

REACHING DIGITAL NATIVE MUSIC MAJORS:  
PEDAGOGY FOR UNDERGRADUATE GROUP PIANO IN THE 21<sup>ST</sup> CENTURY

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by  
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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation titled

REACHING DIGITAL NATIVE MUSIC MAJORS:

PEDAGOGY FOR UNDERGRADUATE GROUP PIANO IN THE 21<sup>ST</sup> CENTURY

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Dr. Wendy L. Sims, Dissertation Supervisor

**ABSTRACT**

This dissertation comprises three projects that were designed to contribute to our understanding of today's digital native music majors and their needs within the group piano curriculum. The first investigation is a review of literature pertaining to collegiate group piano, describing existing research and recommending aspects still needing to be studied. The second investigation used phenomenological qualitative methods to investigate the adaptation processes of group piano students as they adjust to the new demands of collegiate music study. Data from participants ( $N = 6$ ) indicated that despite individual differences, common themes of Preparedness, Motivation, Priorities and Expectations, Support Systems, and Accomplishment/Empowerment were characteristic of the group piano experience for these first-semester students. The third investigation is an experimental study. I sought to determine how the use of technological tools with varied capabilities of providing aural modeling and tempo control features affected collegiate group piano students' achievement. Group piano music majors ( $N = 43$ ) were randomly assigned to one of four treatment groups (control, metronome, YouTube, or Tempo SlowMo). No significant achievement differences were found among the technology groups. Results from these three projects indicated that (a) there is a need for further research in group piano contexts, (b) group piano is a valuable part of the music core curriculum because courses are conducive to 21<sup>st</sup>-century skill development and (c)

individual differences are important considerations when assisting students with adaptation processes and technology selection in group piano. These findings may transfer to other core music classes, student experiences, and practice routines.

## Chapter One

### Introduction

Piano instruction has been a popular means of music education in America for many years. The rise of U.S. manufacturing in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries made acoustic instruments affordable for a vast majority of the public, and produced a dramatic need for qualified teachers. Teaching piano in groups quickly became a practical method for educating numerous new students at once when only one teacher was available. By the 1920s, group piano teacher certification programs had been founded at many of the nation's colleges and universities (Fisher, 2010; Pike, 2014) and piano coursework became a staple of collegiate music study. Despite the robust history of group piano pedagogy and curriculum development over the course of the past century, very little empirical research has been conducted to test and investigate the practices of group piano teachers (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014).

The pervasive nature of technology in today's educational landscape requires in-depth investigations regarding effective pedagogical practices for today's undergraduate group piano students. Technology-assisted practice and classroom apps have become increasingly prevalent in music education over the past several decades, but little is known about how technology impacts pedagogy and curriculum. In addition, very little is known about the specific characteristics of today's music majors and how they adapt and adjust to college. The term *digital natives* has been used to describe students who were born after 1980, and have grown up with increasing access to technology (Cleveland, Jackson, & Dawson, 2016). This term is especially meaningful in higher education, as the current student body transitions to the post-millennial generation. Although these

contemporary students may learn and think differently from their generational predecessors, many faculty members continue to use teaching techniques and curriculum guidelines that are founded in pre-digital age pedagogy. A technological pedagogical and content knowledge (TPACK) conceptual framework may be used to identify the teacher knowledge necessary to effectively integrate technology into the classroom (Bauer, 2012). Research indicates that a deep and expansive understanding of teacher development (with and without technology) is needed to facilitate optimal student learning environments in coordination with robust, research-based standards (see Bush, 2007; Conway, 2007; Standerfer, 2007; Palmer, 2012; Miksza & Berg, 2013; Berg & Rickels, 2017; Silveira, Beauregard, & Bull, 2017). Studying the unique traits and learning processes of today's undergraduate music majors in the context of group piano pedagogy and curriculum may assist educators in understanding the individual needs of these students and how they adapt and respond to the coursework. Investigations of this type will help to ensure high quality teaching practices at the university level because relatively little is known about the individual needs of students and the application of technology in group piano for music majors. Results from this research may also be applicable to other core music classes for undergraduate students.

Intrigued by the possibilities of connecting piano pedagogy with larger trends in music education, and given the paucity of research related to piano pedagogy in general, and group piano pedagogy specifically, my dissertation is designed to contribute to our understanding of today's digital native music majors and their needs within the undergraduate group piano curriculum. My goal was to gather data from the existing literature as well as collegiate group piano students in order to provide (1) a stand-alone

literature review that summarizes what is currently known about group piano at the collegiate level, and to identify common characteristics of 21<sup>st</sup>-century learners and how they adapt to coursework requirements, (2) a phenomenological study that investigates the experience of college adaptation from the perspective of music majors enrolled in group piano level 1 and (3) a quantitative study that explores how technology-assisted practice with varied aural modeling and tempo control capabilities affect collegiate group piano students' achievement during in-class practice sessions. Collectively, these related studies may provide recommendations for group piano instructors and music teacher educators interested in adapting group piano curricula and pedagogical practices to meet the needs of today's students.

### **Background of the Problem**

#### **Digital Nativism**

Digital Nativism (DN) has been defined as a lifestyle “used to describe students who were born after 1980, and have grown up with increasing access to technology, specifically social digital platforms” (Cleveland, Jackson, & Dawson, 2016; Palfrey & Gasser, 2008). Numerous authors have identified the differences between digital natives and their generational predecessors (Prensky, 2001; Cleveland, Jackson, & Dawson, 2016; Palfrey & Gasser, 2008). Most notably, a marked difference in how these students think and process information may be linked to the rapid dispersal of digital technology throughout their lifetimes (Cleveland, Jackson, & Dawson, 2016; Cremata & Powell, 2017; Prensky, 2001; Palfrey & Gasser, 2008). An emerging field of research regarding the unique characteristics and learning preferences of digital natives indicates that aspects of identity, information overload, privacy, and safety may influence students and their

classroom behaviors as a result of technology (Palfrey & Gasser, 2008). Despite the pervasive presence of technology in the lives of today's students, research results describing the benefits and limitations of these tools are mixed with regards to healthy digital habits and problematic use (Aboujaoude, Koran, Gamel, Large, & Serpe, 2006; Lenhart, Madden, Macgill, & Smith, 2007).

### **Collegiate Student Adaptation Processes**

Educators recognize the value in understanding individual student needs when they consider the impact of individual differences on pedagogical and curricular practices in the group piano classroom. Research results indicate that in many cases, incoming students are inadequately prepared to adapt or adjust to college (Karp, 2011; Lehmann, 2014). A rich body of knowledge surrounding the individual and environmental predictors of college adjustment has been identified in existing research (Katz & Somers, 2015) and adaptation to college, specifically as it relates to students' mental and physical health has also been studied across a wide range of student populations (Zea, Jarama, & Bianchi, 1995). However, how the collegiate adaptation process affects music majors enrolled in group piano courses is largely unknown. The experiences of incoming collegiate students and their ability to adapt to new coursework and educational settings may be particularly important to study given the theory of emerging adulthood, which states that the age range from a person's late teens to mid- to late 20s is characterized by identity exploration, instability, self-focus, feeling "in-between," and an awareness of possibilities (Arnett, 2000; 2004; 2007).

