The future of music making and music education in a transformative digital world

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ABSTRACT

The purpose of this inquiry is to examine the potential impact of creative, digital technologies on music pedagogy in the 21st century. In the last decade, digital technologies have fundamentally changed music making, sharing, teaching, and learning and it is rapidly evolving. An unprecedented renaissance of social music making is taking place through the use of musical games, apps, and networked digital tools. Music educators must be current with these emerging trends to stay relevant with youth culture. In our paper, we share the implications these technologies may have for the future of music curriculum and praxis. We express a call for a fundamental rethinking of our basic assumptions about pedagogy and learners, as well as what we as educators view as "valid" musical expression.

The present paper will begin with a brief overview of the digital technological developments of the past decade and their impact on music, describe the functions of new digital music applications (i.e., "apps"), determine their possible uses in music learning contexts, and examine possible pedagogical implications with regard to youth music and music making in a digital world. Digital music applications, and the technologies that deliver and network them, represent a shift in the way music is made and distributed in a global environment. This techno-cultural change has already made a profound impact in North America and other parts of our global village. As educators in the 21st century, we are obligated to take a forward thinking stance to anticipate and adapt to both new technologies and emerging forms of music[1] (i.e., music interactions) and integrate them into meaningful, contemporary curricula. This essay, and the ideas provided herein, is an offering toward this end.

Multiple threads are contributing to a renaissance of music making and the evolution of a social online network of music learning. The participatory Internet, colloquially known as *Web 2.0*, (DiNucci, 1999; O'Reilly, 2005; Greenmeier & Gaudin, 2007; Wesch, 2008) as combined with portable digital devices such as smart phones, tablets, and netbooks to create this fertile pedagogical music environment. A rich milieu of digital tools and networks for music play and music learning has emerged. YouTube, Facebook, and other participatory websites invite communities of learners and creators to share, play, teach, and learn music. Users of all ages are teaching each other songs on digital video, posting music lessons, and learning to play music from "tab" and other invented notations. Music learning enabled with Web 2.0 is happening in informal settings, not necessarily associated with school music programs, and is often learner initiated, learner created, learner directed, and learner distributed. Along with these Web 2.0 innovations, and the proliferation of personal digital devices, networked music "apps" continue to redefine notions of music making, music sharing, and music learning. Sophisticated software has been combined with a networked accessible cultural landscape to enable the formation of communities of learners, teachers, and music makers both inside and outside the school setting. With the exception of the invention of electricity, nothing has had more of an impact on music in the past two centuries than Web 2.0.

HISTORICAL CONTEXT

The changing and fluid practices of music and music making are both informed and formed by multiple influences. Technologies, aural-oral and written traditions, various forms of communication, hegemony and rebellion, social contexts, and other factors all influence music practice. The history of music in the 20th century is one in which an industry based on broadcast and reproduction of music was created, ran its course, and ultimately declined (Gouzouasis, 2000; Kot, 2009). The 1900's was "… a century when humans began it by sharing music making in the innocence of their front porches and firesides and ended in downloading MP3, Shockwave, LiquidAudio, and RealAudio files …" (Gouzouasis, 2000, p. 245). A corresponding change in the music industry surreptitiously grew along with the technological innovations. Kot (2009) details how at the beginning of the millennium corporate record companies shifted their focus from artistry to profits;[2] in the process they ignored the potential impact of emerging digital technologies in both music production and distribution contexts. These digital tools, in the hands of creative adolescents who developed peer-to-peer (P2P) file sharing applications such as Limewire, ultimately led to the industry's decline.

In his historical analysis of the changes in the music industry from 2000-2009, Kot demonstrates how technology and corporate behavior rapidly transformed the landscape of how music was created and shared. This change resulted in a redistribution of power from the record companies to the consumer and musician. The enabling

quality of digital media that grew alongside the corporate takeover of small labels enabled music fans and artists to directly interact. The rapid development of digital music media made possible the removal of the corporate middleman and distribution system from the marketing formula that had been in place since the 1950s, and encouraged do-it-yourself, "indy" artists to produce and distribute their own music. The resulting cultural shift created fertile ground for a new "folk" culture of music creation (Bakan, 2010). Web 2.0, and especially YouTube, is facilitating an on-line renaissance of popular home grown culture (Burgess, Green, Jenkins & Hartley, 2009). In the past decade, consumer electronics and corporate capitalism have dovetailed with creative and technological advancements to create new digital music tools, instruments, toys, and resulting practices of their creation. These progressive practices arise in a historical context that has further decentralized and revolutionized the access, distribution, and uses of music.

Apple's iPad and other tablet interfaces have birthed new ways to enable digital music practice in the broad population of global music makers. Music software programs that run on these tablets, commonly referred to as "apps" (applications), have dramatic implications for music practice. Music apps roughly fall into four categories: 1) music education tools that provide chord charts, scores, fake books, training programs, and lessons; 2) music toys and games that provide a "musicky" experience; 3) music tools that provide instrument tuning, as well as recording and editing platforms; and 4) virtual music instruments. Some apps, such as GarageBand for iPad, provide tools that allow all four of the aforementioned uses. The integration of these four categories of music apps has already profoundly changed the landscape of music making in the informal learning environments outside of school. The recording and digitization of sound and video has fueled multiple technological innovations (Gouzouasis, 2000). These innovations ultimately exist under the influence of corporate control, yet they also represent individual efforts that arise in organic and even anarchistic ways. P2P networks provide individuals the means to create, alter, merge and contribute to both the content and infrastructure of global music practices. Certainly, issues of privacy are a concern, as are fuzzy areas regarding the ownership and copyright of music products, but these must remain the topic of another article. YouTube, Facebook and other social networking tools, as well as hand held devices (e.g., iPhone, iPad, Android phones, Samsung Galaxy Tab) have forever changed the ways that music is created, listened to, and distributed (Kot, 2009). New digital technologies provide tools, networks, and creative ways of producing and recording sound that are already in use, that could, and *we* argue should, be integrated fully into emerging music educational practice. If, to quote The Buggles in their popular song, "Video Killed the Radio Star," digital media have nearly eradicated the television video star.[3] One of our concerns is that our profession, at least at the public school level, may be next on the digital "hit list"

