Integrating Technology into the Music Classroom to Encourage Student Creativity

By

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For the degree of Master of Teaching
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Abstract

This research project focuses on how middle school and high school music teachers can integrate information and communications technology (ICT) into the classroom to encourage student creativity. Creativity is defined as the process of having original ideas that have value. It explores current practices that in-service teachers at these levels are using and the effects that these practices have on student work of a creative nature e.g. composing and improvising.

Using qualitative methods, I have conducted semi-structured interviews with music teachers who currently integrate a high level of ICT into their teaching. Data collected from these interviews was analyzed for common themes. A review of the current literature on the use of ICT in the music classroom was also conducted and will be discussed.

Findings from the study indicate that ICT has a strong potential to help students at this level bypass traditional barriers to creative work. Specifically, software programs such as Garageband, Logic and Ableton Live help students to compose intuitively instead of relying on traditional musical notation. Moreover, the use of ICT allows teachers to carry out new creative projects which were previously inconceivable. Overall, the findings strongly suggest that the increased use of ICT in the music classroom can lead to greater productivity and greater personal enjoyment among students when they embark on creative work.
Acknowledgements

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Chapter 1: INTRODUCTION

Introduction to the Research Study

In the past decade, creativity has become a hot topic in education. From U.S. President Barack Obama to the Ontario Ministry of Education, business leaders, government officials, and education policymakers are increasingly advocating for including student creativity in the curriculum (Berghetto and Kaufman 2014 p. 11). This is due to the fact that creativity has been identified as an indispensable life skill in the 21st century. According to Sir Ken Robinson (2011) organizations everywhere say they need people who can think creatively, communicate and work in teams (2). Furthermore, creativity is needed to generate ideas for new products and services and to maintain a competitive edge (Robinson 2011, p. 6). In the words of Zhao (cited in Root-Bernstein & Root-Bernstein 2013), “creativity is no longer a choice for a select few; it has become an essential quality for all” (17).

The arts, specifically music, is seen as an important medium through which middle school and high school students can develop their creative skills. Developing creativity is one of the four central ideas upon which the Ontario Secondary arts curriculum is based along with communicating, understanding culture and making connections (Ontario Ministry of Education 2010, p. 5). From grades 7-12, students are expected to continually demonstrate and apply their creativity through activities such as composing, improvising and arranging music (Ontario Ministry of Education 2010, p. 99). Finally, they are expected to learn and use the creative process to help them acquire
knowledge and skills in the arts. This process has students imagining and generating ideas, exploring and experimenting, and presenting and performing their final work.

In the past two decades, music education has seen a great proliferation in the use of information communications technology (ICT). According to Wise et al. (2011), the development of digital technology in the music classroom has been particularly rapid over the past ten years and its presence has had major implications for music educators (118). Countries such as the USA, UK, New Zealand and Hong Kong have accepted digital technologies as forming part of the resources to support learning in the music classroom. It has been acknowledged that these new tools may have the potential to enhance creativity, facilitate learning, and encourage exploration and independent thinking (Bray et al. 2000, pg. 125). According to some researchers, their influence is so great that they have brought into question some of the most basic conceptual frameworks that have underpinned traditional music teaching (Cain 2004, p 217).

Despite the potential of ICT to enhance student creativity however, research has shown that it is used in the classroom in very limited ways. Mills and Murray (2000) identify that ICT is often used to underpin traditional values associated with music performance and composition. They go on to say that musical uses of technologies within schools that challenge established and traditional music practices are rare. Beckstead (2001) supports this notion by stating that ICT technologies are not used being used to redesign tasks, but rather to support a more efficient but traditional notion of creative composition. It is therefore possible that the creative and transformative powers of these tools are being left unrealized in current teacher practice.
Purpose of the Study

The purpose of the study is to explore how the creative potential of ICT can be realized in middle school and high school music classrooms. It will explore how in-service music teachers in Ontario are using these tools to get their students thinking and working creatively. It will also examine how the integration of ICT changes teachers’ pedagogical approaches. Finally, it will investigate the challenges that teachers face when integrating ICT into their music classrooms.

Research Topic/Questions

The main research question driving this study is: how can middle school and high school music teachers integrate ICT into the classroom to help develop student creativity? The sub-questions that will be considered are as follows:

• What impact has the integration of ICT had on student learning, engagement and achievement?

• How has the integration of ICT affected teachers’ pedagogical approach?

• What professional development opportunities are available to help in-service music teachers incorporate more ICT into the classroom? E.g. Internal technical support? Professional development conferences?

• What are some of the challenges that teachers face when integrating ICT into the classroom?
Background of the Researcher

My decision to approach the topic of ICT in the music classroom is based on my interest in the proliferation of technological applications that can be used for teaching. Many of these applications are intuitive, engaging, innovative, and allow their users to participate in a range of creative endeavours that were never possible before. I strongly believe that ICT has the potential to influence and transform music education in a positive way.

My interest in this topic also stems from my experience as a professional music educator. From 2009-2012 I designed, developed and taught a course that taught jazz and blues improvisation to middle school and high school students. The purpose of the program was to introduce students to the creative side of music, one in which they could spontaneously compose and play their own improvised solos. At the time, I was keenly interested in how teachers can take student performance off the written page and into the realm of creativity and personal expression. Today, I wish to see how we can integrate ICT into the classroom to achieve these same ends.

Finally, upon graduating from the Masters of Teaching program at OISE/UT, I will become a music teacher at the junior, intermediate and senior levels. Through my research into this topic, I have become acquainted with some of the cutting edge tools and strategies that teachers are currently using. I hope to integrate some of these elements into my own classroom to make my students’ learning experience as engaging and as relevant as possible. I hope to join the community of music educators who innovatively use ICT in the classroom. I also hope to contribute to the body of literature surrounding the use of these tools.
Overview

Chapter 1 includes the introduction and purpose of the study, the research questions, as well as how I came to be involved in this topic and study. Chapter 2 contains a review of the literature and presents background information on the topic. Chapter 3 provides the methodology and procedure that will be used in this study including information about the sample participants and data collection instruments. Chapter 4 provides the findings that were gleaned from the interviews. Chapter 5 provides a discussion of these findings. Finally, references and a list of appendixes are included at the end.
Chapter 2: LITERATURE REVIEW

Introduction

A large body of literature exists on the topic of integrating ICT into the music classroom. However, a much smaller body of literature exists for integrating ICT specifically to support student creativity. Most of the literature that I found emphasized the positive effects of incorporating ICT. The following literature review seeks to find a working definition of the terms “creativity” and “ICT” relative to music education. It also addresses relevant topics with regards to ICT in music education today, ICT as a tool to help students compose, ICT changing teacher pedagogy, and the challenges that ICT can pose to music teachers.

