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### **Interest-Driven Music Education: Youth, Technology, and Music Making Today**

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### **Abstract and Keywords**

This chapter examines how music education can benefit from the use of new electronic tools and materials for music making that allow learners to combine their interests and prior understandings toward deepening their engagement in music. This chapter puts forward a series of new examples that are transforming tradition music education, including rhythmic video games, like Rock Band, which can help bridge the large chasm that exists between youths' music culture and traditional music education. In addition, inexpensive recording hardware and software such as Audacity and GarageBand have provided youth with opportunities to compose and perform as only professional musicians could in the past, uniquely shifting the professional recording and composition landscape. Other prominent examples include software like Impromptu, which successfully engages youth in music composition and analysis by enabling users to create and remix tunes using virtual blocks that contain portions of melodies and/or rhythmic patterns that allow one to understand music theory and composition at much younger ages. Collectively this work heralds a shift in twenty-first-century music education, which has the potential for engaging greater numbers of young learners in authentic music making and performance.

Keywords: music making, interest-driven learning, digital music, rhythmic video games, music, technology

AN artist by training, I engage in research that focuses on the intersection of arts, new media, and informal, interest-driven learning. Over the course of my work, I have collaboratively investigated how new technologies are allowing youth to leverage their musical intuitions in the making, performing, and sharing of music. In this chapter, I share a range of work that examines how music education can benefit from the use of new tools and materials for music making that allow learners to combine their interests and prior understandings toward deepening their engagement in music.

### **New Opportunities for Music Learning**

Where and how do youth learn music? For most, music education is a continuous, two-pronged affair. On the one hand is the formal education that begins for many youth in elementary school, with its acronyms for remembering the pitches on a staff and their first instrumental performances (whether on percussion instruments, recorder, or guitar). On the other hand we find the informal education that begins when youth overhear their first song and continues throughout their lifetime as they consume new artists and hear “new things” in their old standards. Both are relatively universal. For example, here in the United States, regardless of region or income level, the most current estimates state that 94% of all schools offer music education programs (Parsad & Spiegelman, 2012) and youth spend an average of two and a half hours a day listening to music and audio (Rideout, Foehr, & Roberts, 2010). Of the two, however, the former occupies a substantially shorter amount of time in the lives of most youth and often fails to activate youth interests in concert music, which has contributed to the declining numbers (p. 192) frequenting music concert halls and crippling today’s concert music industry (Harlow, Alfieri, Dalton, & Field, 2011).

However, informal, interest-driven participation in music is increasingly dominating youths’ out-of-school recreational activities (Peppler, 2014; Rideout, Foehr, & Roberts, 2010). One of the most common sights today is youth on the subway, at local coffee shops, in schools, and online listening to and engaging in music—most of which is afforded through the new digital music landscape. Moreover, notable pockets of youth are creating a diverse amount of media, including music videos (Knobel, Lankshear, & Lewis, 2010), original compositions, and visual animations or movies with original soundtracks (Luckman & Potanin, 2010; Thomas & Tufano, 2010). This type of music and media production, while not inherently rooted in the canonical arts, denotes a “creative turn” (Sefton-Green, Thompson, Jones, & Bresler, 2011) in how youth create with new technologies and it may very well provide a new informal pedagogy to support music learning today.

Taken together, all this suggests that today’s youth have no shortage of access to and awareness of music in its various forms. However, the challenge is therefore to engage youths’ preexisting interests in the music that is present in their everyday lives and move them to deepening this understanding and becoming original and high-quality music makers (Peppler, 2013, 2014). The promise of new technologies is that they seem to be lowering barriers to who can engage in music making and diversifying the methods of participation that can signify a twenty-first-century approach to music learning. This chapter takes a closer look at several examples of how new technologies are changing the traditional relationships between youth, music making, and performance. These examples highlight new opportunities for music educators, parents, and youth to question current misconceptions of how new technologies offer watered-down or inadequate versions of traditional music education and instead offer new pathways into a music education that is more aligned with youth culture and what we know about high-quality, interest-driven learning.