Findings reported in the music education literature indicate that a variety of factors may affect the adaptation processes of students. Time constraints have been

identified as a factor that influenced adults in choosing to discontinue piano lessons (Cooper, 2001). The establishment of efficient practice routines has also been identified as a key ingredient to student success (Miksza, 2007; Duke, Simmons, & Cash, 2009; Miksza & Tan, 2015). Finally, grit and perseverance toward short and long term goals, and the communication of approval and disapproval from teachers to students have been studied in relation to student success and retention (Costa-Giomi, Flowers, & Sasaki, 2005). Understanding the many factors that contribute to efficient adjustment processes, particularly for college students in the midst of this significant life transition, may be an essential element for improving teacher-student communication in the music classroom. Group piano is a core course in collegiate music curricula. Given the lack of piano pedagogy research regarding this collegiate adaptation topic, and the expansive body of music education knowledge regarding efficient practice routines, understanding adaptation and adjustment for first-semester collegiate group piano students in 21<sup>st</sup>-century undergraduate group piano is an area of valuable study. Research in this area will likely provide insights that affect teacher and student interactions, learning, and retention.

### **Group Piano and Technology**

Teaching piano in groups became an ever more prevalent method of instruction, particularly at the collegiate level, over the course of the 20<sup>th</sup> century and into the 21<sup>st</sup>. Existing group piano research has explored several areas of instruction, including proficiency skills (Betts & Cassidy, 2000), student beliefs and perceptions (Jutras, 2006), student practice habits (Cremaschi, 2012), and teaching strategies (Pike, 2014). However, there are few investigations regarding the value of specific practices and curricular decisions (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014). Anecdotal evidence

shared through conferences, pedagogy textbooks, and teacher magazines seems to be the most common source of pedagogical guidance for group piano instructors (Pike, 2014).

Technology has become a popular topic of interest in both general music education and higher education. Electronic and online materials for music educators have become increasingly commonplace, but very little research exists regarding the value and effect of technology on teaching and learning (Whitaker, Orman, & Yarbrough, 2014). In collegiate group piano classrooms, various types of technology are easily accessible because of the arrangement of electronic keyboards with desktops or tablets in piano labs. A growing trend toward one-to-one technology, defined by classrooms in which each student uses a personal mobile device for individual learning, can be observed in numerous educational fields (Cuban, 2010; Grant, 2011; Dorfman, 2016). Music education research indicates that sustained engagement and the consideration of many different factors (including gender, practice time, and motivation) have the potential to impact the effectiveness of technology in the music classroom (Abramo, 2011; MacIntyre, Potter, & Burns, 2012; Simmons, 2012). Given the accessibility of technology in most collegiate group piano classrooms, instructors need to understand and make curricular decisions based on the impact of various technological components on student learning and effective practice.

### **Problem and Purpose**

Developing instructors' knowledge and skills to teach group piano successfully requires time, effort, and a foundation of researched best practices. Music educators have increasingly called for integration of research, practice, and policy (Conway, 2007; Standerfer, 2007). Although existing literature indicates that group piano pedagogues

invest time and effort in curricular decisions through conferences, pedagogy textbooks, and teacher magazines, very little empirical research exists to support the value of current practices (Pike, 2014). The specific needs of today's digital native collegiate music major students are also overlooked in the existing group piano literature. Given the recent advances in our understanding of digital natives, collegiate adaptation processes, and technology implementation, the purpose of this dissertation was to investigate these overlapping processes within the undergraduate group piano learning environment.

### **Research Question**

The following primary research question was used to guide this investigation: How can university-level piano pedagogues best meet the needs of today's digital native undergraduate music majors in group piano classes? I hoped to combine the new research regarding student adaptation processes and technology implementation with existing literature on the unique characteristics of contemporary college students in order to better understand how the application of empirical research might improve curricular decisions, pedagogical practices, and student outcomes.

### **Research Plan**

To answer the research questions, I reviewed the existing bodies of literature related to digital nativism, collegiate adaptation processes, and group piano. By synthesizing this research, I identified the need for investigations pertaining to students' unique adaptation experiences in group piano, and technology-assisted practice. Then, in two separate studies, I explored how this new understanding could help to improve group piano pedagogy and curriculum for today's collegiate students. Thus, this dissertation

comprises three investigations designed to study how collegiate group piano instructors can best accommodate digital native music majors.

The first investigation is a review of literature that summarizes what is currently known about group piano at the collegiate level. Current research included in this literature review combines work on digital nativism, TPACK, 21<sup>st</sup>-century skill development, student adaptation processes, and standard practices in group piano instruction. In addition, transfers from other fields of study provide vital perspectives on this important emerging topic. Given the expanding body of work related to pedagogical content knowledge in general education and music education, it seemed reasonable to investigate whether the “big picture” of pedagogy and curriculum, as well as specific contextual applications in the digital sphere, may be combined to better prepare collegiate piano instructors for their group piano course assignments. This review of literature was designed to identify applications for faculty members and graduate teaching assistants seeking to meet their students’ 21<sup>st</sup>-century needs, and also suggests potential growth opportunities facing today’s teachers and students.

The second investigation is a phenomenological qualitative study involving first-semester group piano students experiencing the collegiate adaptation process. This study was designed to explore how these students developed productive educational habits (Credé & Niehorster, 2012) that facilitate a smooth transition to the new developmental and psychosocial demands of this foundational college music course (Conley, Travers, & Bryant, 2013). Although collegiate adaptation has been connected to the specifics of campus navigation (Karp, 2011), and adaptation success likely affects mental and physical health (Zea, Jarama, & Bianchi, 1995), little is known about how the adaptation

process impacts group piano outcomes. Interviews of current first-semester collegiate group piano students provided a reasonable method of investigating the practices of music majors so that teachers can better address the diverse needs of individuals in the classroom. The thematic categories derived from these interviews may be used to identify student needs that are not currently addressed in group piano pedagogy and curriculum.

The third investigation is an experimental study that was designed to explore the effects of technology tools that represent different possibilities for aural modeling and tempo control on piano achievement during in-class practice sessions. Although one-to-one technology implementation has been investigated in the past (Dorfman, 2016; Hahn, in press), little is known about how specific components of technology alter the practice behaviors and performance outcomes of group piano students. Results from a study of current group piano students may encourage piano pedagogues to include technology research and practice in pedagogical and curricular decisions. In addition to evaluations of the group piano students' achievement levels in connection with the technology and specific background variables, a survey instrument was used to gather data on student self-reports of practice behaviors, and perceptions of technology. Throughout this study, I sought to explore the complex interactions between technology-assisted practice, performance achievement, student practice behaviors, developmental level, and prior piano experience across four groups (control, metronome, YouTube, and Tempo SlowMo). This study will benefit collegiate group piano instructors as they explore applications of technology in the classroom and use findings and recommendations to improve student preparation and achievement outcomes. Results may also be applicable to music practice for other instruments, classes, and ensembles.

The final chapter of this dissertation provides a summary, a synthesis of findings to answer the primary research question, and implications for teaching and future research. Results will be connected in new and unique ways to contribute to the understanding of pedagogy and curriculum in the 21<sup>st</sup> century for group piano pedagogues in the collegiate setting and to provide suggestions for all piano educators.

### **Importance of the Study**

These investigations will contribute to the body of knowledge about group piano pedagogy and curriculum for today's digital native music majors. Specifically, this dissertation will build on current understandings of how various aspects of music research can be applied to pedagogy and curriculum in the digital age. I will also provide suggestions about how collegiate adaptation processes and technology implementation can be used to improve teaching practices and student outcomes. Ideally, piano pedagogues and other music educators will use the results of these studies to more effectively develop their teaching and classroom routines.

