and needs, music OER has the potential to serve as a solution to the perceived dearth in adequate instructional resources. Through open licensing, OER can be reused, edited, remixed and shared among educators seeking to find and align music content to their learners, to other disciplines, and to the curriculum standards in their states. Furthermore, OER are well-positioned to fill instructional resource gaps for teachers who possess the technology skills and training necessary to use them, especially educators in schools with high poverty concentrations that have less access to resources, and who, by way of interest and skill, are more likely to incorporate technology into music instruction. Coupled with other professional development supports and approaches to curriculum delivery, OER may also—through associated technology allowing educators to co-create and discuss curriculum materials—serve to play a role in supporting educators in the implementation of those materials in the classroom.

Teaching Artists

According to the National Endowment of the Arts, there are approximately two million artists in the U.S. across all arts disciplines (NEA, 2008). More than one-half of arts graduates (estimated at 120,000 total graduates per year) teach at some point during their careers, which takes into account diverse teaching settings, from school- and community-based programs, to private teaching studios (Strategic National Arts Alumni Project, 2011). Based on a survey of 2500 teaching artists across 12 study sites, Rabkin et al. (2011) estimate that one in five teaching artists are musicians who teach music. They further estimate that 35 percent of the work that teaching artists do is in public schools, and that in some areas and cities, teaching artists are responsible for a large portion of the arts instruction in schools. For example, across Boston public schools, teaching artists are responsible for 40 percent of the arts instruction (Ibid.).

The role of the teaching artist is evolving, and is increasingly being defined around a complex blend of skills and capacities. Booth (2009), based on his experience as a music teaching artist and trainer of teaching artists, describes teaching artists as "the designated experts in the verbs of art" (p. 6). Booth argues that teaching artists are expected to offer unique facilitation and the transfer of twenty-first-century skills to learners around creating artistic meaning, and describes them as the primary vehicles for advancing the arts by supporting learner engagement with authentic artistry in the classroom (Booth, 2009; cf. Martin, 2012). Twenty-first-century skills,

Booth explains, are multimodal, and often include practice that focuses on inquiry, listening, experimentation, and performance or recording. Rabkin et al. (2011) add to this discussion by explaining that through the experience gained through the iterative process of creating, critiquing and improving their own work, teaching artists are able to demonstrate to their students the metacognitive assessment practices that are "authentic to artistic production" (p.14).

In this frame of thinking, the role of the teaching artist becomes a dualistic blend of artist and educator. In the public school setting, this role can take various forms. Often working through partnerships with arts organizations that support music education in schools, teaching artists occupy a range of positions from single-day performance visits, to year-long positions wherein, for example, they contribute curriculum and input to a music theme this is being explored by their classroom teacher peers (Sinsabaugh, 2006). Rabkin et al. (2011) describe the teaching experience for teaching artists—and in particular middle school music teaching artists—as follows:

> There is a reasonable chance that the TA [teaching artist] will be responsible for integrating music instruction with another subject in collaboration with the classroom teacher, and responsible for helping develop original curriculum that links the two. Perhaps the TA is responsible for teaching a curriculum associated with the musical programming of her employer – a symphony orchestra or jazz society, for example – music that may be utterly new and unfamiliar to the students. In either case, the challenges of engaging students, holding their interest and attention, getting a commitment from them to learn, and achieving a set of concrete learning goals are likely to be far greater than the challenge at the community music school (p. 153).

As noted in the excerpt, creating original curriculum and working with classroom teachers to integrate music into other subjects are typical aspects of the school-based teaching artist role. However, as Rabkin et al. (2011) further note, while teaching artists may be highly skilled at their craft, most do not have advanced training in education, and only about 10 percent are certified teachers. As such, teaching artists often need tailored professional development support—specifically in the areas of selecting literature, writing curriculum, and creating sequential and scaffolded lessons (Rabkin et al., 2011; cf. Sinsbaugh, 2006).

Meyers (2005) adds to this discussion by explaining that professional musicians, who segue into a school setting and who often work in relative isolation, not only struggle with where to find classroom material, but also with how to find communities of fellow music educators for feedback and advice. In successfully meeting the demands of the teaching artist role, Booth (2009) emphasizes the importance of collaboration across school-based roles—among teaching artists, classroom teachers, and music specialists. A study of 298 teaching artists conducted by the American Association of Teaching Artists (2010) provides evidence for these arguments. On a survey item that asked teaching artists to rate the factors that they consider when selecting an arts organization to contract with on a teaching position, a large majority of the respondents rated community building with peers, professional development, and general support in their role (American Association of Teaching Artists, 2010).