## **New Doorways into Music Learning and Performance**

With the introduction of new technologies, the pathways into music education are changing. As a notable example, my research team at Creativity Labs and I found that “rhythmic video games”—virtual representations of rock music performance and practice—are changing the way young people learn authentic music concepts and notation commonly thought to be the sole domain of formalized music education (Peppler, Downton, Lindsay, & Hay, 2011). The majority of rhythmic video games (e.g., Rock Band and Guitar Hero) are characterized by players’ use of a simplified instrument, such as a guitar or drum set, to execute, “in time,” music that is simultaneously heard

and notated (p. 193) onscreen. The in-game scrolling notational system—a combined form of guitar tablature and a modified MIDI notation that translates notes into vertical rectangular blocks that pass over a horizontal “finish line”—differs from modern staff notation but embodies several of its rich musical concepts, including models of metric hierarchy, subdivision, measurement, and pattern identification (Peppler, Downton, Lindsay, & Hay, 2011). And, by aligning intuitive notation symbols with prerecorded instrument tracks, rhythmic video games enable rare opportunities for real-time formative feedback (“notes” on the screen will fail to illuminate and your instrument temporarily drops out of the song when you hit the wrong keys) that lets players know if their “performance” corresponds with the notation onscreen, reinforcing the symbiotic relationship between a notation system and sound, and sensitizing players to the multiple parameters required to effectively represent music in a written form.

The tension between understanding music in both its aural and written forms is, of course, central to the nature of musical education—that learning about music is as much about becoming familiar with its notational and theoretical underpinnings as it is about its performance, the learning of each becoming increasingly specialized in advanced study. Research indicates that rhythmic video games, by disseminating notational concepts through the act of musical “performance,” are best positioned to address the former. When an individual purchases a guitar after spending an extended period playing rhythmic video games, the knowledge they appropriate from the game to the real world is less rooted in any instrumental facility they’ve developed than in the foundational concepts of music upon which they build their understandings of how music “works,” a distinction voiced in the music education and popular musicology literature by pioneers in the exploration of youths’ informal music practices (Green, 2002, 2005, 2008; Campbell, 1997; Clements, 2008). In this work, scholars cite examples of youth developing their aural, improvisatory, compositional, and/or theoretical intuitions, even haphazardly, through immersion in peer-led musical activities (in the absence of formal instruction) (Green, 2005; Abril, 2008; Lum, 2009). An element that Lucy Green (2002, 2005, 2008) identifies as the prime source of informal music learning is youths’ emulation of recordings, emphasizing the connection between the listening experience and the act of performance. In traditional music education curricula, the listening experience and the act of performance are often kept separate by a focus on how music is notated, with the memorization of note names, key signatures, and tempo markings being a central focus—in effect designating the act of critical listening (e.g., to a master’s performance) as a value-added activity to supplement, when possible, the primary goal of mechanical facility (e.g., pressing the right key at the right time, singing in tempo and at the correct pitch).

Yet the interlocking of aural and notational elements in rhythmic video game environments (i.e., by linking recordings of a master musician’s performance to a scrolling notational system) could be said to present the “best of both worlds,” with youths’ musical understandings potentially augmented by connections they can make between sound and visual representations. The result is an immersion that players report experiencing during rhythmic video game playing, one that encourages them (p. 194) to follow and “read ahead” in a musical score as well as enabling them to listen to music differently; they pick apart different things in the song (e.g., bass, melody, rhythms, structure), thus elevating the gaming experience to a level steeped in music learning (Miller, 2009). It is my contention that the music concepts that are central to the comprehension of traditionally notated music are represented in rhythmic video games’ notation system, which serves as a novice-friendly method whose lessons can be applied to more traditional forms of notation, affording beginning learners a “doorway in” to more formal practices (Wiggins, 2009). This is particularly propitious for low-income and otherwise underserved youth who have greater access to video game consoles (Pew, 2008) than, one might assume, to private music lessons. Furthermore, video game consoles are becoming important music venues, with 71% of youth across all socioeconomic groups having played games like *Rock Band* and *Guitar Hero* (Rideout, Foehr, & Roberts, 2010), two of the most lucrative video games of the past decade (Quillen, 2008).