### **Definitions**

The following definitions were used in this study:

1. Digital Natives: Students who were born after 1980, and have grown up with increasing access to technology (Cleveland, Jackson, & Dawson, 2016).
2. Undergraduate Group Piano: Collegiate coursework designed to teach piano in a classroom setting, typically with the resources of an electronic keyboard lab, multiple students, and 1 teacher.
3. Piano Pedagogy: The study of the art of teaching piano.
4. Piano Pedagogue: A practitioner of the art of teaching piano.

5. 21<sup>st</sup>-Century Skills: The skills, knowledge, expertise, and support systems that students need to succeed in work, life, and citizenship in the 21<sup>st</sup> Century.  
Defined in the P21 Framework for 21<sup>st</sup>-Century Learning (P21 Partnership, 2019).
6. Adaptation/Adjustment Processes: “Those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original culture patterns of either or both groups” (Redfield, Linton, & Herskovits, 1936, p. 149).
7. Collegiate Adaptation/Adjustment Processes: For the purposes of this dissertation, these processes are defined as the development of productive educational habits (Credé & Niehorster, 2012) that facilitate a smooth transition to the new developmental and psychosocial demands of college courses (Conley, Travers, & Bryant, 2013).
8. Technology-Assisted Practice: Any music practice that incorporates one or more technological tools designed to aid overall student success. Mobile device apps, metronomes, online resources, and computer software are all examples of tools that could be used by students in technology-assisted practice.
9. Technological pedagogical and content knowledge (TPACK): A conceptual framework used to identify the teacher knowledge necessary to effectively integrate technology into the classroom (Bauer, 2012).

## Chapter Two

### Understanding Music Major Group Piano in the 21<sup>st</sup> Century:

#### A Review of Literature

Degree programs dedicated to piano pedagogy are a relatively new phenomenon in the field of music education, but the intricacies of teaching piano in private and group settings have been studied, at least informally, for much of the past century (Burnette, 1982; Canfield, 1936; Duckworth, 1965; Frisch 1954; Pike, 2014). Group piano courses are a key component of the curriculum for students pursuing an undergraduate degree in music therapy, education, and performance, yet national standards for collegiate-level courses lack specificity, and the curriculum content for group piano often varies between programs. By comparison, other areas of education literature include numerous studies regarding the complex relationship between research findings, standards, and teaching practice (Coate, Barnett, & Williams 2003; Hiebert, 1999; Robles, 2016; Trevillion, 2008). Despite the prevalence of piano classes in university programs throughout the United States, little empirical research exists pertaining to the value of these courses as part of the music core curriculum (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014).

A study of group piano coursework and associated practices should take into account the specific needs of the learners enrolled. Recent literature describes today's music majors as *digital natives* because they utilize different learning processes than their generational predecessors, as a result of widespread technology use throughout their lifetime (Cleveland, Jackson, & Dawson, 2016; Cremata & Powell, 2017; Prensky, 2001; Palfrey & Gasser, 2008). Today's university group piano students were born at the start of the 21<sup>st</sup> century, and accessible digital technology has likely impacted both their

academic and social routines. Prioritizing the needs of modern group piano learners is relevant and relatable to other lines of research, and is necessary before additional pedagogical topics can be developed in future studies.

Group piano is one of the first classes that music majors encounter in college. It is a core element of undergraduate music curricula and it may present unique challenges because of the skills required. The fact that students need to learn how to practice an instrument that is not their main performing medium sets group piano apart from other core music classes such as theory, history, and aural skills. How students adopt productive educational habits during similar transitional life stages has been described in existing adaptation literature (Credé & Niehorster, 2012). Specifically, collegiate adaptation has been a prevalent research topic since the 1940s (O'Donnell, Shirley, Park, Nolen, Gibbons, & Rosén, 2018), but little is known about how music majors adapt to college and core music classes such as group piano. Acquiring as much knowledge as possible about how 21<sup>st</sup>-century learners adapt to the unique challenges of group piano study would be beneficial for faculty members and teaching assistants as they strive to meet the needs of diverse student populations.

The primary purpose of this literature review is to summarize what is currently known about group piano at the collegiate level, and to identify common characteristics of 21<sup>st</sup>-century learners and how they adapt to coursework requirements. Group piano research is important given the need to understand how student adaptation processes are affected by the learning behaviors of today's digital natives and the increasing prevalence of technology in the higher education landscape. I have identified three microcosms of group piano pedagogy and curriculum that will facilitate this discussion. In the following

sections I will describe (1) existing literature regarding group piano research, history, standard teaching practices, and potential growth opportunities (2) digital nativism and other attributes of today's collegiate learners, and (3) the process of collegiate adaptation/adjustment and how it may relate to group piano outcomes.

### **Group Piano Research**

Group piano coursework constitutes a significant component of the core music curriculum that needs to be addressed in research, because it reaches the vast majority of undergraduate students. In addition to assisting students with their other music coursework, piano classes also help today's music majors to prepare for practical career applications in multiple music fields (education, performance, therapy, etc.) Teaching and learning piano skills in groups presents a unique dynamic for both instructors and students. Existing research articles pertaining to these classes tend to discuss organization and the presentation of material through individual and pair practice, however, rather than instruction for the entire group (Pike, 2014). Considering what some authors have identified as a limited number of empirical research articles related to group piano (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014), it seems that additional research is needed to inform instructors leading these vital courses. The following section of this literature review will investigate the history and standard practices of teaching piano in groups, and existing research in the field. The goal of this section is to gather information and compile resources regarding what is currently known about group piano at the collegiate level. Identifying what still needs to be learned will assist current and future group piano instructors as they prepare to meet the needs of contemporary students. An analysis of growth opportunities facing teachers and students in the 21<sup>st</sup> century will also

be included. This discussion may serve as an important resource to maintain and promote best practices and high standards while addressing changing job market needs.

### **Group Piano History and Standard Practices**

The history of group/class piano in the United States can be traced to the growing demand for acoustic pianos and music instruction in the late 1880s (Fisher, 2010). As America became the world's largest manufacturer of pianos, educators saw the need to teach numerous new students at once, and group piano coursework was included in some public school curricula (Fisher, 2010; Pike, 2014). By the 1920s, colleges and universities were offering group piano teacher certification programs. This phenomenon expanded throughout the course of the 20<sup>th</sup> century, as digital piano laboratories made instruction more convenient and cost effective. During this period of growth, advocates consistently lauded group instruction as potentially more effective than private lessons, because students have the opportunity to learn from both the teacher and their peers (Fisher, 2010; Valle, Andrade, Palma, & Hefferen, 2016).

Despite the prevalence of group piano classes in university settings, there are few national guidelines and standards for these courses. The National Association of Schools of Music provides the most specificity with regards to piano study for music therapy majors, stating that they should develop “advanced keyboard skills, including the ability to play at sight, accompany, transpose, and improvise” (NASM 2018-2019, p. 116). These are specific keyboard competencies with a history of inclusion in piano curricula (Betts & Cassidy, 2000). However, the NASM standards for other music majors are far less specific, requiring music education majors to gain “functional performance skills” at the keyboard (NASM 2018-2019, p. 119) with little explanation of what constitutes

“functional.” Guidelines for performance majors are even less detailed, stating that essential skill development for these students should include “keyboard competency,” with no further explanation (NASM 2018-2019, p. 100). Based on these open-ended standards, individual programs are responsible for developing coursework to meet the specific needs of their students. Program content and duration vary between schools and the typical group piano schedule of coursework may include 1 to 3 class meetings per week over the course of 1 to 4 semesters.