MUSIC TECHNOLOGIES: DESCRIPTIONS AND PEDAGOGICAL POSSIBILITIES

Numerous applications for iPhone—including the *Pocket Guitar, TabToolkit GuitarToolkit, OmniTuner, TuneMaster, Chordplay, Chordmaster*, *iReal b, Guitar Lab,* and *GrooveMaker*—have opened up new possibilities for extending music pedagogies into exciting teaching and learning settings. Moreover, they are easy to use and learning to use them is as simple as finding app demos on YouTube and playing with the graphical user interface (GUI).

Pocket Guitar is a virtual, touchscreen guitar, allowing a user to strum across the touchpad and place fingers in chord shapes that directly correspond to an actual guitar, as well as ukelele and electric bass guitar. It also employs realistic sounds and guitar effects (e.g. wah wah).

Guitar Toolkit provides a digital tuner, scales for standard and open tunings, a chord library of over 500,000 chord voicings, and a metronome. It features an interactive fingerboard whereby the user can see, play and hear a particular scale, as well as touch any note in a scale to hear its individual sound. Its chord finder feature enables an exploratory guitarist to determine the chord name of newly created experimental voicings of chords. Moreover, it has an option for left handed guitarists.

TabToolkit (for iPhone and iPad) is a surprisingly powerful, music notation viewer with simultaneous, multi-track audio playback capabilities. Using mute controls, the user may listen to individual instrument tracks, and one may jump to any place in a piece of music by tapping the screen. It also displays finger placement in real time as the music is playing.

OmniTuner is a powerful tuner for 17 different string, woodwind, and brass instruments, and *Tune Master* is a PC based app for tuning all string instruments.

Chordplay possesses a library of over 1600 chords and numerous guitar sounds. Its custom chord shape representations show the learner not only where to place their fingers on the fingerboard, but also displays the letter names of the pitches in each finger bubble.

Chordmaster is a full library of guitar chords for both right-handed and left-handed guitarists.

Guitar Lab is an app that streams video guitar lessons with standard notation, tablature and text directly to an iPhone.

Groovemaker enables a user to create dance music grooves across 8 tracks that have complete volume, pan, tempo, solo, mute and mixing controls.

iReal b is a music accompaniment tool with every imaginable music control to jam along to your favorite Real Book tunes in multiple keys and tempi. One can purchase additional accompaniment styles, control the volume and tempo of the rhythm section, and enter new compositions through either chord progression entry or PDF file uploads. Because there are thousands of chord charts in various music styles (blues, jazz, rock) that can be found on the Internet, this has become a favorite practice tool for many musicians.[4]

Implementations of these new apps are potentially numerous across all music learning and teaching settings. For example, one can implement these apps for chord study away from the guitar, while riding a bus to school. Recording school or community based rehearsals using a phone or pad device and emailing the resulting digital audio files to choir members to assess their performance could become common practice in the very near future. Requiring students to podcast or vodcast practice and rehearsal sessions for assessment is already being done in a school in Sydney, Australia (Merrick, 2011). Our experiences with GarageBand led us to develop a novel use for it in private guitar lessons—since much of the blues repertoire is written in tablature, once we decode the TAB of a particular riff with our students and determine the stylistic attributes, we then explore how to move the riff pattern both horizontally and vertically along the guitar fingerboard and across the chord progression. Because it is a time wasting task to notate the pattern variations in either standard music or TAB notation—and no blues musician actually “reads” improvisations while performing music—it is expedient and efficient to film the summative aspect of our exploration with an iPhone or iPad, edit the digital video to the essential learning components, export it to GarageBand and assign it to the podcast track, quickly produce the podcast (a 10

minute exercise), then post the file on a blog so that it can be used as a practice aid. In 2003, Peter Gouzouasis used the Manhattanville Music Curriculum Project (MMCP; see Thomas, 1970) as a guide to create a curriculum for learning GarageBand and successfully used it to prepare pre-service teachers in elementary music methods and digital media courses. We find curricula such as MMCP an ideal, open-ended platform from which teachers can frame music learning with new digital media. Beyond GarageBand, many of the tools discussed here can be used in an MMCP framed learning context.