Definition of Creativity

The term “creativity” defies a standard and agreed-upon definition (Dacey and Madaus 1969). However, some definitions by experts and researchers in the field help to point us in the right direction. Sir Ken Robinson, an educator and leading authority on creativity defines it as “the process of having original ideas that have value (Robinson 2013, p. 1).” He goes on to state that it’s “a dynamic process that often involves making new connections, crossing disciplines and using metaphors and analogies” (Robinson 2013, p. 1) Beghetto and Kauffman (2013) provide a definition specifically related to the school context. They state that, “for a student’s project to be considered creative, it would need to incorporate the student’s own ideas while staying within established academic guidelines (12). Pfieffer (2013) adds that creativity involves creating something that is new to the student, that is appropriate or useful, and demonstrates a command of some
kind of media (44).

From these definitions, a general pattern can be drawn. Simply put, creativity involves producing something that is both novel and task-appropriate. It requires original thought from the student, and these thoughts must also be directed toward a clear goal. In the words of Robinson (2011), being creative usually involves playing with ideas and having fun. However, creativity is also about working in a highly focused way on ideas and projects, crafting them into their best forms and making critical judgments along the way about which work best and why (5).

Definition of ICT in the Music Classroom

Just as the definition of creativity is disputed, so too is the definition of ICT relative to music. According to Murray (cited in Pitts & Kwami 2002) ICT in the realm of music refers to “any situation in which electronic technology is used to control, manipulate or communicate musical information” (61). Webster (2002) describes this technology as “inventions that help humans produce, enhance and better the area of sound organized to express feeling” (416). Finally, Byrne and MacDonald (cited Wise et al. 2011) define music technology in the classroom by itemizing the components of that technology. In this definition they include electronic keyboards, sound modules, multi-track recorders, synthesizers, hardware sequencers, and a wide range of software applications that allow sequencing, notation, editing, and recording through MIDI-based and acoustic means (119).

ICT in Education Today
As education moves into the 21st century, there is strong agreement that teachers, administrators and school boards ought to integrate more technology into the classroom. According to Wise et al. (2011), technology is deeply embedded in the contemporary lexicon of many young people's lives. Cain (2004) goes on to say that curriculum change is "necessary" if the world of the classroom is to keep pace with the world outside. Mark and Madura (2010) agree that music teachers need to question the relevance of their instruction to "increasingly technological youth (140). If this is not addressed, they state that this may result in "declining enrolments in school music" (123). The integration of ICT can therefore be seen as essential to keeping music education relevant and engaging in today's high-tech world.

In Ontario, the Ministry of Education strongly supports the use of technology to deliver the arts curriculum. In their grade 9-10 arts curriculum document, they state that ICT provides "a range of tools that can significantly extend and enrich teachers' instructional strategies and support student learning" (Ontario Ministry of Education, 2010, p. 42). The grades 1-8 arts curriculum likewise states that an education in the arts must "engage students in using various technologies through which artistic expression can be achieved" (Ontario Ministry of Education 2009, p. 56). Finally, both documents list specific expectations that require the use of technology. These include A3.3, "students will use current technology when practicing, performing, composing, and/or arranging music" (Ontario Ministry of Education 2010, p. 103). In Ontario therefore, the use of ICT is not just a recommendation, but a requirement.

**ICT Empowering Students to Compose**
The literature provided a survey of how often composition is taught in Canadian high schools today. According to Beckstead (2001) composition has been largely absent from the public school setting since the early 20th century. Beckstead specifies that since this time, composition was considered far beyond the capabilities of public school children because it was assumed that the composer needed great facility in one or more instruments and mastery of Western notation (45). In Canada, composition was confined to private lessons for the more gifted youngsters and to students in the upper years of university music education (Beckstead 45).

Beckstead asserts however, that recent advances in technology, as well as a reexamination of the notion of composing in schools, are leading toward “a fundamentally different approach in music pedagogy” (44). Kardos (2012) adds that working with ICT provides a different framework from traditional staff notation within which to understand harmony, rhythm, melody, tonality, texture and meter. This alternative framework is useful in fostering confidence in students who have had discouraging experiences learning music the usual Western way, or who might be fearful of the (perceived or imagined) complexities of music theory (151). She states that in the classroom, technology is a valuable asset in providing alternative strategies to learn about how music works, to foster confidence and creativity and bridge the knowledge gaps that inevitably exist between students with more or less visual experience (151).

A study conducted by Wise et al. (2011), supports the use of a different framework for teaching composition. In this study, students using ICT were able to compose despite not having a strong theoretical base in music. Throughout the study the authors realized that the traditional theoretical skills they had previously thought students needed to create
effective compositions were not needed (129). Rather, students composed by relying on what "sounded good" to them (130). ICT allowed them to compose using their intuition and their 'ears' rather than their limited knowledge of musical theory. This case provided but one example of how the integration of technology can allow students to surmount traditional obstacles facing their practice of composition.

**ICT Changing Pedagogy**

The literature contained much discussion about how the integration of ICT can change traditional classroom pedagogy. One of the most frequently cited models of this transformation is the Subsitution, Augmentation, Modification, Redefinition (SAMR) model, posited by Puentedura (2006). This model shows the stages that adopters of educational technology often follow as they progress through teaching and learning with technology. In the “substitution” phase, the technology acts as a direct tool substitute for the old method, with no functional change. In the “augmentation” stage, the technology acts as a direct tool substitute, with functional improvement. Next comes the “modification” stage, where the technology allows for significant task redesign. Last comes the “redefinition” stage, where the technology allows for the creation of new tasks, previously inconceivable.

The integration of ICT has already caused teaching practices to pass through these stages. Notation software such as Sibelius acts as a direct “substitution” for notating music by hand. However, specific features of Sibelius such as *audio playback* allow the technology to perform additional functions that the old *pen and paper* method cannot.
The technology therefore passes into the *augmentation* stage, whereby it provides functional improvement over the old method. The *modification* stage is represented by students being able to perform tasks like program their own drum beats and manipulate the properties of certain sounds. These functions allow for significant task redesign. As teachers and students continue to experiment with the possibilities of ICT, it is likely that it will result in the *redefinition* of tasks and the creation of new modes of learning.