In sum, building capacity for the dual role of artist and teacher requires collaborative practices among teachers, and professional development and instructional resources that support new

approaches to teaching around, for example, modeling musical artistry, as well as curriculum development and lesson planning. Touching on both the need for greater collaboration among teaching artists and classroom teachers—as well as on the benefit to students of teaching artists rooting teaching in their own authentic artistry—music OER can play a key role in achieving instructional goals. For example, music OER have the potential to support teaching artists, learners, and classroom teachers in the co-creation of new musical and media recordings, in addition to lessons and other curricular materials, by encouraging performance, recording, and sharing with the wider community.

Learners

As discussed in the preceding sections, educators have the potential to serve as a large end-user market for music OER, filling gaps in instructional materials, especially in under-resourced schools, and opening up possibilities around co-creation of resources with peers. It should be noted, however, that recent data reveal that learners comprise the largest group of end-users for music OER. In a survey of 488 users of a large collection of K-12 music OER learning modules on Connexions, Schmidt-Jones (2012) found that the largest group of users of the modules was self-directed learners (39 percent of respondents), followed by formal learners (23 percent of respondents).

These findings, in part, mirror user data from other OER sites and collections. OER Commons user data reveals that 55 percent of its users are learners (28 percent are self-learners; the remaining 27 percent are students), and 40 percent are educators; the rest fall into the category "other" (library specialists, librarians, district administrators, and other groups). Site statistics on MIT's OCW collection also reveal that self-learners make up largest percentage of users, at 43 percent, followed by students (42 percent), and finally educators (9 percent) and others (6 percent).

In assessing the needs that music OER meets for learners, Schmidt-Jones's (2012) study, cited above, found that more than one-half of self-learners surveyed used the materials as a means of providing access to music education that was absent in their schools and communities. Students in formal education, on the other hand, were found to use the materials to supplement formal instruction primarily for their music theory courses, and also for their music performance courses and acoustic courses. Schmidt-Jones further found that in using the materials, some music students were satisfying personal curiosities raised by their studies, while others used the materials to meet course expectations.

Summary of Defining the End-User

Beyond formal and informal learners, who currently make up the majority of the end-user market for large OER collections and at least one OER music collection in particular, educators have the potential to serve as a substantial end-user market for music OER. In terms of music specialists and classroom teachers, OER can serve as an attractive solution to meeting curriculum challenges—especially for educators in under-resourced schools, where there may be a lack of adequate materials alongside a possible pre-existing proclivity to turn to technology for affordable solutions to curriculum challenges. Likewise, teaching musicians, faced with increasing expectations that accompany their role, and a possible lack

of formal training in education, also serve as a key group of potential end-users for music OER. For teaching artists, OER can likely address a currently unmet need for those who are searching for curriculum materials or pedagogical solutions to meet their classroom requirements, as well as those who may wish to document, contribute and share their expertise and teaching practices with their peers. The section below addresses the ways that the potential benefits of OER may be optimally realized, specifically from the perspective of music education content providers and other field experts, as well as from the perspective of music educators themselves.

6. Lessons from the Field

To illuminate areas for consideration in supporting the development and adoption of music OER, ISKME conducted interviews with 11 experts working in the music education space and six music educators. The 11 expert interviewees were selected based on their knowledge of experience in focusing on a range of issues of relevance to the study—from perceived gaps in resources in music education, to factors supporting the adoption and use of music OER by teachers and learners, to the potential benefits of music OER to teaching and learning. The interviews with the six music educators sought to expand on these issues, specifically from the perspective of the potential end-users of music OER. The interviewees included:

- *Three OER providers* working to create and share music OER, including a leader at MusicTheory.net, a leader at KQED Spark, and an individual who authored a collection of music OER on Connexions
- *Six leaders of music education initiatives and organizations* that offer online digital music content for educational purposes to a variety of audiences, including Little Kids Rock, Ali Akbar Khan, the Association for Cultural Equality, Young Audiences, Dallas Symphony Orchestra Kids, and the Institute for Learning, Access and Training at the Chicago Symphony Orchestra
- *An intellectual property lawyer* with international experience in the development and analysis of intellectual property laws and policies that support open, online access to information and resources
- *An arts education researcher* who has examined issues related to the needs of teaching artists, the integration of the arts and music into teaching, and interdisciplinary teaching approaches
- *Six K-12 music educators,* including two music specialists, and four classroom teachers teaching an integrated music curriculum. Four of the educator interviewees had experience using OER, and two did not have OER experience

The above 17 interviewees were identified and recruited through the following channels: 1) a review of literature pointing to key individuals studying and examining needs specific to the K-12 music education space; 2) ISKME's and Carnegie Hall's networks of teachers and experts with experience or knowledge in the music education and/or OER space; and 3) recommendations by other interviewees.