In our prior research, Michael Downton, Eric Lindsay, Ken Hay, and I sought to better understand the potential relationship between rhythmic video games and music learning among today's youth. Toward this end, we conducted a study in the after-school hours at a local Boys and Girls Club (Hirsch, 2005) located in a midsized midwestern city (Pepler, Downton, Lindsay, & Hay, 2011). At the time of the study, freely available music lessons were offered by volunteers at the Boys and Girls Club, most often on the violin or recorder. However, very few members took advantage of the opportunities for formal music instruction, and the few who did were primarily Caucasian and from middle- to upper-middle-class homes. This landscape quickly began to change when we introduced a Rock Band Club, as it quickly became popular with youth, with about 10 times the enrollment of the traditional music lessons.

As we investigated the relationship between the in-game notation system to other formal notational systems, we, aided by local music educators, developed a series of sight-reading, transcription, and echoing tasks, pulling measures from the local music textbooks based on the Kodály method (e.g., *Spotlight on Music*, 2005) that were age-appropriate and followed K–5 standards for music. This assessment was administered to all participants in the Rock Band Club as well as a group of nonparticipants and further analyzed, correlating the relationship between the number of Rock Band sessions and youths' scores on the traditional music assessment using a simple univariate regression. Collectively, our results showed that extended play in Rock Band positively and significantly correlated with the assessment results of youths' traditional music abilities (Pepler et al., 2011). The results provided evidence that the youth playing rhythmic video games saw a connection between the two notational systems and that extended Rock Band play was significantly correlated with how well youth were able to sight-read, transcribe traditional staff notation, and perform rhythmic echoing tasks. While we probably wouldn't go so far as to say that the game was teaching traditional notation, we believe that the game attuned youth to reading notational forms of music that made it easier and more relevant to them when they were presented with traditional notation back in the classroom.

(p. 195) As Green has observed, young musicians only interact effectively with music to the extent that they are enjoying themselves. In her observations, “cooperation, sensitivity to others, commitment and responsibility are explicitly highly valued by the young musicians” (2008, p. 8). Comparing the Rock Band Club to the private instrumental lessons at the Boys and Girls Club, the contexts for performance were quite different; the violin and recorder students never gave recitals or official performances for their Boys and Girls Club peers, whereas the Rock Band Club youth treated each session as a performance, with nearby members clapping and dancing to the music blasting from the television. With performance being one of the most rewarding aspects of being a musician, the Rock Band youth (through their displays for the audience and wide grins when their “band” played well together) appeared to get a sense of what that aspect of being a performer was all about much sooner than their private-lesson peers (who would also have to practice much longer on their instruments before having a piece “performance ready”). Without the opportunities for performance, the students in private lessons were engaged in an activity that seemed, at least to youth on the outside, lacking in context or function. Yet the members of the Rock Band Club eventually overcame their earlier apathy toward the idea of taking private lessons, possibly because the Rock Band Club provided them with a venue to forge their identities as musicians. In fact, almost all the youth enrolled in the Rock Band Club signed up for traditional music lessons for the first time following their Rock Band play, resulting in the first ever waitlist at the Boys and Girls Club for private instrument lessons. Asked why he had finally signed up for free violin lessons after playing in the Rock Band Club, an 11-year-old boy replied, “I want to learn guitar, and if I can do this (mimics the playing of a violin), then I can do this (mimics the playing of a guitar)” (Pepler et al., 2011, p. 1). In this response and several like it, we see that the young boy was able to see the relationship between what he liked and aspired to do with music and the kinds of traditional

Western instruments and repertoire available to him. And the fact that several of the youth who signed up for private lessons after participating in the Rock Band Club verbally acknowledged that they had been sitting on latent desires to learn an instrument for some time further points to the connections that youth were forging between the Rock Band Club and their musical selves.