Puentedera's ideas are echoed in the work of Kiesler (1997). Kiesler refers to the use of technology as causing either “amplicative” change or “transformative” change (47). Amplicative change refers to technology being used to perform traditional tasks better or more efficiently (the substitution and augmentation stage in Puentedura's model). Meanwhile, a transformative change is one that shows a qualitative difference in how people think, act and react. (the modification and redefinition stages in Puentedura's model). According to Beckstead (2001), most of the changes that ICT is bringing to North American music classrooms are at the amplicative, and not the transformative level (51). He states that technologies are currently being adapted by schools to support a more efficient but traditional notion of composition. However, he does not dismiss the possibility that these tools will eventually pass into the transformative stage and proceed to be used in new and unexplored ways.

A study conducted by Wise et al. (2011) concluded that technology can lead to a shift in the music classroom from instructivist to constructivist learning. The study noted that teachers integrating ICT adopted a more student-centered approach to their activities. In this study, all of the teachers using technology stated that when they set students to a
task at the beginning of a lesson, they felt more confident that they would achieve it with only minimal teacher assistance (127).

**ICT Posing Challenges to Teachers**

Though the literature identified many advantages to integrating ICT into the classroom, it identified several challenges to this practice as well. Green (2008) states that the use of technology causes the traditional hierarchical role between teachers and students to change (12). In today's technology-driven world, it is usually the students who are often more familiar and dexterous with digital tools than their teachers. Music teachers are therefore under pressure to accept that they do not know everything and that they are not the holders of all musical knowledge (12). Green goes on to state that teachers who have difficulty understanding the need to use ICT in the classroom may not be comfortable to operate in a genre that is foreign to them. Hargreaves et al. (2003) asserts that integrating technology may require experienced teachers to rethink instructional practice and transform the way they have done things for many years. Teachers who are less flexible with adapting their instruction, strategies and assessments may therefore find the advent of technology more of a burden than a gift.

Another challenge of integrating ICT into the classroom is the risk of technology "taking over" the music program. Shand (2002) recognizes technology as a mixed blessing. On one hand, it can be used to enhance music making, and is therefore a valuable pedagogical tool. On the other hand, it can easily dominate a music program, leading to an emphasis on developing technological skills for their own sake, rather than as a means to acquiring musical skills and understanding (11). Paynter (cited in Savage
INTEGRATING TECHNOLOGY INTO THE MUSIC CLASSROOM TO ENCOURAGE STUDENT CREATIVITY

2005) reinforces this point. He states that ICT should be seen as a means to supporting the quest for genuinely musical activities. Too easily, it is used as an end in itself – ICT for ICT's sake (107).

Wise et al. (2011) performed a study that reflected teachers' attitudes towards using "too much technology." The study found that teachers were clear about the necessity to balance the use of digital technology with the opportunity to develop other musical skills and undertake other music activities. For example, all of their research subjects said that students needed to have opportunities to play traditional instruments and to play music together. Moreover, several of the teachers believe that technology was "a necessary part of the music courses they offered, but that it was only one part of what should happen in the music classroom" (131). Shand (2002) echoes this point: "as technology continues to change, the possibilities for students to be involved with music-making will also develop, but the teacher is the real key to fostering creativity in music education, and the teacher's ultimate focus must be on the students and the music, not on the technology" (12).
Chapter 3: METHODOLOGY

Procedure, Data Collection and Analysis

This research project is based on an analysis of existing literature on the topic, as well as qualitative data gathered from interviews with three participants. All participants were asked the same set of questions. The interviews lasted between 30-90 minutes and were digitally recorded and transcribed in their entirety. The interview protocol was developed to guide the interviewees to reflect on their experience using ICT in the classroom and the impacts that it has had on their students’ creative work.

Upon transcription, the data collected was carefully reviewed according to the themes described in the above literature review. Multiple readings of the gathered data were performed as well as a careful revisiting of the literature. The interviews were coded by hand using pencil and coloured marker. The codes were then compiled into a list and analyzed according to themes. These themes served as the basis for my findings which can be found in chapter 4.

Instruments of Data Collection

The instruments of data collection were interviews using Turner's (2010) "general interview guide" approach. Through this approach, the researcher prepared the interview questions beforehand, and some flexibility was allowed in the process of the actual interview. For example, I was at liberty to ask impromptu follow-up or probing questions to ensure clarity and reduce the chance of misinterpretation of an interviewee's response. Through this method, the same general areas of information were collected from each
interviewee, allowing for a high degree of focus. At the same time, a degree of freedom and adaptability according to the circumstances of each interview was also retained.

For a full list of questions to be asked in the interviews, please see Appendix A.

Participants

My three participants were in-service music teachers in working Ontario. For the sake of anonymity, I have chosen to call them by the pseudonyms “Crosby”, “Stills” and “Nash”. All three hold their OCT certification in music education and have experience teaching music at the middle school and high school levels. Crosby and Nash are full-time music teachers in the Peel District School Board and the Toronto District School Board, respectively. Stills is currently working as a supply teacher in music in several independent schools. All three teachers integrate a high-level of ICT into their classroom practice. They are also known to develop and deliver creativity-based activities using these tools.

Ethical Review Procedures

Once my subjects agreed to participate in the study, I prepared and sent them a letter of consent (see Appendix B). In the letter, I provided them with information regarding the data collection process, how the data will be used, and the confidentiality of the information provided. At the participant's request, I reviewed the letter with him/her and answered any questions he/she had. I then asked each participant to sign the letter and provided him/her with a copy.

Throughout the interview, I made every effort to ensure that the participant was
comfortable and willing to participate. I also reminded the participant that he/she may refrain from answering any question, and that they were welcome to opt-out of individual questions or the entire project at any time without consequence.

Following the completion of the study, participants will be offered access to the completed transcripts and will be welcomed to ask the researcher to omit any data that they don’t feel properly reflect them as educators. The participants will also be informed of the project's completion and will be able to request a copy of the project from the researcher if they wish.

**Limitations**

Due to the small sample size, the thoughts, opinions and beliefs of the participants may not accurately represent the diversity of opinions of Ontario music teachers. For this reason, the generalizability of the results is limited. However, I do have the benefit of placing my findings in the context of previous research performed in this area.