The discussion below groups the interview findings into three categories for supporting the creation, adoption, and use of music OER: Content considerations, technology considerations, and licensing considerations. As revealed, each section highlights key lessons learned within

these areas from the content provider and field expert perspective, as well as the educator perspective.

Content Considerations

Enabling users as co-creators

Six of the eleven expert interviewees discussed the important role that content providers play in enabling users as co-creators of OER. Specifically, they cited how when users and other stakeholders contribute by adding examples, exercises, and other content to an existing resource, they support the enhancement and continuous improvement of OER. One OER provider discussed the importance of specifically supporting teachers in adding relevant content to an original piece of OER from their own curriculum, such as readings for students to explore before or after a particular music lesson. Another interviewee, a member of an organization that offers online music resources, discussed the important role that students can potentially play in supporting the development of new contemporary versions of audio content. Several interviewees discussed specific mechanisms for enabling user contributions. These included, first and foremost, that content providers utilize open licensing that allows users to edit, remix, and share content, alongside other strategies such as hosting competitions to motivate contributions and remixes of content, and offering content that is unfinished and unpolished because "people really like to feel they are making a contribution to a project."

Offering modular, digestible content

Four of the expert interviewees emphasized the importance of offering content that is modular, and that can be broken down into digestible pieces to support learner engagement with the content as well as teachers' ability to tailor content to meet learner needs. One interviewee, an author of music OER, discussed the need for content that is packaged into smaller modules, and that has an "overarching structure, but […] within that some flexibility that would respond to the culture of the learner, the teacher's culture, [and] the culture that the music is coming from." Another interviewee discussed the importance of digestible, short learning content for students to enhance their engagement in material—for example, by offering video content in five-minute segments and linking to other, more comprehensive content for students who want to explore topics further.

Two additional experts, both content providers, further described specific approaches to offering or creating modular content. One discussed his organization's music education collection, which features content on chord progressions. The interviewee explained that teachers can click a box explaining how to play a solo for a particular chord progression, another box that provides song lyrics, and yet another box that leads to the radio version of the song—providing small modules that are grouped as part of a larger lesson. Another interviewee discussed his organization's approach to creating modular content—explaining that it entails a willingness to spend time testing various options and ideas for lessons and activities, and eliminating those that are "too big for a teacher to explore in a modular way" or that don't contribute to the overall end goal of the lesson. The interviewee also noted that it is important to create content that teachers can pick up and use within a short time slot, but that they can also put it aside for several days and start again when needed.

Similarly, all of the six teacher interviewees indicated that a preferable content structure for OER is one that allows them to select components of a given resource that would best meet the needs of their students and that would match their time constraints for curriculum development. Specifically, teachers reported that curriculum that is organized into distinct lessons, with several student learning activities within each lesson, would enable them to adapt the material to their existing curriculum. For example, one teacher described how she would use the pieces of a lesson deemed most interesting and useful to her students' needs, but might not adopt the full lesson.

Supporting alignment of content to standards

Four of the experts interviewed stressed the importance of offering music content that is aligned to state or national music standards, or to other standards, as a means to help educators address the requirements of their community or school district. One interviewee discussed how, because educators' home states and school districts may have varied requirements, it can be difficult for music OER sites to offer resources that match every educator's potential needs. Another interviewee, an educator and author of music OER, mentioned the Common Core State Standards (CCSS) as a unifying tool, explaining that nationwide common educational goals would make it easier for sites and collections with a wide reach to align materials with one set of standards. A third interviewee explained how this looks in practice for the music lessons developed by his arts organization, as lessons are aligned to both the National Standards for Arts and the CCSS. Specifically, at the end of each unit within a lesson, the national arts standards—as well as the CCSS math or English Language Arts standards that the unit addresses[8]—are listed.

Four of the educators interviewed, who had experience with OER, indicated that when OER is clearly aligned to music content standards, the resources are easier for them to adopt and use. Furthermore, the educator interviews revealed that embedding state-level standards and the CCSS into the resources would also benefit their ability to easily adopt the content. One interviewee explained that in the current standards-focused environment, educators are frequently pressed to explain to administrators, parents, and others how curriculum addresses the standards, and are under pressure to ensure any additional curriculum materials they bring to the classroom are standards-aligned.