"MUSICKY" MUSIC MAKING

Other digital platforms and software offer music experiences to non-musicians. These are essentially music toys and games providing what we are calling a "musicky" experience. For example, the application *La Di Da* enables users to sing (badly) into the device and have it auto tuned and processed into a produced song, with drums, chords and back-up tracks. This application uses multiple technologies including chord recognition, auto-tune features, set backup tracks for genres and multiple music styles, and recording technology to allow people with minimal music skill the pleasure of music creation. Social networking capability lets the newly initiated composer share their song creations to Facebook, Myspace, and with other *La Di Da* users worldwide. *La Di Da* is not presented as a tool for musicians, rather it is designed to give non-musicians access to a creative outlet that requires no music training or "talent," yet is still able to enable the creation of a real music "product" in the form of a recording. The recent release of *Glee*, based on the television show, adds another dimension to the participatory music making process, enabling singers to perform with their peers around the world, record their performances, and receive scores (i.e., points) on their performances. Other music games such as *Bubble Harp* allow the user to draw on the screen with their fingers and produce Brian Eno-esque synthesized loops and patterns. Though not making music in the traditional sense, there is no question that these are musicky experiences. This is similar to games such as *Guitar Hero, Rock Band* and a host of other music simulators.

Guitar Hero is one of the most popular computer games of the past decade. Its dominance in gaming in youth culture is undeniable. In basements and recreation rooms throughout the technologically advanced world, groups of young people gather around a glowing screen to engage in what might not be considered a music experience, but may be considered as "musicky." The phenomenon became so popular that the animated television show, *South Park*, featured its main characters dueling on guitar controllers for world dominance. Groups of amateurs gathering together in social settings, engaging in an accessible form of expression that provides musically satisfying experiences that contextualize the social gathering is not new. In the days before a recording culture evolved, folk musicians gathered around illuminated campfires and wood stoves to play and sing to simple I-V and I-IV-V progressions, creating song lyrics—words and stories—about their shared culture. The difference is that today, what we have traditionally considered as non-musicians can become musicians.

At a *Rock Band* party, untrained music makers gather in social settings to access simple music experiences. The campfire and kitchen stove has been replaced by the glow of a TV screen, but the carefree community-based music party that brings people together to sing, talk, flirt, and bond remains the same. These toys and games enable non-musicians to have a music experience. It is not really making music, but it *feels* like it is—it gives a non-trained amateur access to the social advantages of music participation and success. The *Guitar Hero-Rock Band* phenomenon and the new music applications being developed daily for portable digital audio devices represent a significant reclaiming of music for those not literate in traditional music making. It would be of interest

to conduct research to determine what impact these apps have on music motivation and skills development, and these could be possible directions for further study.[5]

THE IPAD AS INSTRUMENT

Some apps cross the boundary between music toys and true music instruments. A popular application, *Ocarina*, enables the device to function as a digital flute in which users can purse their lips and blow into the microphone while adjusting their fingers on the touch screen to produce a not unpleasing tone. The scale and modes produced by the digital ocarina can be adjusted in the settings to keys and modes, and other *ocarina* users around the world can listen in real time to the music expressions of the iPhone performer as it is simultaneously broadcast through wifi and 3G networks. *Bebot* features a touch interface synthesizer that satisfactorily emulates a theremin.[6] Another app, *iBone* turns the hand-held computer into a faux trombone, complete with partials,[7] and add to the bonefide sound that is produced. *Steel Guitar* is just that—a fully functioning steel guitar. Further, in addition to real time broadcasting, users of these music instruments and voice are recording their performances and sharing them through social networked technology. *Glee* is perhaps the best example of this phenomenon. Other apps are being used by ensembles, bands, and solo musicians to create music videos. *MadPad* is a compositional tool that can be used to compose soundscapes with "found sounds," rhythm patterns, and tonal patterns. Each "pad" composition features 12 pad slots where a composer can film and upload—in real time with the iPad or iPhone—the images and sounds of their choice. Once saved and uploaded, a user can perform a newly composed composition by tapping on the video pad slots. A person can compose, upload, and share pad music with other composers. A YouTube search of the software app *Magic Fiddle* for the iPad, provides over 1000 examples of people playing this "cool, new instrument" as well as how it is shared with others online. In a final twist, *Leaf Trombone* combines music playing capabilities with an on-line competitive gaming environment.

GARAGEBAND FOR IPAD AS GAME CHANGER

The "killer" music app that has recently emerged is *GarageBand* for the iPad. This portable version of *GarageBand* contains the recording and looping capabilities of the desktop based version, but dramatically extends its music possibilities by incorporating touch based instruments and "smart instruments." These new capabilities transform *GarageBand* into a virtual orchestra of music instruments. The touch screen of the iPad enables a musician or music student to actually "play" the sampled instruments. A keyboard, guitar simulator, and drum kit are represented on the screen, and are able to offer touch sensitivity, expressive dimensions and a very musical feel. "Smart instruments" are music controllers that help a non-musician choose chords, arpeggios, drum patterns, keyboard patterns, music loops and more features that they can add into their compositions. These music ideas are like Lego building blocks for creative composition. This interface is not only a "game changer,"[8] it is a learning changer. A user with minimal music skills can create songs, riffs, compositions and other music products, mix them, publish, and readily distribute them. *GarageBand* on the iPad is a recording device, a compositional tool, a distribution network, and a suite of music instruments. With the introduction of this app, and the ones that will surely follow and refine it, we see the potential of the new, networked digital media as a game changer in music practice.

FourTrack, and its companion software *StudioTrack* (for iPad) is a singer and instrumentalist's practice tool. One can record backup tracks in 16 bit, 44.1 kHz quality[9] with the push of a button. Third party microphones and

headsets make this app the most radical shift in field recording since the introduction of the Nagra battery-operated tape recorder of the 1960s that was used in motion picture and television production until the 1990s (see Greyscalegorilla, 2008, for an in-car, composing-while-driving, demo).