The standards and accreditation requirements for collegiate music programs highlight the critical need for group piano instruction. Keyboard competency is a requisite performance standard for all professional baccalaureate degrees in music and all undergraduate degrees leading to teacher certification (NASM 2018-2019, p. 98-100). Group instruction is essential because piano classes are required to assist undergraduate students in developing this competency. Budgets, equipment, and faculty teaching loads are just a few of the factors that make it necessary for music majors to learn piano in groups, rather than private lessons (Fisher, 2010). At the same time, there is an imperative need for numerous group piano instructors in order to limit the size of each class section. Based on my experiences at conferences, multiple institutions, and reading the literature, it appears that colleges and universities rely on both faculty instructors and graduate teaching assistants in the group piano area because many sections need to be offered to accommodate all music undergraduates.

### **Existing Research about Group Piano**

Little empirical research exists that is specific to the group piano context and curriculum (Betts & Cassidy, 2000; Cremaschi, 2012; Pike 2014). Much of the group

piano literature that does exist can be separated into four distinct categories; (a) specific student proficiency skills such as sight-reading and harmonization (Betts & Cassidy, 2000), (b) student practice habits (Cremaschi, 2012), (c) student beliefs and perceptions (Jutras, 2006), and (d) teaching strategies (Pike, 2014). American pedagogues have written a vast array of textbooks for the piano teacher, including Agay (2004), Baker-Jordan, (2003), Bastien (1988), Chronister (Darling, 2005), Coats (2006), Fisher (2010), Jacobson (2016), and Lyke, Haydon, and Rollin (2011). According to Pike (2014), however, none of those authors conducted formal research on group instruction. Anecdotal, experience-based evidence, rather than empirical studies, seems to drive professional development and practice in group piano (Pike, 2014). Both informal and formal research methods are beneficial to the field, but the lack of empirical data leaves something to be desired when considering the value assessments of specific teaching and learning strategies (Betts & Cassidy, 2000). Although the existing research provides highly valuable information for group piano instructors, its scope is limited when compared to pedagogy and curriculum opportunities in other branches of education.

### **Growth Opportunities in 21<sup>st</sup>-Century Group Piano**

The accessibility of technology, changing education standards, and the evolving job marketplace are three growth areas that heavily influence the perspectives of group piano students. Research has indicated that the modern day music student requires different skill sets when compared to previous generations (Dorfman, 2016; Myers, 2016). A discussion of these unique skill sets would not be complete without mentioning the skills identified by the Partnership for 21<sup>st</sup>-Century Learning, a joint public-private venture that developed the P21 Framework for 21<sup>st</sup>-Century Learning. Based on input

from educators, education experts, and business leaders, this framework defines and illustrates the skills, knowledge, expertise, and support systems that students need to succeed in work, life, and citizenship (P21 Partnership, 2019). The P21 Framework notes that learning and innovation skills help students to prepare for increasingly complex life and work environments in the 21<sup>st</sup> century. These learning and innovation skills include what P21 identifies as the “4Cs: Creativity and Innovation, Critical Thinking and Problem Solving, Communication, and Collaboration.” Since its inception in 2002, P21 has promoted the 4Cs in the movement toward a practical 21<sup>st</sup>-century approach to education (Trilling & Fadel, 2009).

Many educational fields increasingly focus on 21<sup>st</sup>-century skills, but some skills are not yet included in many of the learning outcomes prescribed by institutions of higher education (Kivunja, 2014). Numerous authors have provided suggestions to address this deficiency. Current frameworks recognize that there are multiple ways to be a good teacher and to teach effectively (Marland, 2007). However, effective teaching within the 21<sup>st</sup>-century paradigm requires a shift from teacher-directed to student-centered learning (Trilling & Fadel, 2009). Interactive exchanges in the classroom and a focus on equipping students with relevant career skills and problem solving processes allow educators to cater learning to the individual needs of students (Kivunja, 2014). In music education research, preparation for a broad range of careers has been noted as a common theme among music student course recommendations (Groulx, 2016; Myers, 2016).

Skills for the 21<sup>st</sup> century may be incorporated into the curricular considerations for group piano classes, and some of the inherent strengths of group instruction should naturally support recommended practices. For example, when group piano is well

sequenced and carefully administered, it involves social activities and constant informal assessment (Pike, 2014). These criteria match the collaborative element of the P21 Framework 4Cs, which involves teaching students to work respectfully with different teams, and to compromise and communicate to achieve goals (Trilling & Fadel, 2009). Social interactions with classmates and continuous teacher and peer feedback can also prepare students for a job market that is heavily reliant on the leadership skills of interpersonal communication and networking (Myers, 2016). Trilling and Fadel (2009) argue that the proliferation of digital technologies in modern life has created a new demand for these communication skills. In addition, group piano instructors may facilitate cooperative learning by promoting positive interdependence, individual accountability, equal participation, group processing, and simultaneous interaction (Kagan, 1994).

Group piano study has a fundamentally different focus compared to private lessons (Fisher, 2010; Pike, 2014). Although technical exercises and repertoire often make up the bulk of assignments in applied study, group classes focus on additional 21<sup>st</sup>-century skills that students will use in their future careers (especially sight-reading, transposition, harmonization, improvisation, and accompanying). Recent survey results indicated that elementary general music teachers use accompanying skills more often than any other piano skill in their classrooms (Baker, 2017). The ability to accompany and sight-read necessitates cognitive chunking—the identification of meaningful chunks and patterns (Pike & Carter, 2010). Technical exercises and repertoire can be useful in the development of this cognitive skill, but 21<sup>st</sup>-century teachers should be able to identify short excerpts that emphasize these techniques without taking too much practice

time away from other core proficiencies. Group piano teachers may also carefully budget student practice time to include a myriad of practical skills, instead of limiting their students' focus to extensive technique and repertoire demands.

Student projects provide an excellent opportunity for music majors to showcase their group piano knowledge and playing skills in a creative endeavor (Fisher, 2010). Twenty-first century skill projects can be completed outside of class so that students have the opportunity to synthesize and apply their knowledge throughout the semester. Examples of “real-life” projects include accompanying a junior-high level solo, arranging a popular song for piano, teaching and playing a choral warm-up, improvising music for an elementary classroom game, or conducting an ensemble and playing individual parts. Semester projects should be assigned with enough detail to inspire participating students and guide creative choices, but open-ended enough so that students can blend their interests with crossovers in the field, and make the project relevant for their future careers (Myers, 2016).

Another essential guideline for group piano pedagogy and curriculum planning is ensuring that teachers can demonstrate both what to practice and how to practice. Although research results indicate that practice check-lists may have little effect on student grades (Cremaschi, 2012), the literature has also provided evidence that cognitive chunking and other methodical practice strategies contribute to increased accuracy and improvement in piano performance (Pike & Carter, 2010). Providing thorough expectations about outside practice and in-class responsibilities is key to student success (Pike, 2014). Weekly assignment sheets, online class discussion boards, and in-class review activities may be used to convey these expectations. Assignments should not only

include a list of activities and exercises to be practiced, but also how much time to spend on each item, and what steps to follow. To share practice strategies, collegiate piano coursework may include opportunities for “open lab hours” or other tutoring times when all students can reflect on their own practice, share their experiences with peers, and receive feedback from tutors or instructors.