Furthermore, the limited time allotted to this project will necessarily make it less thorough. If more time allowed, I would like to do separate studies on specific age groups (primary/junior/intermediate/senior). This would allow my study to respond to the unique challenges that each of these age groups represent.
Chapter 4: FINDINGS

Theme 1: Composition

My research participants agreed that the integration of ICT had a significant impact on how students were able to compose. A common theme throughout the interviews was that digital audio workstations (DAWs) such as Garageband, Logic and Sibelius provided a simpler, more intuitive approach to composition. According to Stills, the effectiveness of these programs came from the fact that they do not require a strong knowledge of musical theory or musical composition to compose. To communicate a musical idea for example, students can simply sing notes into Finale or Sibelius and the program will notate the melody for them. Students are then free to manipulate the musical elements of the idea such as its pitch, rhythm or timbre. They may also duplicate the idea and drag and drop the different copies into different sections of the piece to form an arrangement.

In the words of Stills,

Garageband is so beautifully visual, you can just take things and move them around in time…move them from instrument to instrument and transpose them, loop them, all that stuff. It offers new possibilities that working with pen and paper doesn’t.

An additional advantage of these software programs is that they allow students to instantly hear back their compositions. For example, they can record two bars of music and immediately hear if it sounds “right” to them or not. According to Crosby, this feature allows students to “entirely rely on their ear” when deciding how to arrange their pieces. They record their ideas, listen critically to them, and make any changes they deem necessary. In the words of Crosby,

Just…put a kick in. Put a kick in somewhere else. Does that sound good? Does that sound like…normal? Does that sound like…you know…bob your head to that? Can you MOVE to that thing? Like, “no?” Ok, that’s wrong. Move it somewhere else.
Altogether, these ICT programs allow students to focus on their ideas, rather than on the means through which to communicate them. They can more readily engage with the steps of the creative process such as *imagining and generating, exploring and experimenting,* and *producing preliminary work.*

Stills and Nash also identified an equity issue that arose when students composed in this way. Traditionally, those students who had had access to additional music education outside of school were privileged when it came to the act of composition. This was because they had acquired additional music theory and music notation skills that helped them to notate and arrange their musical ideas. The use of ICT however, empowered all students to compose, regardless of their outside music education. It therefore acted as a “leveling force”, according to Stills.

**Theme 2: New Creativity-Based Activities**

The participants each described ICT-based activities that they carried out in their classrooms. Some of these activities the participants had created themselves, while others had been discovered by the participants via online resources or professional development opportunities. Two common themes ran through them. First, they all engaged students’ creative skills in some way. Second, they would be impossible or inconceivable to carry out without the use of ICT.

**Sound Design**

Sound design is the manipulation of the different elements of sound (timbre,
attack, decay, etc.) to create a new or original sound. Although this can be done with analog equipment such as analog synthesizers, it is usually done through the use of a musical instrument digital interface (MIDI) keyboard hooked up to a DAW such as Garageband, Ableton Live or Logic. In Stills’ sound design project, students were given video footage and asked to compose a short piece of music to accompany it. Herein, they created sounds to reflect a certain mood e.g. joyful, sad, eerie. This activity made cross-curricular links between art, film and music while also teaching students how to manipulate the element of timbre to create a desired emotional effect.

**Foley**

Another ICT-based activity involved the creation of Foley. Foley is the reproduction of everyday sound effects that are added to film, video and other mediums in post-production. These sounds can be anything from the squeaking of doors to the swishing of clothing. Stills gave his students footage from old films, usually The Three Stooges. Using the DAW Logic, students uploaded the footage and proceeded to add their own Foley sounds. Although this activity did not deal with some of the traditional elements of music such as pitch and harmony, it did deal with other elements such as rhythm and timbre. It also had students working with the modern tools of music production: microphones, mixing boards, computers and DAWs. Ultimately, it required a keen sense of creativity - what sounds to add and when to add them to create effects such as humour, mystery or suspense.

**Remixing**
Another ICT-based activity carried out by one of the participants was remixing. Remixing is the editing or recreation of a song so that it sounds completely different from its original version. In Nash’s class for example, a hip-hop song by Wiz Kalifa was remixed into a different genre. This activity required students to use Garageband to manipulate certain elements of a piece (e.g. the rhythm, the instrumentation) in order to have it conform to the new style. It also required students to understand the musical underpinnings of certain musical styles. What makes a hip-hop song sound like hip-hop, as distinct from a classical piece? Throughout this activity, students gained an understanding of not only technical computer skills, but also of the stylistic elements of music.

The aforementioned activities represent a small sample of the total number of activities that were described. Unfortunately, the length of this paper does not permit me to describe them all.

Musique Concrète

A final ICT-based activity involved the creation of musique concrete. Musique concrète is the practice of using found sounds in the environment to make a composition. Sounds such as footsteps, birds chirping, and cars passing by are recorded, edited for length, then arranged according to the composer’s artistic vision. The use of ICT made this process extremely accessible. In Stills’ class, students used their smart phones to record sounds found in the environment in and around their school. They inputted these sounds into a DAW such as Garageband or Audacity. The students then trimmed the sounds into their desired lengths and arranged them into a composition. Additional
features such as looping, auto-tuning and adding digital effects were also engaged. All in all, students used their creative capacities to capture, edit, arrange and mix their own compositions in the genre of musique concrète.

The activities described in the previous paragraphs represent only a small sample of the activities mentioned by the participants. Unfortunately, the length of this paper does not permit me to describe them all. It was encouraging however, to hear that my participants were using ICT to engage students’ creative skills. This according to the literature, is the ideal way in which ICT ought to be employed.

**Theme 3: Pedagogy**

**A More Student-Centered Approach**

All of my participants stated that with the integration of ICT into the classroom came a shift in the teacher’s pedagogical approach. This shift was from a teacher-centered model to more of a student-centered model. The creativity-based activities that my participants described were usually open-ended and allowed for personal interpretation on the part of the student. In the words of Stills,

> the moment kids start working with Garageband, some of them are going to be making very classical things and some of them are going to be making dance music. And you have to be able to take any project they're working on and pull out of it the learning of elements of music and tie it in.