IMPLICATIONS FOR OUR PROFESSION

Digital technologies have fundamentally changed the ways that music may be taught and learned. The multiple streams of technological advancement that began at the end of the last century have made an indelible mark on global culture.[10] The digital revolution is as event as significant as the introduction of Guttenberg's printing press, if not more so. Further, McLuhan's (1962) narrative on the impact of print on human knowledge and introduction of the concept that we live in a "global village," Harold Innis's (1952), notion of the process of change as being implicit in the forms of media technology, and Gouzouasis's recognition of the parallels between mass media and music media (1995, 1996, 2000; Gouzouasis & LaMonde, 2005) point to the tsunami-like impact of digital media on the evolution of both music media and music itself.

Whether it is on an iPad, iPhone, Google Android device, or some other form of technology, digital software that makes and allows for easy sharing of music will remain with us for the foreseeable future. Drum emulators, beat boxes, synthesizers, multi-track recording software, and network distribution tools have facilitated a revolution in music making that is likely to have as great an impact on music practice as the invention of the pianoforte, the saxophone, radio broadcast and recording technologies, and music notation itself. One may question if some of these contemporary music practices are truly music making and if they meet the criteria of classically and jazz trained music educators, as well as our traditional conceptions of what can or cannot be taught in a music classroom. While some may believe that there is no questioning of our current practices, we posit a need to reconsider and expand our curricula and pedagogies to include digital media.

On the other hand, we may need to reconsider the ways that musicians are prepared and educated in academia as it seems that our own music orientations may be the very thing that is stifling the profession from adapting and adopting popular music and digital media into our own learning and teaching practices. As discussed with many colleagues over the years, despite our attempts to introduce music students in university music and teacher education programs to new materials and pedagogies, the majority seem too comfortable in their own knowledge bases and experiences and are reluctant to adopt new ideas. In other words, it seems that people want to teach the ways that they were taught and ignore new developments. They recapitulate their own learning in their practices rather than become innovators.

Once humans developed the tools, music technologies have always changed music practice—this in turn *should* change music educational practices. Just as inventions such as the piano, harmonica, and synthesizer had a lasting impact on music making, the ability to play "real" music using music apps is changing modern sonic expression. Some innovative front line teachers are already implementing these apps and devices, and they are already being combined with podcasts, blogs, and video sharing in music education classrooms for both performance and assessment practices.

The portability and accessibility of new apps beg questions as to why, when, how and what we create. Moreover, they place us in a position of questioning how they influence the ways we conceptualize teaching and learning. We can be certain that these digitally infused practices cannot be stopped and that they have moved forward at

such a rapid pace that the profession has been largely unable to harness or apply the new technologies in ways that are meaningful to both the music curriculum and youth culture.

"Digital natives" is a term used to describe those born after 1980 that are fluent in the use of networked digital tools (Palfrey & Gasser, 2010; Prensky, 2001). Though somewhat disputed as an all-inclusive generational trend (Bennett, Maton & Kervin, 2008), there is a fluency in the media wrought by growing up with it that is not possessed by those who have had to adopt it in later years. Children growing up with cell phones that are more than phones, social networking that connects them and allows for shared creativity, and now music toys, tools, and instruments that break previous barriers to access and music creativity place us in a new world of "tech meets flesh."

Many music educators, ourselves included, are "digital immigrants" rather than "natives." In other words, we have adapted to digital technologies as they developed, rather than being born into development phases of tools such as synthesizers, MIDI, laptop computers, and music software. Prensky (2001) suggests that digital immigrants speak digital with a form of accent. Immigrants have adjusted to the digital environment having been raised in traditional media. They miss the sense of play and flexibility in their thinking, likely because they do not think in terms of fluency (Thomas, 1991; Gouzouasis, 2005). On the other hand, digital natives are fluent in the technology as if it is their mother tongue. Prensky goes on to develop the concepts of "legacy content" and "future content" to describe the difference between curriculum before and after digital innovations. Legacy content contains systems and patterns of thought that reflect older ways of processing information. In music, legacy systems such as notation, rote learning, music theory, harmony, counterpoint and other Western colonial systems of music thought are giving way to a future (and present) of music toys, graphic interfaces, playful musicky experiences, and digital video sharing. New content may contain and reflect aspects of old content, yet it extends content development by virtue of the fluidity of digital systems. New technology both suggests and makes possible a spiraling curriculum, one that is self directed, spontaneous, open-ended, and has direct meaning to the learner. As such, it throws current hegemonic notions of teacher-student and teacher-learner into question.[11]

The digital world also brings with it certain problematics. Certainly we must be aware of issues of corporate control, surveillance, privacy, and security. But as music educators, we need to rethink our approaches to learning and teaching. We must invest ourselves in keeping up with these changes if the profession intends to stay meaningful and current with the ways technologically-advanced cultures are using the new technologies for music making. The mainstream of our profession, at the K-12 educational level in the United States and Canada, has not kept pace with innovations. We must look closely at our curricula. It may be that organized, teacher-directed school music education is no longer a viable pedagogical force and our profession's failure to recognize the broad impact of digital media will make many current practices—in schools, private music studios, and traditional music making environments (e.g., community bands and choirs)—obsolete.