When considering instruction versus assessment time, collegiate piano teachers may grapple with the substantial amount of class time needed for formal assessments (including quizzes, exams, and proficiencies). However, peer-assessment and self-assessment can help to ensure the effective use of classroom time (Valle et al., 2016). Students can receive valuable feedback from both their instructor and their classmates, and casual peer assessment in the form of partner or small group work and large group performances can provide performers and audience members with learning opportunities (Fisher, 2010). When formal assessments are needed, teachers can easily expand these measures beyond the limited class time by using technology. Performance and practice videos cut down on the amount of class time spent listening to individual student playing, provide students the opportunity to use practical recording technology as suggested in recent curricular trends (Myers, 2016), and give teachers the chance to view students’ practice environments and habits.

Curricular planning for group piano teachers may involve increasing attention to technological implementation (Dorfman, 2016). Easy access to recording and score-reading technology on smartphones, tablets, and laptops could help ensemble and group playing become more effective and convenient (Burrack, 2012; Johnston Turner, 2013). Students in the modern era can easily share recordings from their home practice, and

interactive apps may assist teachers in providing constructive feedback (Menscher, 2017). Assessment of practice strategies via recordings should be just as important as the assessment of in-class performances. This pedagogical technique is consistent with current trends in education, which have increasingly promoted process rather than performance-based learning (Myers, 2016).

The objectives of group piano study closely align with the opportunity to foster creativity and empathy, pattern recognition, and meaning—abilities that are lauded in 21<sup>st</sup>-century skill development (Pink, 2006). The key to teaching creativity and innovation lies in providing students with experiences solving real-world problems and utilizing higher-order thinking (Anderson, Krathwohl, Airasian, Cruickshank, Mayer, Pintrich, Raths, & Wittrock, 2001). Research indicates that music students placed a high value on experience-based learning activities such as student teaching, ensembles, and applied lessons (Groulx, 2016). Today's students should be encouraged to identify gaps in the information they are given and to find ways to fill those gaps (Kivunja, 2014). The act of solving musical problems with peers in the group setting may empower students to learn on their own through experimentation, and prepare them to solve future problems (Myers, 2016; Pike, 2014). Collectively, 21<sup>st</sup>-century skill development, the P21 Framework 4Cs, and other modern trends in education provide natural growth opportunities for group piano curriculum planning.

### **Digital Nativism and the Contemporary College Student**

The phenomenon of *digital nativism* has been used to describe students who were born after 1980, and have grown up with increasing access to technology, specifically social digital platforms (Cleveland, Jackson, & Dawson, 2016; Palfrey & Gasser, 2008).

Because this phenomenon describes the experiences of most collegiate students in the 21<sup>st</sup> century, it is important to understand its effects on collegiate learners. The term *digital natives* was coined as early as 2001, when Mark Prensky noted the radical changes taking place in society, particularly that the needs of contemporary students were not adequately met by the existing educational system (Prensky, 2001). Numerous authors have stated that students who have grown up in the digital era think and process information differently than their generational predecessors, in large part because of the rapid dissemination of digital technology during their lifetimes (Cleveland, Jackson, & Dawson, 2016; Cremata & Powell, 2017; Prensky, 2001; Palfrey & Gasser, 2008). Furthermore, music educators have suggested that digital devices hold legitimate potential as both practice aids and as full-fledged musical instruments (Bauer, 2014; Mishra & Fast, 2018; Randles, 2013; Williams, 2014).

Research regarding the unique characteristics of digital natives is still emerging, but early scholarship has indicated that identity formation, information overload, privacy, and safety factors related to technology use may impact students' classroom behaviors and attitudes (Palfrey & Gasser, 2008). A study from the first decade of the 21<sup>st</sup> century found that approximately 64 percent of teens in the United States had created and shared some sort of Internet content, and similar findings have been observed on a global scale (Lenhart, Madden, Macgill, & Smith, 2007). This percentage of creators likely has increased in recent years. Although digital tools may facilitate a plethora of creative pursuits, it is unclear if social media activity translates to tangible academic skills, or if the benefits outweigh the risks (Palfrey & Gasser, 2008). Findings of a 2006 study indicated that 13.7 percent of adult participants reported finding it difficult to stay away

from the Internet for several days at a time, and 8.2 percent used the Internet to escape problems or relieve negative moods (Aboujaoude, Koran, Gamel, Large, & Serpe, 2006). Such feelings have been a common, lifelong reality for today's collegiate students. The influence of technology in the university classroom is likely unavoidable, and so it falls to the instructors to harness the unique traits of digital native learners for pedagogical purposes (Palfrey & Gasser, 2008).

### **TPACK For 21<sup>st</sup>-Century Educators**

Musical technological pedagogical and content knowledge (TPACK) is a conceptual framework that describes the educator knowledge necessary for effective integration of technology in teaching and learning (Bauer, 2012). Given the recognizable differences between today's collegiate students and those of previous generations, higher education faculty members may encounter challenges in finding appropriate uses for technology to guide students in the pursuit of curricular objectives. Recent calls for teacher improvement in this area have outlined the need for individualized and self-defined professional development opportunities, enhanced feedback through the use of videoconference technology, and more diverse preservice and in-service offerings specific to urban school settings (Anderson & Denson, 2015; Angeline, 2014; Burrack, 2012). In addition, online applications, including personal learning networks and Really Simple Syndication (RSS) readers have been cited as practical means to facilitate long-term, individualized professional development experiences within mentorship and collaborative exploration (Bauer, 2010).

Before educators can meet the technological and pedagogical needs of their digital native students, they must first become fluent users of technology in the context of

their own learning. A pervasive focus on classroom technologies at the Group Piano and Piano Pedagogy (GP3) Forum and other music educator conferences is one example of how collegiate instructors have demonstrated a specific desire to reach contemporary students (Fast, 2001, 2003; Price, 2005, 2007, 2009, 2011). Popular conference discussion topics include instructional software, podcasts, SMART Boards, recording and sequencing, online teaching, PowerPoint applications, security cameras, class management software, and how to teach in the 21<sup>st</sup> century (Price, 2005, 2007).

### **Understanding How Today's Music Majors Adapt**

Understanding the relationships between music major adaptation processes and pedagogy/curriculum in the 21<sup>st</sup> century may provide a key to understanding how core classes such as group piano impact the musical development of modern students. I am operationally defining the process of academic adaptation/adjustment as the development of productive educational habits (Credé & Niehorster, 2011) that facilitates a smooth transition to the new developmental and psychosocial demands of college courses (Conley, Travers, & Bryant, 2013). Such processes have been studied extensively in the broader college environment and first-semester seminars are often used to help new college students navigate this difficult transition. However, research indicates that music majors may require additional individually-tailored interventions beyond the scope of mainstream college preparation seminars (Karp, 2011; Lehmann, 2014).

Teachers of first-year college music majors need to understand their students' adaptation/adjustment processes. A study of higher education practices indicated that individual student differences might be more closely linked to retention and long-term GPA than the presence or absence of any first-year seminar (Clark & Cundiff, 2011).

Teachers should therefore understand individual student differences and adaptation processes in order to help their students achieve at the highest level. However, even the most effective instrumental teachers are limited in their ability to address student needs because instruction time comprises less than ten percent of a student's total instrumental study (Puopolo, 1971). Given this limited instruction time, teachers may need to develop extremely efficient methods for addressing individual student needs during class, and through digital, written, and verbal assessment feedback.