Anticipating and meeting diverse learner needs

Five of the experts interviewed emphasized the importance of tailoring content to learners' varied needs. In particular, one interviewee indicated the importance of content design that "thinks seriously about how we present this information to those who have significant speech, hearing, or motor impairments." Another interviewee indicated that music education content should open up possibilities for students to share back with their teachers as a means of sparking students' interest and excitement.

[8] Examples of English Language Arts standards addressed include: "Determine or clarify the meaning of unknown and multiple-meaning words and phrases," and "Identify the main topic and retell key details of a text." Examples of CCSS math standards addressed include "Understand the relationship between numbers and quantities; connect counting to cardinality", and "Directly compare two objects with a measurable attribute in common, to see which object has more of/less of the attribute, and describe the difference."

Several other experts emphasized the importance of adequately addressing students' varied learning levels by, for example, creating different access points within a resource based on where students are in their learning, or offering activities, games, and exercises that are experiential and hands-on to appeal to learning needs across all ages. The educator interviews underscored this finding. Four educators discussed the importance of interactive exercises, particularly those that are designed to engage students in doing physical activities and interacting with the musical content. One educator relayed an example of a resource that involved students in creating new compositions using their bodies and voices. Elements such as these, educators indicated, would be useful in meeting the needs of students with variety of learning styles, skill levels, and prior knowledge.

Technology Considerations

Aligning content formats and tools to end-user technology

A key technology consideration raised in the interviews was the need for OER providers to tailor their content formats and tools to the technology needs specifically of the end-user. Two of the expert interviewees discussed the importance of offering downloadable content for rural and urban schools that may not have the funding or the capability for streaming in their classrooms. Three experts, all content providers, stressed the importance of offering music education content on smart phones to meet the needs of today's learners, including those in communities where cell phones may be more prevalent than computers.

Enhancing discoverability

The interviews further underscored the importance of supporting enhanced discoverability of music OER for teachers and learners. One expert interview participant explained, for example, that existing platforms are heavily biased toward text-based descriptors of content, rather than music-based descriptors, and that most music OER collections will "have to think about what metadata will enable content to be easily found by the people who are most going to want to find it." He further explained that this could mean exploring unique ways for describing resources in a way that fits a specific population of music-focused users.

Licensing Considerations

As mentioned earlier in this paper, the benefits of music OER, in terms of advancing teaching and learning, can be viewed through the lens of the "freedoms" that OER offer. Again, these freedoms include the right to freely use content, the right to adapt and modify content, the right to remix original or adapted content with other content to create something new, and the right to share copies of original, augmented or remixed content with others. Integral to achieving the potential of these freedoms are issues regarding licensing and terms of use.

Interviews conducted with OER providers and other field experts revealed that music OER brings with it unique considerations around licensing, especially when music recordings, performances, and lyrics are components of the content. As one interviewee explained, these music elements—if not in the public domain—often comprise multiple rights holders, from songwriters, to performers and producers. The section below discusses key themes that emerged

from the interviews, specifically related to intellectual property considerations for future OER providers seeking to create and offer music OER, as well as the benefits of open licensing more generally.

Supporting the inclusion of performances and recordings in music OER

For OER providers and authors seeking to include music performances, recordings, and lyrics in their content to enable experiential learning for students, several of the expert interviewees discussed solutions that would address the complexities (and expenses) involved in clearing rights for such music content. Three interviewees, for example, suggested using music in the public domain. However, one of these interviewees, an author of music OER, indicated that while rich in classical and folk traditions, music in the public domain does not include pop, which may be a drawback for some learners: "An awful lot of the learners want to understand [pop], to see what music theory says about popular music, and how it's comparable or not comparable to classical and folk." Another interviewee suggested that larger OER providers, with adequate resources in place, can re-create proprietary material with contract artists, with the resulting material being described as "in the style of" a particular song. He further noted that: "It might be a little more expensive [to re-record], but it would certainly be more productive and faster, and probably more successful, than going out and trying to get the rights from everybody." Other solutions raised by interviewees included holding contests or asking users to contribute their own original, openly-licensed recordings and performances. In sum, using public domain materials, re-recording songs "in the style" of a certain piece, or relying on user contributions were seen as workaround options for addressing rights issues.

Supporting innovative, "unintended consequences"

Two of the expert interview participants highlighted the benefits of open licensing, specifically in terms of user contributions that emerge from unexpected stakeholder groups. A leader of an OER initiative explained, for example, that OER and associated technology invites new and innovative contributions from users. Specifically, the interviewee noted that through licensing that enables modifications and remixes of content, users will contribute content that is "surprising and delightful, and exactly the kind of thing that you would have hoped for, or would not even have thought you could have hoped for in terms of uses." He further stated: "You are going to see kids in elementary schools doing this [remixing and creating derivative works], you are going to see teenagers, senior citizens in enrichment programs in retirement homes doing stuff with this that you wouldn't have even imagined."