Applying Gouzouasis and LaMonde's (2005) model for understanding music making, which is founded upon the precepts of the four-part tetrad,[12] "Individual tetrads are neither exclusive nor definitive" (p. 8), and as such, much more can be added to, and interpreted from, the tetrad featured below. The following analysis of digital music making, illustrates that a digitally infused notion of music education does more than obsolesce traditional appraoaches and practices; it also provides meaningful music making opportunities for both students and teachers. As media of expression, digital music tools do attempt to push aside all forms of music performed in traditional contexts, as well as eradicate the teaching practices, musicianship, skills, and music that are part of

those music forms and traditions, but, as illustrated in Figure 1 below, digital technologies also have the potential to enhance, retrieve and transform musical pedagogy.

Enhances accessibility to music, as well as to music making		Transforms teacher directed instruction into learner centered instruction
Jamming alone and with friends		… GarageBand replaces stage band
Composing is as easy as pushing a button		Composing becomes a recording process
Collective, online songwriting		*Teaching* music becomes *facilitating* music making
Playing "by ear"		
New compositional processes		21st century popular music repertoire
(enhance)	E T	*(transform)*
(retreive)	R O	*(obsolecse)*
Revived music making in new ways		Pushes aside traditional music making practices, traditional repertoire, traditional teaching approaches
… informal musicing, file sharing in a global recording studio		Western music notation becomes more and more unnecessary and goes the way of hieroglyphs
The (re)birth of the age of the self publishing musician and creation of global distribution networks		"Music teachers" or "music guides"?
Social networking and sharing of music		
Playing music and playing musically		

Figure 1: Digital music making as pedagogical practice

If, as proposed in 1979 by Ron Thomas, "discovery is the most important and exciting means for learning" (p. 10), we may question why more student-centered, collaborative, discovery-learning experiences are not central to music teaching in our schools. Teachers who work in child-centered, arts-based, emergent learning environments have been modeling non-authoritarian pedagogy for decades. For example, practitioners of the influential Reggio Emilia approach (Edwards, Gandini, & Forman, 1993) understand children to be complete contributors to their knowledge making. Reggio theory places adults in a completely different kind of role in relationship to students than in a traditional classroom. Adults and children exchange information as equal contributors to learning. Parents are viewed as partners in the learning process and they are involved in designing curriculum. The Reggio classroom is not a classroom, it is an *atelier*—a workshop. In it, the teacher acts as "researcher" while the children explore a rich, artistic environment through one of the "hundreds" of symbolic "languages" (e.g., drawing, dramatic play, music, sculpture, and writing). Curriculum emerges from the living learning environment based on the interests and inclinations of the children. Group and individual creative arts projects are everywhere.

As another example of rich learning environments, in 2001 Barrie Bennett and Carol Rolheiser produced a compilation of over 200 tactics, strategies, and graphics organizers in a single textbook that has applicability to a wide range of classroom teaching situations. In a later publication, Bennett (2006) elaborates upon the concept of instructional intelligence, describing it as a process that incorporates theories of change and systemic change to conceptualize curriculum, assessment, instruction, and our knowledge of how students learn. Moreover, Bennett draws from a broad range of research to create systems that enable teachers to design instructionally intelligent, student centered learning approaches for K-12 teachers across the curriculum. Over 30 years, he has worked

with numerous school districts in Australia, Canada, Ireland, and the USA to implement these tactics, strategies, and graphics organizers in a systemic manner. While these practices are widespread in other teaching areas, very few music practitioners in studios, classrooms and rehearsal settings have been identified as having implemented these creative ways of teaching and learning in music curricula.

Spending just a few hours on YouTube it becomes self-evident that digital media enables students to learn on their own or in small collaborative groups to compose, rehearse, perform, critically evaluate, and listen to music, and that this is indeed what is happening – if not generally in music classrooms where the traditionalist model of teacher-directed, transmissive, rote teaching-to-learn strategies prevail.

This is not to advocate for the total elimination of traditional music and traditional approaches in music education. Rather, we are acting as "messengers" in the McLuhanistic sense, with an eye toward the urgent need for our profession to adopt, adapt, and change at the same pace that popular culture is changing and has changed since the start of the Digital Age. Our profession has catered to a select minority (in many cases, less that 20% of a school's population)[13] of students at the secondary school level in traditional band, orchestra, and choral contexts for the past 100 years. The vast majority of adolescents no longer need "music educators" to acquire music skills, participate in music making activities, and create music—and they have not for at least two decades. That fact leaves our profession in a precarious position.

For music education to not fall into complete irrelevancy within the social, daily contexts of music making our profession must challenge some basic assumptions concerning the purposes and learning outcomes of music and music making. Interestingly, in a McLuhanist reversal that harkens back to the early part of the 20th century, music may be becoming less of a "profession" and more of a vocation (Gouzouasis & LaMonde, 2005, pp. 6-8). Despite Keen's (2008) debasing of amateur participatory culture and Wesch's (2008) idolization of it, networked digital tools have given individuals broadcast and distribution power. We have now entered a new age of the so-called amateurs, hobbyists, recreationists and dabblers (Gates, 1991), and we may need to consider those categories on a developmental continuum—a lifespan involvement with music, where those qualifying labels merely serve to identify a stage of music development. In pedagogical practice, as Regelski (2007) discusses in his seminal essay, a lifetime of musical amateurism should increasingly become the goal of general music education. And as Gouzouasis (2010) addressed, we need to identify an ethos for our profession and adapt to new ways of encouraging and facilitating music experiences that are relevant to those we teach, the potential broader audience we should be teaching, and those who we'd like to engage in music learning and creation.