A theory regarding the developmental stages of collegiate age students may also assist teachers in understanding how today's music majors adapt to college. The theory of emerging adulthood recognizes that the lives of students ranging in age from late teens to mid- to late 20s is distinct from the period of adolescence and that of adulthood (Arnett, 2007). In recent years, a prolonged transition to full-fledged adulthood has been observed in this age group, and the characteristic descriptors of emerging adulthood include identity exploration, instability, self-focus, feeling "in-between," and awareness of possibilities as primary facets of this period in a person's life (Arnett, 2000, 2004, 2007). Digital, developmental, and environmental factors all contribute to the collective traits of today's music students and their adaptation processes and habits.

### **Non-Music Factors Related to Student Adaptation**

Non-music factors, including schedule considerations, may impact students' ability to adapt, and the efficiency with which students develop effective practice habits that are applicable to specific coursework. The demands of outside interests and activities have the potential to affect piano practice routines. When students are not equipped with consistent and reliable practice habits, they may not feel well prepared for class, and will

likely experience adaptation difficulties. Adult group piano students cited their busy schedules, and conflicts with other activities as factors for discontinuing piano lessons due to lack of practice time (Cooper, 2001). Although group piano is required for most music majors, the schedules of some students may be more demanding than others. For example, marching band students may be unable to practice on game days, and music education majors may face the strenuous time commitments of practicum and student teaching schedules. For music minors and non-majors, intensive courses or compressed schedules may also impact their classroom success (Gallo & Odu, 2009). For this reason, it is important for teachers to understand the inherent differences between the various music degree plans in order to assist time-crunched learners in developing practice routines around scheduling conflicts.

Class size has also been cited as a potential factor that influences student adaptation and success. The author of a study comparing the achievement levels of students in large and small beginning piano classes found no significant difference (Jackson, 1980). However, the participants in Jackson's investigation ranged in age from preschool to college, and class sizes ranged from 2 to 8 students. The results may be different for today's collegiate piano classes, which typically include 12 or more students in each course section. Class size and faculty-to-student ratios have been often associated with instructional quality in other areas of higher education (Bandiera, Larcinese, & Rasul, 2010; Martin, 2015), and several authors have suggested that instructors may engage in more active learning when they transition from large to small group teaching (Wright, Bergom, & Bartholomew, 2017). Music education research indicates that a key component of efficient student learning relies on instructor identification of critical skills

to teach in limited amounts of class time (Betts & Cassidy, 2000). Evaluations of group piano pedagogy and curricula may assist teachers in identifying difficult proficiency skills in order to help students adapt to course demands in an efficient manner.

Grit and perseverance may also affect student adaptation. In a study of collegiate, instrumental music majors, grit was the strongest predictor of practice efficiency (Miksza & Tan, 2015). However, encouraging “gritty” behavior may also divide students according to specific attitudes and behaviors (Kirchgasler, 2018). Students struggling to complete short-term practice objectives may need extra assistance outside of class to achieve long-term goals. Grit is also significantly related to flow and self-efficacy (Yoon, Kim, & Kang, 2018). Students who display grit are likely to practice more, thus increasing their skills, which in turn leads to flow and fluency. The gap in skill level between students who display grit in their early practice and those who do not is likely to widen quickly over time because of societal influence (Kirchgasler, 2018), as students whose practice is efficacious become increasingly comfortable at the piano, and their less effective peers continue to struggle with fundamental, short-term tasks.

Miscommunication and communication disconnects between students and teachers may also impact adaptation success. Research has indicated that communication issues may lead to the erosion of students’ personal confidence in music coursework (Gavin, 2016). This type of confidence crisis may lead to inefficient practice, unsuccessful adaptation, and even withdrawal from the music degree program. Authors of a study of collegiate instrumental music majors reported that communication disconnects were common between teachers and students, and may result in substantial differences between the practice approaches that are taught by instructors and those used

by students outside of class (Miksza & Tan, 2015). Just because collegiate instructors introduce a specific rehearsal strategy does not mean students will remember or use the suggested techniques on their own in the practice room. Researchers and educators could benefit from continued exploration of the non-music factors that may impact student adaptation in the group piano setting.

### **Music Factors Related to Student Adaptation**

Student adaptation in collegiate piano may also be affected by prior music experiences, and a variety of musical factors shaped by a student's primary instrument of study and degree program. Results of a study of adult group piano students indicated that participants who rated their keyboard skills as "very good" or "pretty good" were more likely to enjoy lessons and practicing when compared to participants who had less piano expertise in childhood (Cooper, 2001). Students who have little to no piano background may be both ill-equipped for piano instruction, and may also be less motivated than their experienced peers because lessons and practicing are not as enjoyable for them as they are for the students who studied piano at a younger age. In addition to piano background, pre-existing practice routines tend to be repeated and have the potential to impact a student's ability to adapt (Miksza, 2007). A study of band students found that those who utilized more formal practice strategies (including metronome work) early on in their practice often had the highest class scores (Miksza, 2007).

An additional consideration in understanding how new collegiate piano students adapt to their coursework is the balance of rote learning versus reading notation. The rote versus note debate amongst music educators has permeated American music education for more than a century, since the days of Lowell Mason (Volk, 1993). Anecdotal

evidence may be used in support of teachers on both sides of this debate, but research has indicated that a combination of both visual and aural stimuli facilitated learning and retention of rhythms (Shehan, 1987). Teachers may need to identify the importance of rote and note learning and facilitate instruction in both of these modes for music majors as they adapt to the new demands of collegiate piano instruction. Classroom success is most likely promoted when teachers are aware of individual learning habits and environmental predictors that impact student adaptation (Katz & Somers, 2015).

Adaptation processes are likely impacted by other music factors, including practice efficiency. The ability to practice successfully and efficiently is impacted by a student's ability to set objectives, design routines, self-assess, and imagine the aural goal (Oare, 2011), but music majors may learn different fundamental practice strategies depending on their primary instruments. A wind or voice student will likely learn more practice strategies related to airflow than a string or percussion student (Koster, 2010). Group piano adaptation may be more accessible for students who have experience with primary instrument practice that is most similar to piano. Music majors have learned how to practice on their primary instruments, but whether that translates to beginning piano instruction has not yet been determined. Research has indicated that performance quality is more closely linked to the type of practice rather than to the amount of practice (Duke, Simmons, & Cash, 2009). Performance quality is one possible indicator of successful adaptation. Therefore, it is imperative that instructors help students to develop effective practice strategies rather than focusing on amount of practice, when considering their adaptation and how it may be impacted by factors within and outside of the classroom.

## Conclusions

Group piano is a core music class in undergraduate programs that endeavors to help students develop “real-life” skills in an environment that is both practical and engaging. In order to develop high quality curricula and pedagogical plans, instructors likely need to understand the history, standard practices, and research pertaining to group piano. However, when considering how to best meet the needs of contemporary students, I recommend that educators evaluate how 21<sup>st</sup>-century skills will be developed in group piano courses and how the unique adaptation processes of today’s collegiate learners impact student success. Although, as noted, there is little existing research pertaining to group piano (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014), piano pedagogues have successfully used anecdotal, experience-based evidence to drive professional development for much of the past century (Pike, 2014). Further investigations are necessary in order to understand the current state of the profession and if there are any curricular changes needed. Through the process of analyzing existing practices, piano educators can initiate further progress by undertaking empirical research on a more consistent basis. Undertaking and disseminating research of established and emerging teaching practices will likely yield a vast array of valuable knowledge.