With the students going in different directions, the teacher’s job shifted from giving direct instruction to facilitating learning on a more individualized basis. As Nash put it,

> [with ICT] it’s much more individualized, much more differentiated. Um, it changes your pedagogical approach because you’re not as much of the teacher in charge in front of the room. Everyone is sort or working in their own little creative
spheres and you have to find a way to help them move between those and expand their creative thinking a bit.

Stills likewise stated that, “[working with ICT] is more of a facilitated discovery than a taught thing.” Both Stills and Nash agreed that the teacher’s job in the ICT-driven classroom is to circulate among their students, give them new ideas, keep them on task, and answer any questions that they may have.

**Increased Student Autonomy**

My participants stated that with this more student-centered pedagogical approach, it was important to give a higher level of autonomy to the students. As students are each working in their own creative bubbles, the teacher must give them room to explore, experiment and discover. The teacher must be aware that there is no single right answer to arrive at, nor a single right process through which to get there. As such, students must be given the autonomy to approach problems in their own way, to make mistakes, to reflect on them, and to revise their thinking. Often, this creative process can be as important as the final creative product.

In tandem with this increased autonomy came a warning to not let this autonomy become too great. Both Stills and Nash stressed the importance of having clear learning goals with every lesson in which ICT is used. Stills stated that students need direction in their process of discovery. He stated that, “they must be free to explore, but their exploration must be aimed at a clear objective.” Nash echoed this statement by saying that,

in any kind of creative or more fostered creativity we have to start with small sort of constrained opportunities for it, and then eventually as their creative skills grow,
you can, you know, open the parameters more and more.

In essence, Stills and Nash stated that it is easy for students to drift off task when the nature of the task is so open-ended. Students may see their increased autonomy as an opportunity to research or create whatever they want. As a teacher, it is important to clearly establish the learning goals and parameters of the lesson or the assessment. The teacher’s job must include ensuring that students are staying on task and that they are using the technology for its intended purpose.

**Theme 4: Professional Development**

**Professional Development Opportunities**

My participants had differing opinions about the professional development opportunities related to ICT that were available to them. Crosby, who works for the Peel District School Board, said that there are “a ton” of opportunities out there for teachers wanting to learn more about ICT. He identified himself as a regular presenter at workshops for the music association of the Peel board. This is the association to which all music teachers in the board belong. Another professional development opportunity he mentioned was “education camps,” which are multi-day intensive programs where participants learn how to use a new application in great detail. He stated that he had recently participated in an education camp to learn the program *Max*, which is a toolkit for creating custom digital instruments.

Nash, who works for the Toronto District School Board, agreed that a range of opportunities were available to him. He said that workshops and conferences are offered at both the provincial level and the board level. The provincial offerings include the
annual conference run by the Ontario Music Educators Association (OMEA). The board level offerings include specialists coming into his school and teaching him how to work with specific programs. His overall impression of these professional development opportunities was positive: “at the TDSB we’re very lucky to have…um some pretty cutting edge and some pretty good professional development in terms of seeing new things.” He also stated that the majority of the new activities and tools that he implements in his classroom are discovered at these workshops and conferences.

Stills, who works for an independent school, was not so positive about the professional development opportunities available to him. He stated that online and print resources were available though the OMEA but hands-on opportunities were very limited. According to him, few opportunities to attend workshops exist beyond the annual conference that the OMEA hosts in the fall. He did not mention participating in any workshops at the school level, making me believe that such opportunities were not available to him. According to Stills,

I don't think that [integrating ICT] is something they're, they're necessarily going to bring someone in to do for a PD day in the boards. I think there are way too many people coming in to talk about curriculum and gifted education and things like that. I…I don't know if there's anyone facilitating that. There should be.

It therefore appears that access to professional development opportunities is less for those teachers working for independent schools. As they are not part of a public board, they are not privy to the board-level resources that the other two participants found effective.

Stills identified another source of professional development beyond conferences and workshops. This source was other music teachers. In the words of Stills, “don’t try and reinvent the wheel. Talk to people, look at teacher’s blogs, see what others have done
and use it/adapt it to your own purposes.” He encouraged the development of an open community where teachers freely share their lesson plans, assessments, rubrics and other materials. He stated that teachers should borrow from one another, experiment with the tools, and post their reflections and refinements online. He himself had posted some of his original Garageband lessons online and hoped that other teachers had been able to use them.

Self-Directed Learning

In speaking to the participants, it was interesting to note that all of them were very interested in ICT outside of their professional careers. They self-identified as “computer geeks”, as “independent learners”, and as “really into this stuff.” As Nash stated,

I’ve always had an interest in music recording, music production. Um so part of it was just that natural extension of my own, my own interests and I was given that when I got that first job with the chance of doing music recording. I really jumped at it because that was um something that I was able to really latch on.

Because of their intrinsic enthusiasm for ICT, these participants proactively sought out new tools and new learning opportunities. They were constantly developing their skills, and this helped them to be at the cutting edge of their profession in this domain. Although opportunities for professional development exist at both the board and the provincial level, it would appear that the top innovators in the field rely on self-directed learning to grow their skill set.

Shortcomings of Professional Development

Amidst the professional development opportunities (or lack thereof) that the participants described, they all seemed to agree on a particular shortcoming that the
province-level conferences and workshops had. This shortcoming was that the sessions did not adequately train the teachers to implement their new learning into their own classrooms. Though they may have had acquired new skills during the workshops, they often found themselves unable to apply these skills in their actual classroom practice. As Crosby put it, “it can be hard to go to workshops and see someone do something and then being like, ‘well how do I do this in my…my classroom?’” Nash echoed these sentiments:

“You’ll see these iPads with all these possibilities and sometimes sort of like a little bit overwhelming because there’s so much to do, but then after that workshop there’s no mechanism for actually learning and integrating it.

Crosby and Nash also agreed that the board-level workshops did not suffer from this problem. These workshops were more effective because they involved a technology specialist coming into the school and showing the teachers how to work with their own equipment. According to Nash,

“some of the best professional development I’ve had has been school-based and school-level which is…this is a piece of technology that we’re going to adapt, whether it’s some kind of e-learning thing or whatever and then the whole school spends time working on that particular piece of technology […] so it was a very sort of hands-on, targeted approach, and I think that’s very very valuable because teachers walk right into the classroom and they go, “oh yeah, I know how to do this. I know how to teach this.