Perhaps this phenomenon can be explained by the fact that rhythmic video games differ from most video games in that they don't simulate as much as they represent actual experience, with a great deal of fidelity to the rhythmic aspects, especially, of music making. A significant reason why rhythmic video games could provide an advantageous introduction to music learning concerns the culture of video gaming and could provide its relationship to the performative aspects of being a musician and leverage what we know about effective video game design (Gee, 2003; Salen & Zimmerman, 2004). For example, youth were not sent into practice rooms to learn music fundamentals; their learning experiences were wrapped within the guise of game play and group activity. This proved important not only for youths' sustained engagement, but potentially for the learning itself. Furthermore, we forget the large chasm that exists between youths' music (p. 196) culture and that which we value in traditional music education, making Western music (like playing violin, practicing Bach, and reading modern staff notation) seem distant and unapproachable and leading them to opt out of even freely available opportunities.

When my colleagues and I recently followed up with our Rock Band Club cohort some years after this study, we found that most of them were still participating in the local youth orchestra and were deeply committed to playing the violin—years after their Rock Band Club experience.

One thing to note that emerged from our adult Rock Band expert-novice studies, however, was that when we invited professional rock musicians in to play the game (i.e., rock bands that had their own albums, played regular and professional gigs, and frequently covered the game's tunes as part of their covers) they adamantly disliked the game, performed poorly in-game, disliked the game's controllers, and felt that it was a pale imitation of actual onstage performance. They actually brought their own instruments to the study and, at the start of our observations, quit playing the game and picked up their instruments to play the songs in the game for us. One of the criteria for participation in our "rock musician" group that became important in our later interviews was that they learned to play "by ear" as a way of coming into music and had little to no ability to read traditional notation. This playing by ear meant that they had become accustomed to greater creativity and flexibility in the performance, had a greater reliance on listening to the music and to one another, and disliked the restrictions that the game's notation and restricted instrument had on their freedom to perform the music.

By contrast, we also invited groups of musicians with doctorate-level academic training in music, with prior experience with ear training, sight-reading, and writing traditional staff notation, to play Rock Band. In all instances, the academically trained musicians performed exceptionally well in the game. They went quickly through the various levels of game play, achieving expert in-game status easily, likely because of the alignment between traditional notation and the game's notation, as well as the game's privileging of the highly developed skill sets these musicians had in sight-reading, musical performance, and ear training. Moreover, they reported an overall enjoyment of the game, highlighted the immersive qualities (e.g., reporting a "performance high" after a successful performance), and a heightened aural perception of how rock music is put together that was not discernible in their everyday listening.

All of this highlights the fact that the ways in which new technologies are designed will privilege some ways of knowing and creating music while dismissing others that are valuable aspects of our music history and traditions. The music education community has long lamented that many youths fail to connect the repertoire, instruments,

and skills embodied in informal music activities (e.g., rock music, garage bands, songwriting, and the cultural capital that comes with those activities) to formal music education. Music education that youths learn in garages and online environments is quite different from what their peers learn in high school bands and orchestras (Green, 2002) and could further inform designs for new technologies in interest-driven music education.

(p. 197) **Reshaping the Music-Making Experience**

New technologies are not just changing the nature of music performance, they have radical and far-reaching impacts on nearly all aspects of the music-making experience, including recording, distribution, sharing, composing, and even the genres of music itself (with new hybrids of previously distinct forms of music, new digital or computational forms of music and sound art, and so forth). For example, the widespread availability of inexpensive recording hardware and software (e.g., Audacity and Pro Tools), coupled with the expanding opportunities for amateurs to distribute and share their work online, has caused tremendous shifts in the music industry (Graham, 2009). For the first time in 2009, digital sales surpassed physical CD sales (Arango, 2008). Because musicians can now sell their work directly through online marketplaces such as iTunes, they do not need to wait for major record label deals and difficult-to-obtain album contracts. Some young artists have started their own DIY record labels and/or begun marketing themselves primarily using free services such as YouTube and other social media platforms. Instead of following the lead of professional artists, young artists are redefining how musicians create, produce, share, and distribute their work in the twenty-first-century digital marketplace.