The following recommendations provide potential topics for re-examining group piano coursework in the context of the 21<sup>st</sup> century. These suggestions are supported in existing education literature, but should also be explored in future investigative studies specific to piano. The goal of this literature review was to gather information regarding what is currently known about collegiate group piano. In addition, I was interested in connecting that knowledge with an understanding of common characteristics of 21<sup>st</sup>-

century collegiate learners and how they adapt to group piano. Findings indicate that there are few national guidelines and standards for these courses, but they remain a critical component of an undergraduate degree in music. There is a small amount of existing research pertaining to group piano, but numerous authors have identified the need for further studies. Topics that may be particularly relevant in future research include the development of 21<sup>st</sup>-century skills in group piano, technology implementation, and how students prepare for the evolving job marketplace. The social environment of a group piano classroom can naturally foster the 4Cs: Creativity and Innovation, Critical Thinking and Problem Solving, Communication, and Collaboration. These skills have become key components of career-readiness in a variety of fields, and study of their development in the class piano context would be valuable.

This literature review also described the tenants of digital nativism and how this phenomenon has become an important framework for understanding 21<sup>st</sup>-century collegiate students. Students who grew up as digital natives think and process information differently than their generational predecessors as a result of the rapid dissemination of digital technology during their lifetimes (Cleveland, Jackson, & Dawson, 2016; Cremata & Powell, 2017; Prensky, 2001; Palfrey & Gasser, 2008). Research regarding this topic is still emerging, but initial results indicate that today's students have a heightened comfort with technology and may also explore a variety of creative endeavors associated with technology use. However, research also indicates that excessive use of digital technologies could have negative effects. Because the influence of technology in higher education is likely unavoidable, it is important for educators to explore potential frameworks (including TPACK—technological pedagogical and

content knowledge) to make the most of contemporary students' unique learning behaviors (Palfrey & Gasser, 2008). In order to do this effectively, instructors will also likely need to become fluent technology users themselves.

Investigating how collegiate students adapt to their coursework by developing productive educational habits that facilitate a smooth transition to the new demands of college courses is essential in order to fully understand how standard practices in group piano can be combined with the unique needs of today's digital learners. This topic has been studied extensively in other areas of higher education, but little is known about how music majors adapt to their individual circumstances. However, the theory of emerging adulthood suggests that traditional age college students face a complex array of transitional development stages during this period in their lives. Equipping instructors with a deeper understanding of music major adaptation would likely help them assist collegiate students in successfully adjusting to their new environment. There are a variety of non-music and music factors that educators may need to consider to fully understand the complex adaptation process. These factors include schedule, class size, grit and perseverance, communication, prior music experiences, rote and reading learning styles, and practice habits and efficiency.

### **Where Do We Go From Here?**

Understanding 21<sup>st</sup>-century music major group piano involves reflecting on a complex combination of historical and standard practices, the need to facilitate successful student adaptation to college, and the development of 21<sup>st</sup>-century skills for group piano students. In order to facilitate high quality coursework that is relevant for contemporary students, group piano teachers may discuss course requirements with other music faculty

to ensure that methods of instruction and content are connected with other core classes, including applied lessons, music theory, aural skills, history, and ensembles. Facilitating a comprehensive curriculum that connects core subjects is an increasingly important objective for any collegiate music department. The input of students and faculty members is critical to the success of today's group piano programs, because heightened communication may identify potential conflicts and problems before they erode student confidence (Gavin, 2016).

The role of adaptation processes in collegiate piano is one that has not yet been directly addressed in piano pedagogy research, but the transfers from other fields of study described in previous sections of this literature review suggest that adjustment processes may potentially affect students on a daily basis, and should be addressed in pedagogy and curriculum guidelines. The literature reviewed indicates that there is a need for faculty members and piano pedagogues to understand the background music knowledge that new students bring with them to collegiate piano coursework, as well as how that knowledge may be combined with university resources during the adjustment process. Future studies may explore the connection between teacher professional development and student adaptation processes (including factors such as scheduling, music background, and practice time and efficiency) in music and piano coursework. Studies that examine the intricate web of adjustment factors will provide teachers with practical tools for developing their own knowledge and skills, understanding classroom behaviors, and assisting students in the college transition.

In today's educational culture, group piano courses are highly relevant to the collegiate music curriculum because piano proficiency skills have important and

legitimate career use in music therapy, education, and performance (Betts & Cassidy, 2000; Pike & Carter, 2010; Baker, 2017). Group piano also encourages personal gratification and career value for music majors. However, the wide variability between programs, non-specific curricular standards, and a lack of empirical research pertaining to group piano environments may contribute to some ineffective teaching and learning outcomes. The unique needs of today's digital native learners require further study, which may lead to necessary updates in pedagogical practices and curricular guidelines for the modern group piano instructor. In order to determine whether piano curricula meet the needs of 21<sup>st</sup>-century students, educators may consider how classroom activities and assessments can introduce students to changing technologies, education standards, and an evolving job marketplace. Undertaking new research in these areas would be valuable for educators as they explore the intricacies of understanding music majors and other group piano students in the 21<sup>st</sup> century.

## **Chapter Three**

### **Adaptation Processes in Undergraduate Group Piano:**

#### **A Phenomenological Study of Music Major Adjustment**

Collegiate music programs in the United States cater to diverse student populations and have widely varying processes through which students apply, audition, enroll, and engage in their first semester. Numerous authors have explored the campus demands faced by college students, and have investigated the relationships between adaptation and students' mental and physical health (Baker, 2003; Consolvo, 2002; Derakhshanrad & Piven, 2018; Katz & Somers, 2015; McKenzie & Schweitzer, 2001; Zea, Jarama, & Bianchi, 1995), but little is known about how music majors adapt to the specific requirements of collegiate academic and social life. Successful adaptation is characterized by the adoption of productive educational habits (Credé & Niehorster, 2012) and many students may face similar adaptation challenges as they develop their collegiate routines (Ackermann & Morrow, 2007-2008; Chang, Sana, Riley, Thornburg, Zumberg, & Edwards, 2007; Martin Jr., Swartz, & Madson, 1999; Tinto, 1975, 1993, 1996).

College adaptation or adjustment has been a prevalent research topic since the 1940s. Over time, the focus of this research has shifted from the study of adaptation as a variable of interest in predicting specific behaviors, to considering adaptation as a general level of ability or functioning (O'Donnell, Shirley, Park, Nolen, Gibbons, & Rosén, 2018). As a predictor variable, the adjustment/adaptation process has been investigated in connection with attrition, mental health services, grade point average, and social activities (Baker & Siryk, 1984, 1989), as well as academic standing (Gerdes & Mallinckrodt,

1994). The importance of the adaptation process itself as a primary outcome variable has been the emphasis of more recent studies (Boulter, 2002; Dennis, Phinney, & Chuateco, 2005; Lapsley & Edgerton, 2002; Paul & Brier, 2001). Researchers have explored possible connections between adaptation and social comfort (McDonald & Vrana, 2007), coping styles (Jantzer, 2006; Matthews, 1998), social support (Schneider & Ward, 2003), and student-parent relationships (Hickman & Andrews, 2003; Schultheiss & Blustein, 1994).

Students' ability to quickly and effectively adapt to the various challenges encountered in their new college environment may impact their overall stress, mental and physical health, and long-term academic success (Credé & Niehorster, 2012).