Crosby agreed that the board level offerings were superior because they took place in the school that he was working at. The specialist would take the same equipment that Crosby used everyday and teach him to use it in new ways. This approach allowed Crosby to immediately see how he could apply his new skills with his own class. There was a direct relationship between what he was being taught and how he could integrate it into his own teaching. As Crosby stated, “the easiest way is to sit in a computer lab, see it done, do it, apply it right away.”
Theme 5: Challenges

Despite the many advantages that ICT brings to teaching and learning, all three participants agreed that it comes with drawbacks as well. Issues such as equity, breakability, obsoleteness, and additional planning time were mentioned. Each of these challenges will be discussed in turn.

Equity

The relationship between school finances and the integration of ICT was a major theme throughout the interviews. The schools in which the participants taught had greatly varying budgets with which to fund their music programs. As a result, the level of ICT integration in their programs varied greatly as well.

Crosby’s school was very well funded and had a large budget for ICT. This resulted in a wealth of equipment available in his classroom: a full class set of iMac computers equipped with Logic, Garageband, Ableton Live, Finale and Sibelius software, a full class set of MIDI keyboards, a full set of netbooks, an Apple TV streaming device and a SMARTboard equipped with professional-quality speakers. Moreover, his school had a Bring Your Own Device (BYOD) policy. This encouraged students to bring in their personal laptops and smartphones, thereby adding to the amount of ICT at hand.

At the other end of the spectrum, Nash’s school had very limited access to ICT. His classroom didn’t have a single computer, and he resorted to bringing in his personal laptop whenever he wished to do a computer-based activity with the class. Moreover, his students came from a relatively low socio-economic status and did not have their own personal devices that they could use. Nash described this lack of equipment as a challenge. Though he would have liked to incorporate more ICT into his classroom
activities, the school’s budget and the students’ limited resources would simply not allow for it.

Though the potential for ICT integration is largely dependent on school finances, teacher advocacy can also play a large role. Crosby identified himself as a strong advocate for purchasing up-to-date equipment. He explained his strategy for getting his principal to care about and contribute to his ICT goals:

You have to make a loud noise and, and, and do it relentlessly in a…professional manner, but relentlessly. If you give up or you don’t really want to put the effort in, then you’re not going to get this and just…put it away and you know what, resent me for having it, fine, but this can be achieved anywhere. I’ve done it in more than one building and now I’ve seen people copy me and do it elsewhere too. And it wasn’t because they had any special arrangement with or connection or anything. They just pushed and pushed and pushed.

In the event that one’s principal is unable or unwilling to provide these funds, there are other avenues that a teacher can take. Crosby told a story about a teacher he knew that needed money to buy additional instruments. One year at a Christmas concert he “pled poor” to the parents. He expressed his appreciation for the parents coming to the concert and mentioned that all proceeds would go toward a fund to buy new instruments. He also encouraged parents to donate whatever extra money they could afford. As a result, the parents formed their own independent association with the specific goal of financially supporting the school’s music program. Eventually, the association was able to raise the necessary funds. As Crosby put it, “he went out there and he, he kept on saying it until he found someone that was listening. In this case the parents were listening.”

Crosby’s experiences demonstrate that the teacher has agency in acquiring the funding that he/she desires. With some persistent but professional advocacy, the teacher
can find a way to receive above and beyond what his/her school allocates. Though the school’s budget will highly influence the level of ICT available at the school, the teacher can play a key role in expanding these financial possibilities.

More Lesson Planning

Another challenge, identified by Stills, was that the use of ICT required more planning on the part of the teacher. Whereas traditional methods of teaching music are rife with resources such as lesson plans, assessments and rubrics, teaching with ICT is sparse in this domain. This is because teaching with ICT is a relatively new practice, and the production and sharing of ideas isn’t nearly on the same level. Teachers themselves must therefore be proactive in making activities, instructions, materials and assessments for their students. In the words of Stills, the teacher must take extra time “to make sure that something’s actually going to be useful, to make sure it’s the best option, to figure out how to use it, to figure out how to explain it, to figure out how to make a lesson out of it.” This can take considerably more time and energy than teaching without ICT, and teachers must be willing to make this investment.

Nash added to this point by stating that teachers must take the time to internalize a new program before attempting to teach with it. The teacher must practice using the program and must become comfortable with its everyday use. The teacher must also explore the possibilities of the program and determine how it can be used effectively in class. Finally, the teacher must anticipate any problems that his/her students may have with the program and prepare solutions to them.

Technical Difficulties and Obsoleteness
A myriad of other challenges surrounded the use of ICT. These were mainly related to technical difficulties and obsolescence. With high-tech tools come high-tech problems, and teachers must be prepared for some amount of frustration and loss of time when their ICT tools malfunction. Crosby gave a specific example in which students were trying to upload their final assignments to the school’s online learning environment. The final assignment was in the form of an mp3 file, which was too large for the learning environment to handle. Crosby had to resort to collecting the assignment on 25 separate USB sticks, which was extremely cumbersome to organize, assess and redistribute.

Another challenge was obsolescence. As Nash stated,

once you do have the equipment, you have to constantly upgrade it. So it's about…if nothing else, for the teachers it's about constantly staying on top of…what's coming out. So what are…the app updates, the program updates and hardware updates. That's great for you to do at home and then each year you can be like "ok, everyone's gotta download this app to your smartphone.” That's easy. But if it's like software in the computer lab, it's a nightmare to have to constantly upgrade it.

If software programs are not up to date, they may become incompatible with other machines or devices that are up to date. If, for example, a student is using an outdated version of Logic at school and tries to work on that same project with an up-to-date version of Logic at home, the two programs may not speak to each other. Another scenario is that an older version will speak to the newer version, but not vice-versa. In this case, student work may become lost or may be rendered useless as they switch between versions. Overall, the rapid pace of both hardware and software development necessitate a constant need to upgrade and update one’s equipment. This can represent both a mental and financial burden on any teacher hoping to integrate ICT into his/her classroom.
Chapter 5: DISCUSSION

Implications For Teachers

Funding

My findings suggest that a teacher’s ability to integrate ICT into his/her classroom will be strongly linked to the budget that his/her school allows for this purpose. ICT is expensive and requires significant funding in order to purchase, maintain, and repair. For teachers, it is extremely important to know the existing level of ICT in the school, and the budget that is allowed for acquiring new equipment. The teacher’s level of ICT integration ought to be based heavily around these two figures. For example, a teacher whose school contains a Mac lab equipped with Garageband, Logic and Ableton Live software will have far more opportunities for ICT-based activities than a teacher whose school has one computer for the entire class.