Following Gouzouasis (2010), and Vakeva (2010) "[t]o support this potential for cultural transformation, music educators need to welcome a critical attitude towards existing musical practices" (Vakeva, p. 66). To do anything less is not only unethical,[14] but will lead to the irrelevance of our profession in organized, school contexts. If, as was stated earlier, digital media have virtually eradicated the television video star, the next target could well be organized, formal music education.

YOUTH AS DIGITAL NATIVES: PEDAGOGICAL IMPLICATIONS

Adolescents of today who aspire to learn music, who are highly engaged with music making, are more than mere amateurs—they are digital natives, expert gamers, self-motivated learners, and self-directed learners. Major questions that we need to consider in the Digital Age are (1) who determines what constitutes the notions of

specialist or professional and who labels and defines amateur, as well as (2) why we make such academic distinctions.[15] Adolescents don't necessarily aspire to be "classy"—those who play guitar desire to be recognized as expert 'shredders,' just like Slash and Joe Perry, and that's why over 10 million copies of *Rock Band* (for XBox 360 alone; Berardini, 2009)[16] and 25 million copies of *Guitar Hero* (XBox360 version) are in use in homes around the world. Home music making is widespread (Rideout, Foehr, & Roberts, 2010)—it's happening online, in videoconferencing, in peer-to-peer contexts, with magazines supplemented with compact disks and DVDs, on hand held devices, and with video games – yet music educators, at least in the USA and Canada, rarely see or recognize the implications for their profession. Hierarchical distinctions between so-called 'formally trained' musicians versus 'informally trained' musicians (Lines, 2009) upon which traditional music education programs are based are ineffective and irrelevant to this culture, to this ethos. These adolescents and young adults are the digital natives—the surfers of the digital tsunami—that our profession has ignored for at least the past decade.

In consideration of the contribution that music "participation" makes to the quality of life, Gates (1991) recognized the need for recruiting strategies of music group members by examining music learning outcomes in school based music programs. While this is a worthwhile endeavor, we propose looking at the bigger picture, as Gates implies from a leisure theorist perspective (p. 3), to question why people begin and continue with music activity over the lifespan. Since that paper was published 20 years ago, the music learning landscape has changed dramatically. While the exclusion of audience in his analysis was rooted in phronesis,[17] the ways that we access music, use music, play with music, perform music, listen to music, and compose music have changed radically. There now exists a nearly invisible line between music listener as mere audience member (p. 5), and music listener who readily becomes an arranger (i.e., mixer, manipulator, composer) of music through initial, incubational, listening processes—mainly because the things one can do with music, the learning curve needed to create and recreate music, and the tools of music creation have become so accessible. In other words, audience member is the obvious starting point for anyone who chooses to holistically engage in, and with, music.[18] Given the ubiquitous, complex, (p. 22) accessible nature of music and music behavior in the Digital Age, it is imperative that we nurture (p. 11) any and all music activity, both in and out of schools, in spite of various, stratified categorizations—professional-amateur-public, leisure-hobbyist.

More recently, Overton (2004) recommends that, rather than looking at artificial, split binaries and differences, we need to look at these issues as amateur *and* professional, informal *and* formal. They should be considered from a relational metatheoretical perspective that bridges biological, cultural, and person-centered approaches to inquiry—they should be considered from an embodied person-centered approach.[19] The music making we are observing today emerges from a notion of the "embodied person actively engaged in the world" in which we live (Overton, 2004, p. 1). To think holistically, we need a different language to describe the music making of today. For millions of adolescents and adults, the new "clergy" (Regelski, p. 24) are the Rock Band, Guitar Hero and YouTube shredders, and school education is no longer needed in many music learning contexts (especially guitar, arguably the most popular instrument of the 20th century). One need only look at guitar sales since 2001 (see Figure 2), over one billion dollars in retail sales for the past three years, over nine billion dollars since 2001 (see International Sales Data, 2011; The Music Trades Online, 2011), to imagine the impact of popular music and popular music making on a music learner's choice of instrument.[20]

Year	Units	% Change	$ Retail	Change	Average Price
2010	2,991,260	-9.6%	$1,151,290,000	-4.1%	$372
2009	3,302,670	0.2%	$1,158,592,050	13.3%	$350
2008	3,201,220	41.0%	$1,022,861,000	13.3%	$309
2007	2,341,551	20.5%	$903,261,000	-1.9%	$386
2006	1,942,625	11.4%	$921,057,000	-.13%	$529
2005	1,742,498	5.6%	$922,280,000	-0.1%	$529
2004	1,648,595	23.3%	$923,522,000	21.2%	$560
2003	1,337,347	15.9%	$762,185,000	9.6%	$569
2002	1,153,915	5.8%	$694,883,000	-2.2%	$579
2001	1,090,329	-.33%	$710,769,000	-.63%	$652

Figure 2: Total Guitar Sales Since 2001

Major orchestras are experiencing financial problems because the most people born after the mid 1970s have little interest in Classical music. Rather than being "elevated above everyday life and ordinary people" (Regelski, p. 24) this form of music is largely irrelevant to the majority of 21st century adults and youth for whom Rap and Hip Hop artists, American Idols, and super shredders are the music aristocracy. It is no surprise that every child we have met over the age of 12 for the past 30 years, in classrooms and homes in the USA and Canada, request that we play "Stairway to Heaven" when we take a guitar out of the case. The point is, popular music (e.g., "Classic Rock") has replaced Classical music as the "music Classics" of the present generation of learners.