A field expert working in the OER space underscored this argument by stating that "people are unexpectedly creative and innovative, and it is almost impossible to predict with certainly all the possibilities of a new development [like music OER]." In sum, the interviewee emphasized the important role that open licensing plays in facilitating the unintended consequences that will likely result as people remix and augment open materials.

Supporting remixing through solutions that address interoperability

Two interviewees raised the issue of interoperability—and specifically the complexities of various pieces of content being offered under different licenses and different terms of use. For

example, confusion may arise for a teacher who wants to combine his own content that he has assigned a Creative Commons Attribution (CC BY) license with a piece of content found online that is licensed under a slightly more restrictive license. One interviewee, an intellectual property expert working in the OER space, discussed how in situations like this, the resulting content does not inherit the initial resource's license, which can cause incongruity and create confusion for users. To resolve the issue of rights around merged resources, the interviewee recommended that OER sites only allow content to be uploaded under one license, dictated by the site, so there is no question of multi-licensing. "That makes life easier for people so they know how they can use the work, because we are not all lawyers, so people get confused if there are many different licenses," the interviewee explained. Alternatively, the interviewee discussed how OER providers could organize their collections into sections based on the types of licenses used. In sum, considerations such as these, by providing clarity around terms of use, were said to play an important role in support remixing and the creation of derivative works by users.

Summary of Lessons from the Field

As revealed, open educational music resources, though open licensing, have the potential to support end-users as co-creators and innovators in the content creation process. Producers of content can support these and other use possibilities by offering content that is modular, digestible and engaging, and that is aligned to end-user needs as well as to education standards. Addressing these opportunities involves exploration into creative solutions and policies around content development efforts, including using public domain resources or other workarounds, to create engaging music content that supports the inclusion of performances and recordings, and choosing licensing approaches or technology solutions that enable clarity around terms of use for users.

7. Discussion and Conclusions

This study has revealed the potential, important role that music OER can play in meeting current gaps in education content, especially for under-resourced schools, and for teachers and teaching artists who do not have access to adequate resources. The study has also highlighted the opportunities for music OER to support the documentation of teaching practice and the creation of supplementary resources (for example, in the form of videos of teachers using music OER in the classroom) by teacher authors—which can in turn support knowledge sharing and professional development for future teachers. In line with the literature, this could be especially valuable to teaching artists and their potential need for support in the areas of selecting literature, writing curriculum, and creating sequential and scaffolded lessons, as well as music specialists and classroom teachers, who may face challenges in meeting music education standards—especially in the area of relating music to other subjects.

This study has also revealed several gaps in the existing music OER space, which may present barriers to adoption by the educators who would most benefit from the uptake of these resources. For example, the study revealed that few OER collections support user contributions, and that few collections are standards-aligned. These gaps—in conjunction with findings from the interviews revealing the importance of providing modular, digestible, and engaging content that can be tailored to teaching and learning needs—serve as pathways and opportunities to explore

on behalf of music OER providers. For example, providers can explore and develop approaches to creating modular content that meets the time, resource, and other needs of teachers, and that, importantly, encompass tools that allow for remixing, modifications, and reposting of content. Furthermore, content providers can explore ways to offer music OER that are aligned to national and state music standards and the Common Core State Standards—including approaches that draw upon teacher users to align content to those standards.

Furthermore, this study has revealed a lack of clarity around the terms of use for many freely available music collections. Open licenses and new terms of use for OER necessitate awareness and responsibility on behalf of users to use materials appropriately. How the field supports users in this awareness and responsibility is of great importance. In this sense, the field would be well served if music OER providers played a role in how users come to know and understand the licenses. These efforts could include creating clearer terms of use for custom licenses, structuring and designing collections so it is clear which things can be remixed and which cannot, and using less restrictive licenses (for example CC BY or CC BY-SA) so that content can be remixed with other content. In sum, there are opportunities for the field to develop solutions to ensure that innovation and legal constraints do not continue to be at odds with one another.

Music OER have the potential to engage learners in new ways of knowing and learning, and to make music education accessible to student populations that have previously lacked access. There are also potential benefits for educators in both formal and informal learning networks, in terms of offering authorship experience and collaborative professional development that can help shape the future of the music education field. In sum, there exists great opportunity to leverage the power of OER to impact student learning, enhance teacher professional development, and strengthen networks of educators—and ultimately the music education field as a whole.

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