The socio-economic status of the students will also affect how much ICT integration is possible. Students from a high socio-economic status for instance, are more likely to have access to computers with internet connections at home. They might also own their own laptops, tablets and smartphones. All of this personal technology would allow them to work on ICT-based assignments outside of class. It would also allow them to perform certain activities that require the use of smartphones, such as the musique concrète activity described in the previous chapter. Meanwhile, students of a low socio-economic status are less likely to own the aforementioned personal devices. This may prohibit them from being able to work on ICT-based assignments outside of class time. As such, the teacher must adjust his/her expectations for the rate at which when certain
tasks can be accomplished.

When trying to acquire funding for ICT in the classroom, advocacy is key. It is entirely possible for music teachers to raise funds above and beyond the annual budget that a school allocates towards its music program. Music teachers must be proactive in advocating for why their school would benefit from the purchase and integration of specific ICT tools. Such advocacy must be done in a “relentless, though professional manner”, according to Crosby, a successful advocate in several schools. He was convinced that a high-tech classroom could be “achieved anywhere” if the teacher is persistent and has a strong rationale for acquiring the ICT tools.

**Pedagogy**

My findings also suggest that the integration of ICT requires the use of a more student-centered pedagogical approach. ICT lends itself very well to independent creative work such as composition, sound design and remixing. Students are heavily inclined to work in their own “little creative spheres,” as Stills puts it. As a result of this, teachers must be ready and willing to move away from the traditional teacher-centered model and embrace a more student-centered one. Additionally, students must be given the freedom to explore the creative possibilities of a given activity. They ought to work autonomously in order to come up with their own processes and solutions. The role of the teacher becomes to expand their creative thinking, answer their questions, and keep them on task.

When doing this type of student-centered work, it is important that the teacher
establish a clear set of objectives. These objectives should be challenging, engaging and age-appropriate. For example, by the end of a composition lesson, the teacher could require that a four bar melody with bass accompaniment to be recorded using Garageband. Though the students are given autonomy in how they achieve the task, it is essential that they be working toward this specific goal. This gives students a sense of direction in their learning and focuses their efforts on acquiring a concrete skill or set of skills.

**Loss of Traditional Composition Skills**

All three participants agreed that the use of ICT simplifies the composition process. It effectively allows students to compose without any knowledge of or experience with music notation and music theory. This ease of use however, begs another question - does it lead to the deterioration of traditional composition techniques? Does it shift the focus away from learning about important things such as theory, harmony, and notation? Is it a great loss if students are to no longer acquire these traditional skills?

I believe that the answer to all of the above questions is yes. As students engage with sophisticated software programs, it lessens the time and focus they are able to invest in learning traditional techniques. I believe that this shift is lamentable because traditional composition is a rich and complex art that ought not to be lost on the current generation of students. Throughout their middle school and high school years, they ought to acquire a basic level of “music literacy” – the ability read and write traditional music.
In assessing the appropriate place of composition using ICT, we must consider that ICT is adept at composing in some genres, and not so adept in composing in others. It is adept for popular music for example, which relies on short repetitive melodies, few instruments and simple harmonies. It is not so adept for classical music, whose melodies tend to be longer, its orchestration larger and its harmonies more complex. For classical composition therefore, a knowledge of musical theory and musical notation is necessary. One must understand how intervals work for example, in order to compose a perfect or imperfect cadence. If students are to learn to compose in the genre of “classical art music”, they will certainly need these traditional skills.

My suggestion therefore is that teachers try to strike a balance between pop music and classical art music in their composition programs. Just as most concert bands have a mix of pop and classical music with what they play, so it should be with what they compose. ICT and its associated skills of recording, trimming, mixing and mastering ought to be used with the former genre. The skills of music notation and music theory ought to be used with the latter. In this way, the composition program passes the rich and complex skills of its tradition to the current generation of students. At the same time, the program stays relevant by embracing the music of the present and the means through which to make it.

Implications for the Educational Community

More Sharing Between Teachers
My findings suggest that there currently exists a lack of resources for integrating ICT into the music classroom. Materials such as lesson plans, assessments and rubrics are all in short supply when compared to the materials available for teaching music in traditional ways. It is clear from my interviews however, that my research participants were creating and using these types of resources themselves in their own classrooms. This leads me to believe that other music teachers in Ontario and the rest of Canada are doing the same thing. The problem then, is not a lack of resources, but a lack of sharing between teachers.

What needs to be established therefore, is an online space where teachers can share the materials that they create and use. This space must be free or inexpensive to access and must be widely publicized within the music teaching community. Moreover, teachers need to be encouraged to upload their materials to this space. A culture of sharing must be fostered in which teachers post their successes, failures, challenges, solutions and lessons learned to the community. With greater communication and collaboration, teachers may more quickly discover how to make the most of their ICT resources.

Professional Development

Of the two types of professional development available to my participants - provincial level and board level - there was strong agreement that the latter was the more effective. The board level professional development often had specialists come directly into the teachers’ classrooms to show the teachers how to use their own equipment in
new ways. Teachers found this more effective since they could easily apply their newly acquired skills to their own teaching practices. By contrast, the provincial level professional development shared broad ideas and techniques that did not necessarily relate to the teachers’ teaching situation.

Given these findings, it is my suggestion that more funding go into professional development opportunities at the board level. Moreover, I suggest that teachers be given more time to participate in these opportunities. It is clear from my findings that board level professional development is more effective in enhancing teacher practice, therefore school administrators should allocate a greater quantity of time and resources toward these types of initiatives.

Limitations

I would like to reiterate that due to the small sample size of research participants, the thoughts, opinions and beliefs expressed in this study may not accurately represent the diversity of opinions of Ontario music teachers. For example, some teachers may have gleaned excellent ideas and teaching techniques from provincial-level professional development conferences. Others may be active contributors to online communities in which teachers share their resources. The discussion in this study is based solely upon the ideas of my three research participants, and my subsequent interpretation and reflection upon them.
Further Study

At the conclusion of this research, I still have a list of questions that I would like to explore:

- What is the ideal balance between ICT activities and non-ICT activities in the classroom?

- What other traditional skills (beyond knowledge of music theory and notation) are potentially being lost by integrating more ICT into the classroom? What is the impact of this loss?