Many digital native music learners—especially guitarists—are extremely skillful.[21] One need only watch a DVD of *Crossroads*, the yearly guitar festival organized by Eric Clapton, to understand the overwhelming virtuosity of the new generation of guitarists and the impact of digital learning on the advancement of virtuosity. We may attempt to classify adolescents as amateur guitarists, however, they don't see themselves in that manner. They may be classified as "amateurs" by our profession's traditional standards, however, these classifications and accompanying terminology may not be applicable to contemporary music making. The movie "8 Mile" is just one example of how seriously youth consider their "own" music and own forms of music making. Given how rapidly music learning has changed in the first decade of the new millennium, qualitative distinctions between amateurs and professionals, like those between formal and informal music learning, are now rendered artificial or at best synthetic, and in a sense even "apothetic."[22] In other words, the meanings and hierarchical relationships of these terms and concepts need to be reexamined and called into question in digital music making contexts.

Since (at least) the 1950s, all of the changes in music, music making, and music practices have occurred while the majority of people in our profession were not looking at and listening to youth culture. That (1) analyses of youth music practices have been undertaken as if they are something new, unique, and researchable, and (2) youth music practices have been framed in false dichotomies—our music versus their music (Cavicchi, 2009), informal versus formal music (Green, 2008), amateur versus professional (Regelski, 2007), school music versus real music (Kratus, 2011)—are contributing factors to our ongoing misguided misunderstandings of youth music and youth music making. Self-teaching is not a new and unique phenomenon—as children of the 1960s, we have experienced many of the forms of learning that are only recently being discovered and recognized by researchers. Moreover, self-teaching and learning, as well as collaborative learning in small groups, has been the most prevalent form of "music education" well before the invention of the electric guitar. While research has it's important place, music education policy-makers should not put formal research ahead of a common sense

approach that acknowledges everyday 21st century musical practices.[23] Popular music has been the "soundtrack of our lives" since the invention of the radio, and popular music making has shared the same status across generations of youth for over 80 years. Ironically, in our experiences, the majority of our profession has not recognized the importance of everyday music making and music learning experiences.

Our profession requires a cataclysmic shift from dictating curricula and curriculum content from the 1950s—meaningless to the majority of youth for at least the past 40 years. Regelski (2007) hints at what may be the biggest problem that the profession needs to overcome—the serious diet of classical music and classical music study at all levels of music education. By severely limiting what constitutes "good music" and permitting only limited forms of music making for future music educators, our teaching institutions isolate themselves from the realities of 21st century music that are founded upon numerous forms of popular music that have been the core of youth music making and music listening for at least the past 80 years. The ongoing endemic apotheosis of Western classical music and "traditional school music" must cease immediately if music educators are to remain relevant.

Regelski (2007 p. 40) adroitly recognizes the disconnects between school music and what we would call "real music" of the "real world" (and the virtual world).[24] His paradoxical notion of music education as a rival to music amateuring is already a reality, for we believe the "rupture" (or "rapture") happened over the past decade. While we were snoozing to the mellifluous sounds of "Dance of the Sugar Plum Fairies" (i.e., insert your favorite piece of music here), we missed the "reset button" (Regelski, 2011) on the alarm clock many years ago, and we may possibly be awaiting the death knell of music education in schools within our lifetime unless radical changes to pedagogy and curriculum occur as rapidly as digital technologies are emerging.[25]

NOTES

[1] As discussed with Terry Gates (founding member of the MayDay Group; see http://www.maydaygroup.org/php/aboutus.php), we use the word “music” throughout this paper as both a verb and noun, much in the same way that the term “dance” is used. Also, we would like to use the term “musicing” in parallel to “dancing,” and not refer specifically to either musicing or musicking as elaborated by either David J. Elliott or Christopher Small, respectively. However, to distinguish our position and leave that discussion for a future paper, in the final edits of the present paper we have chosen the phrase *music making* instead of musicing or musicking. We are neither focused on the relative merits of the two spellings of the term at hand, nor the philosophical positions of the authors noted above. The reason we spell “musicky” as we have in the present paper is based on optics (i.e., it looks better than “musicy”). Also, without the “k” a reader may not know how to pronounce the word.

[2] In 2000, Gouzouasis argued that this happened perhaps as early as the 1960s when radio stations were formatted according to listenership and market shares (e.g., women, 18-24).

[3] TV and MuchMusic in North America do not not nearly have the impact they had 15-30 years ago. We specify this by stating “television video star.”

[4] *iReal* is a *Band-In-A-Box* clone for PDA and makes what was once a cumbersome activity for Gouzouasis a fluid practice experience. Chord progression charts are readily printed from an iPad saving them as a pdf and uploading them into a pdf viewer that makes them available to print through a web browser.

[5] Gouzouasis has recently applied for a 5 year grant (SSHRC-Canada) to study motivation, socio-emotional factors, and music skills development in traditional school and non-traditional contexts). Scott Goble, Susan O’Neill, Rita Irwin, Slava Sensyshyn, Karen Lee, and Martin Guhn are also involved in this planned project.

[6] A theremin is an electronic instrument that was patented in the late 1920s. It has been used as a sound effect in mystery and monster movies because it possesses and eerie sound. It was also used by The Rolling Stones on their 1967 albums, “Between the Buttons” and “Their Satanic Majesties Request.”