For young musicians wishing to produce professional-sounding work, new technologies are further blurring the lines that once divided artist, record company, and distributor. Notably, Apple's Logic Pro and GarageBand, Sony's ACID Pro and Sound Forge, Cakewalk Sonar, ReCycle, FL Studio, Propellerhead's Reason and Ableton Live are all prominent examples of programs that enable musicians to create original compositions featuring realistic virtual instruments, radio-ready beats, and audio engineering effects—while using little more than an electronic keyboard and a laptop. Youths who have never learned to play an instrument can even create entire compositions by dragging and dropping various arrangements of prerecorded “loops”—royalty-free segments of drum patterns, musical gestures, and chord progressions. Although skeptics could argue that music built on others' loops is not wholly original, the use of prerecorded loops (or “samples” from other artists' work) is arguably an authentic practice of professional composing and producing, as is evidenced by its pervasive use in genres such as hip-hop, electronica, and rap. Many companies are dedicated to the sale of loops and sample music libraries. With the right tools, a music hobbyist can create something in 15 minutes that used to cost people \$1,500 per hour to produce with live musicians in a studio. Further, a flood of new mobile apps, such as Beatwave, Sonorasaurus Rex, PatternMusic, and Looptastic, is expanding the opportunities for music creation.

Online web communities for digital music composition and performance have given young people a place to share, critique, and collaborate with others. New online communities for sharing music include MacJams, iCompositions, Circuitbenders Forum, General Guitar Gadgets, Create Digital Music, Facebook/MySpace, and SoundCloud.

(p. 198) Such communities represent a major shift in how music is consumed and created—from a solitary act of composing via paper and pencil to a worldwide collaborative and creative enterprise. Youth rock band rehearsals are even moving out of the garage and into cyberspace. One compelling example was TwitterBand: a group of 11 people who have never met in person but who share an interest in music and philanthropy have formed a band

through the social media network Twitter and have released singles and videos that have helped raise money for charitable organizations.

The underlying story behind much of the market demand for these tools is that children (and adults) know more about music than they realize (Bamberger, 1991) but in prior generations have just lacked access to the right tools and materials for music making. Bamberger and colleagues have shown that both novice and expert musicians talk about music in much the same ways; that is, music is perceived in meaningful “chunks” rather than discrete properties (e.g., “notes”) (Bamberger 1991; Downton, Pepler, & Bamberger, 2011). As new technologies enter this landscape, real or perceived barriers to music making are breaking down, opening new doors for young musicians and composers to create, perform, and share their music with others.

New technologies can make their greatest contribution to music education in the form of bridges between learners’ intuitive and formal understandings of music when these technologies provide a welcoming environment in which users can explore the conceptual underpinnings of composition (i.e., by arranging and layering premade groups of melodies and rhythms, as a foundation) in the absence of prior musical training. Many programs are now available, including Bamberger’s *Impromptu*, that allow youth to become, more than just consumers, creators of music—in effect moving creating music from the confines of professional recording studios to homes and classrooms throughout the world (Savage, 2005; Théberge, 1997).