- Is there a difference between urban schools and rural schools in their ability to integrate ICT into the music classroom?

- What are student perceptions of using ICT in their music class?

If I were to investigate these questions, I am confident that I would find a wealth of academic and practical resources that address them. As previously mentioned, both creativity and technology are hot topics in education at the moment. Academics and classroom teachers alike are experimenting with these matters, writing about them, and sharing their results.

Future studies stemming from my research could include the following:

- How can professional development opportunities at the provincial level be made more relatable to teachers’ classroom practice?
INTEGRATING TECHNOLOGY INTO THE MUSIC CLASSROOM TO ENCOURAGE STUDENT CREATIVITY

- How might teachers with small budgets for ICT still offer effective ICT-based activities?

- What are the most effective strategies for teaching ICT with a student-centered approach?

Conclusion

Music educators all over the world agree that ICT can be a powerful tool for developing student creativity. ICT gives teachers the potential to design, develop and implement creativity-based tasks that were previously inconceivable. This research has sought to examine innovative ICT-driven practices that are being employed by middle school and high school music teachers in Ontario. It has shown that these music teachers are active in using these tools to positively develop students’ creative skills.

It must be reinforced however, that ICT is not a magic bullet. Simply putting students in front of computer screens will not engage their creative capacities as a matter of course. Effective creativity-based activities and assessments require significant planning, experimenting, reflecting and revising on the part of the teacher. Often times, it requires more of an investment of time and energy than if the teacher were to teach using traditional methods. If the teacher is willing to put in this extra effort however, the results can be remarkable.

As we move further into the 21st century, it is likely that technology will play an ever larger role in teachers’ classrooms and pedagogy. It is my recommendation that teachers
embrace these new tools with a mix of enthusiasm, curiosity, and critique. We must be open to the new possibilities that this technology presents – its ability to enhance and expand our creative potential. At the same time, we must be critical as to whether this technology is genuinely strengthening our creative capacities, or whether it is merely a seductive new toy. If we are to approach the integration of ICT in this way, I am confident that it will have a positive and long-lasting effect on the current generation of creative thinkers.
REFERENCES


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APPENDICES

Appendix A: Interview Questions

Thank you for participating in this study. Just as a reminder, this study concerns in-service teachers’ perceptions of the effectiveness of their initial teacher education programs. Throughout this interview, I will be asking you between 10-15 questions. Follow-up or impromptu questions may also be asked for the sake of clarity. The interview will last between 30-45 minutes. Please be reminded that you may opt out of answering any question or out of the entire project at any time without consequence. Before we begin, do you have any questions for me?

Main research question

• How can music teachers integrate ICT into the classroom to develop or encourage student creativity?

Background Information of Interviewee

• What is your current teaching position (grade level, instrument grouping i.e. winds strings, vocal)
• How long have you been teaching music?
• What was your experience with music performance or music teaching prior to your become a professional music teacher? (i.e. is your background in jazz? Classical music? Pop/rock? Musicology?)

Interviewee’s Experience with the Topic and Issues
• What ICT do you integrate into your music classroom? Please be specific.

• What effects, if any, has the ICT had on student engagement? On student performance? On student achievement? On student creativity?

• What are your reasons for integrating ICT into your classroom?

• There are many ICT tools and programs that are relevant to the music classroom.

  How do you decide which ones to use?

• Has the integration of ICT changed or influenced your pedagogical approach? If so, how?

• How do you discover new ICT tools? Once they are found, how do you learn to use them?

• How important do you feel it is to integrate ICT into the music classroom?

Challenges

• Have you encountered any challenges in integrating ITC into the music classroom? If so, what were they?

• Did you manage to overcome these challenges? If so, how?

• What advice would you give to other music teachers who are interested in integrating ITC into their classrooms?
Professional Development

• Are there any professional development opportunities available to you to help you integrate ITC into the classroom? If so, what are they?

• Have you participated in any professional development opportunities related to this topic?
  o If so, did you find them helpful?
  o If so, have you integrated what you learned there into your teaching practice?

• Are there any professional development opportunities in this field that are not available to you that you would like to see? If so, what are they?

• Is there anything else you would like to mention?

• Do you have any questions for me?
Appendix B: Letter of Consent for Interview

October 1st, 2013

Dear Participant,

I am a graduate student at OISE, University of Toronto, and am currently enrolled as a Master of Teaching candidate. I am studying how music teachers can incorporate technology into the music classroom in order to foster student creativity. This research is done for the purposes of investigating an educational topic as a major assignment for our program. I think that your knowledge and experience will provide insights into this topic.

I am writing a report on this study as a requirement of the Master of Teaching Program. My course instructor who is providing support for the process this year is Dr. Arlo Kempf. My research supervisor is Mary Ann Fratia. The purpose of this requirement is to allow us to become familiar with a variety of ways to do research. My data collection consists of a 30-45 minute interview that will be tape-recorded. I would be grateful if you would allow me to interview you at a place and time convenient to you. I can conduct the interview at your office or workplace, in a public place, or anywhere else that you might prefer.

The contents of this interview will be used for my assignment, which will include a final paper, as well as informal presentations to my classmates and/or potentially at a conference or publication. I will not use your name or anything else that might identify you in my written work, oral presentations, or publications. This information remains confidential. The only people who will have access to my assignment work will be my research supervisor and my course instructor. You are free to change your mind at any time, and to withdraw even after you have consented to participate. You may decline to answer any specific questions. I will destroy the tape recording after the paper has been presented and/or published which may take up to five years after the data has been collected. There are no known risks or benefits to you for assisting in the project, and I will share with you a copy of my notes to ensure accuracy.

Please sign the attached form, if you agree to be interviewed. The second copy is for your records. Thank you very much for your help.

Yours sincerely,

Mitchell Wong

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Instructor’s Name: Dr. Arlo Kempf
Phone number: __________________ Email: ____________________

Research Supervisor’s Name: Mary Ann Fratia
Phone #: (905) 286-5817 Email: maryann.fratia@utoronto.ca

Consent Form

I acknowledge that the topic of this interview has been explained to me and that any questions that I have asked have been answered to my satisfaction. I understand that I can withdraw at any time without penalty.

I have read the letter provided to me by Mitchell Wong and agree to participate in an interview for the purposes described.

Signature: ____________________________________________

Name (printed): __________________________________________

Date: ____________________