[7] A “partial” is an acoustical aspect of music that affects the trombone in the overtone series. A trombonist can change pitch either through use of the slide or by changing the composure of the lips (i.e., the embouchure), which alters the direction of the airstream that enters the mouthpiece. Thus, by adjusing the embouchure, multiple pitches can be played with the slide left in one single position. The app provides a clear graphic presentation of this concept.

[8] “Game changer” is a simple expression that also functions as a pun, which is why we have it in quotes. Humans *play* digital games, they also *play* music instruments, thus we make the not so abstract leap to considering these apps and devices as *playful* “game changers.”

[9] While digital recording quality can be measured, the audible effects are very difficult to ascertain with the human ear. It is arguable that there is little audible difference between 16/44 and 24/96 recordings. Also, 16/44 is the standard compact disc recording quality parameter.

[10] We live in a "global village" and we take a McLuhanist stance on this point (Marshall McLuhan coined the term in 1964) and cite him herein. While conservatory trained ethnomusicologists may not agree, there is ample evidence of how rapidly digital media have transformed music making in various parts of the globe, including Africa (listen to African hip-hop, rap, and guitar music as one example).

[11] Considering the fluency that most children and adolescents possess with digital media, and the lack of fluency the majority of teachers possess, those roles are frequently reversed and teachers no longer hold the role of knowledge provider and master leader.

[12] See Gouzouasis & LaMonde, 2005, for a detailed discussion of *obsolescence* in tetradic analysis. The juxtapositions that are posed in a tetrad are purposely set up for the reader to consider extreme contrasts.

[13] We believe that this is a conservative estimate of participation in traditional music programs in North American schools. Many school districts in North America no longer offer school music programs.

[14] From an Aristotelean perspective, if one does not possess an ethos, one cannot be ethical. That point has been re-elaborated by Gouzouasis (2010) in a music and music education context.

[15] Many of the greatest musicians of the past 100 years are considered to have been musically illiterate, having started their careers as informal music makers (see biographies of Les Paul and Wes Montgomery as examples).

[16] In addition, as of September 17, 2009, over 700,000 copies of The Beatles: Rock Band were sold. See http://www.rockband.com/forums/showthread.php?t=165148&page=1 for additional information.

[17] Phronesis (φρόνησις) is "practical wisdom," not to be confused with sofia (σοφία), "theoretical wisdom." See Gouzouasis (2010) for a more detailed discussion.

[18] Again, in correspondence with Terry Gates, we considered and played with the notion of using "music" as a verb. This would seem to alleviate some of the problems caused by using the terms "musicing" and "musicking" as elaborated by David Elliott and Christopher Small, respectively, and should be explored in another paper.

[19] By setting up binaries such as amateur-professional, informal-formal, etc. we perpetuate the same false split binaries that have perplexed both modernist and post-modernist thinkers for the past 300 years. By adopting a relational metatheoretical stance, we may be able to look at 21st century music practices in a holistic light.

[20] It is mind boggling to consider that only six countries manufacture close to 90% of the world's music and audio gear—the USA, China, Taiwan, Japan, Indonesia, and Korea. It is interesting to consider that five of the top guitar manufacturers are Asian countries given that we do not have precise data on guitar usage in Asian countries; moreover, China is the most populated country in the world today. It leads one to wonder how many people are being drawn to play the guitair in the world's most populated country.

[21] We had initially claimed that they are more skillful than conservatory trained musicians, and in many ways, perhaps in a separate paper can argue that many musicians who are orally-aurally fluent with an instrument

may perform a broader variety of styles of music more creatively than musicians who are primarily trained through notation.

[22] A derivative of "apotheosis" (from the Greek, *apotheoun* (ἀποθεοῦν) which literally translated means "from, or of, God" but is extended to include the notion of making something divine, and of raising something to a God-like levels

[23] In North American, our music education system has been distorted by "The Academy" the past 100 years. The argument was well elaborated and discussed at the MayDay Colloquium in Salt Lake City (2011) with enlightening results. Many people began to question why we teach Western classical music in K-12 music education, why we proliferate concert bands and concert choirs, and our rationale for doing so. One may question what the typical 15 year old cares about orchestral music and university music programs and why it seems to be the role of music education to "enlighten" youth of the 21st century. Read Kratus (2011) and Gouzouasis (2010) for additional elaboration on this topic.

[24] "School music" and "real music" is another false dichotomy that needs to be reconsidered and dissipated. As noted by John Kratus (2011), popular music (i.e., "real music") has not been a part of the curriculum since the turn of the 20th century.

[25] Many music programs have been living in a serious, red alert situation in North America the past 30 years. Music programs are among the first to be cut from school district budgets and the relevance of "school music," in the traditional sense, is not as secure as some colleagues may believe it is in different parts of the world.

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Danny Bakan is doctoral student at The University of British Columbia. He teaches undergraduate courses in music education and was recently awarded a Social Sciences and Humanities Research Council Fellowship (2010) to study early childhood music education in a networked world. A lifelong music learner as well as teacher, he was adjunct faculty at Ryerson University's School of Early Childhood Education, has recorded two albums of original and folk music that have been broadcast on CBC (Canada) and NPR (USA), and has performed at major folk festivals across Canada and the USA. Danny also teaches banjo, guitar, and ukulele in the Vancouver area.

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