*Impromptu* successfully engages youth in music composition and analysis by enabling users to construct, reconstruct, and remix tunes using “Tuneblocks”—virtual blocks that contain portions of melodies and/or rhythmic patterns—all while building an understanding of important musical concepts such as form, melody, pitch, rhythm, and structure (Bamberger, 2000). Bamberger’s *Impromptu* is unique due to the high emphasis it places on learners’ reflecting on the decisions they make in the construction process. In the process, these reflections can also reveal aspects of learners’ cultural identities. For example, Bamberger’s prior work demonstrates that when listeners are dealing with unfamiliar atonal music passages (i.e., music that does not have a recognizable tonal center) they will actively tinker with the compositions to establish a tonal center, even in the absence of a formal understanding of what sounded “wrong” about the atonal music or what sounded intuitively “right” about their tonal creations (Bamberger, 2003). Cases like these highlight how novice listener-composers will initially inject their own cultural preconceptions of music into their compositions in lieu of more formal intentionality. For example, when the Tuneblocks in the program feature patterns foreign to users’ aural sensibilities (i.e., tunes from outside the users’ own culture), the users then become more aware of their cultural biases through their reflections (e.g., some users might say that a pattern sounds “spooky” or “weird” when they are unfamiliar (p. 199) with it, whereas someone from that pattern’s culture might find the music “comforting”) (Downton, Pepler, Portowitz, Bamberger, & Lindsay, 2012).

As the arrangement of Tuneblocks makes some of the more imperceptible aspects of music apprehendable to the user—such as form and structure, as well as the construction of pitches and rhythms (Bamberger, 2000)—these apprehensions require users to listen critically and adjust their perceptions concerning what they are hearing. In this way, they are becoming aware of the commonalities and differences among differing cultural traditions (Bamberger, 1974). Furthermore, the task of creating music from the “building blocks” of other cultures’ music is offered as a possible mechanism for restructuring thinking and adjusting perceptions in such a way that culturally diverse materials become recognized and accepted as different yet relevant to one’s own culture (i.e., developing an awareness and respect for artifacts of a culture other than one’s own). Technology may very well play an important part in maintaining the role of music in crosscultural understanding, as it can be a means through which

to distribute music across traditional divides as well as a way to empower youth to write and share their music across cultural barriers.

## How New Technologies Are Changing Music Education Today

In sum, we can see that new technologies are providing many opportunities to positively envision the performative and music creation aspects of music education today, including their capacity to provide (1) immediate feedback to players just learning to play a new instrument, (2) scaffolded ways of interacting with new and alternative forms of music notation (yet still deeply connected to traditional notation systems), (3) authentic contexts for performance, and (4) genres of music participation that are more connected to youth culture.

However, some notable limitations of today's music technologies are also illustrated in some recent trends. More recently, designers tried to respond to the common critiques of rhythmic video game play and offered new and more authentic peripheral guitar devices, complete with a full range of strings. As they did so, they were trying to make the video game experience simulate the "real thing." Despite these aspirations, these attempts were never as widely popular among the public. One explanation is that this drive to be more authentic in terms of traditional musicianship turned away from what was initially successful about the game—the focus on the notation, the immersive performance, and the easy entry to music performances—and replaced it with a focus on instrumental facility and the fine motor skills needed to command a traditional instrument.

Further, those new demands placed on the player/performer also run up against the limitations of the technology itself. The ways the games are designed (and even the <sup>(p. 200)</sup> authentic relationships to traditional staff notation) privilege particular types of music training and neglect other equally important traditions of learning about music. As noted, in the case of rhythmic video games, our expert-novice studies seemed to indicate that Rock Band resonated most with musicians who had traditional academic training in music (in our case doctoral-level musicians and composers). By contrast, musicians who had taught themselves to play "by ear" and had little to no ability to read traditional notation reported a dislike of games like Rock Band that embed a form of notation in the game play.

Furthermore, new technologies are providing easier entryways into pursuits like composing and novice music making, radically shifting the lines between performer, listener, and composer. The kinds of reflective meaning making that new technologies afford in the process can engage youth in very high-level conversations, similar to what might typically be expected at the postsecondary level. As music becomes more accessible, so does the opportunity for youth to listen to a wider array of music, becoming aware of traditions outside their cultural norms. Combined with new software for music composition, these opportunities allow for young people to remix and make existing music their own, forging new connections to other cultures in the process. All of which lays the foundations for new visions for a twenty-first-century music education that has the potential for engaging greater numbers of young learners in authentic music making and performance and for reconnecting today's youth with the rich traditions and repertoires of music that have accumulated over the years.

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