Understanding the collegiate adaptation process as experienced by freshmen music majors is important because initial adjustment may impact their academic achievement, development of music skills, mental and physical health, and ability to retain the grades required for scholarships. The seminal measure of college adjustment is the Student Adaptation to College Questionnaire (SACQ) (Baker & Siryk, 1984), which has been used to produce a vast body of knowledge across numerous fields of study. This well-respected quantitative measure has been used to investigate a diverse array of variables related to college adaptation (see Baker & Siryk, 1984; Jackson, Pratt, Hunsberger, & Pancer, 2005; Just, 1999). However, the lack of clear agreement regarding relationships between adjustment to college and other variables as measured by the SACQ (Credé & Niehorster, 2012) suggests that qualitative measures may provide additional vital knowledge pertaining to college adaptation.

The challenges of the college transition begin well before move-in day and continue into the sophomore year. Accepted music students must adjust to the new environment and continue to work through additional tasks (e.g. remedial/review classes, entrance exams, and performance barriers) before they can enter upper level coursework (Lehmann, 2014). The variety of collegiate enrollment processes in use focus on the aspects deemed essential for completing a degree, but other factors (including adaptation) affect students' success and intention to continue music study (Corenblum & Marshall, 1998; Gavin, 2016). Skills from one instrumental area do not necessarily transfer to new contexts without intervention (Koster, 2010).

Group piano offers a unique environment in which to study collegiate adaptation for music majors because these courses are a typical experience for first-year students, and require the development of both music knowledge and skill. In addition, group piano courses for music majors are usually relatively small classes, which may offer students the opportunity to develop practice habits within a feedback-intensive setting. Although first-year seminars and other campus preparedness courses have been designed to assist students in adapting to college life, some group piano students may need additional individually-tailored interventions specific to their degree program (Clark & Cundiff, 2011). The current study was designed to investigate the diverse experiences of first-semester collegiate group piano students and how they used prior knowledge, support systems, and university resources to navigate the complex task of adapting to the demands of piano study.

The purpose of this phenomenological study was to investigate the experience of college adaptation from the perspective of music majors enrolled in group piano level 1.

For the purposes of this research, academic adaptation/adjustment processes will be operationally defined as the development of productive educational habits (Credé & Niehorster, 2012) that facilitate a smooth transition to the new developmental and psychosocial demands of college courses (Conley, Travers, & Bryant, 2013), specifically group piano. Little is known about how music students of various backgrounds use their previous music knowledge, support systems, and campus resources to adapt to new learning environments in college. There are relatively few studies that focus on college age or adult group piano students (Conda, 1997; Cooper, 2001; Jutras, 2006). The findings of this study may be beneficial for music faculty members in their efforts to tailor instruction to the individual needs of diverse students. Findings may also be transferable to core music coursework (e.g. theory, aural skills, ensembles, history, and applied lessons) as well as other performance skill development areas, including sports, theater, or dance.

## **Review of the Literature**

### **Understanding Emerging Adults**

A review of literature on this topic would not be complete without examining the unique qualities of collegiate learners. The theory of emerging adulthood is a helpful tool for understanding the lives of people ranging in age from late teens to mid- to late 20s (Arnett, 2007). This theory was first proposed in 2000 as a way to address existing weaknesses in the terminology and theories used to describe this age group (Arnett, 2000, 2004, 2007). Previously-held theories of life course categorized college-aged students, (ages 18-23) as young adults having just completed the period of adolescence (Glanzer, Hill, & Robinson, 2018), but these frameworks are no longer adequate in modern,

industrialized societies because of the long period of time during which most people transition to adulthood, and the connection between this transition and psychological development (Finan, Ohannessian, & Gordon, 2018). The theory of emerging adulthood recognizes identity exploration, instability, self-focus, feeling “in-between,” and awareness of possibilities as the five primary facets of this period in a person’s life (Arnett, 2007). Recent research has investigated the relationships between emerging adults and at-risk behaviors including consumer debt, debt problems, and problem gambling (Oksanen, Savolainen, Sirola, & Kaakinen, 2018), alcohol misuse (Aresi, Cleveland, Marta, & Alfieri, 2018), and depressive symptoms (Finan, Ohannessian, & Gordon, 2018). Recent literature has also explored the unique self-regulation abilities, cultural influences, and life purpose beliefs of emerging adults (Glanzer, Hill, & Robinson, 2018; Shen, Cheah, & Yu, 2018). Several trends, including accessible postsecondary education and training, contribute to the commonalities of this developmental life stage.

### **Understanding Music Majors**

Collegiate students are frequently used as subject samples in music education research. A content analysis of *Journal of Research in Music Education* articles published between 1953 and 2002 reported that 34% of subject samples were drawn from college/university settings (Ebie, 2002). Despite the frequency of studies conducted in this environment, college adaptation remains an emerging topic in the existing music education literature. Previous examinations have found discrepancies that may shape the defining characteristics of institutions and student communities. For example, research indicated that music education faculty members had limited responsibilities compared to

their applied faculty peers during the admissions process for music education students (Royston & Springer, 2015, 2017). Students who are accepted on the basis of their primary instrument audition may struggle to adapt to first-year classes outside of their applied study, including group piano. Although university faculty members generally were found to agree that preparing students for their future careers was the ultimate goal of undergraduate coursework, there is little consensus regarding the specific skills that should be taught and assessed (College Music Society, 2015; Rohwer & Henry, 2004). It may not be uncommon for beginning students who are ready to advance to more difficult material to be held back in frustration while the habits of less prepared students are addressed in music classes (Puopolo, 1971).

Music majors (regardless of degree program) likely face many of the same challenges as their non-music collegiate peers, such as difficulties associated with navigating an unfamiliar campus, developing new relationships, traditional v. non-traditional student status, and satisfying bureaucratic requirements (Karp, 2011). Understanding students' goals and dreams can help teachers plan subject material, repertoire, and activities that are designed to meet students' personal needs, thereby improving teacher effectiveness (Jutras, 2006). Researchers have investigated the prevalence of stress-induced meditation practices (Diaz, 2018), perceived burnout levels (Christian, 2007), and the use of online learning as a means of financial relief (Albert, 2015) for collegiate music majors. These studies collectively indicated that music faculty members generally wish to assist their students in adjusting to college, but there is little knowledge about the specifics of the adaptation process available for them to draw on for guidance.

## **Intention, Meaning, and Perception: A Model of Cognitive Adaptation Processes**

College adaptation has been found to affect both students' mental and physical health (Zea, Jarama, & Bianchi, 1995). However, cognitive skills largely reinforce successful adaptation and provide mental support for feelings of motivation, compatibility, and satisfaction (Derakhshanrad & Piven, 2018). Because most faculty and student interactions take place in the classroom, it seems necessary to focus on the literature surrounding cognitive processes for college adaptation. Future studies may also investigate the physical processes. The IMP model (intention, meaning, and perception) is a helpful tool for identifying the stages of students' cognitive growth, and for organizing existing literature (Haltiwanger, Lazzarini, & Nazeran, 2007). Intention refers to the "state of brain readiness" that contributes to motivation (Derakhshanrad & Piven, 2018). Meaning is defined as the "ability to assimilate meaning" or self-evaluation from one's performance. Perception refers to the attitudes, feelings, and beliefs that make up identity and sense of self (Derakhshanrad, Piven, & Zeinalzadeh Ghoochani, 2017). The IMP model encourages an appreciation of individual student differences (Haltiwanger, Lazzarini, & Nazeran, 2007) and explains the circular nature of adaptation that allows students to constantly apply new feedback to existing patterns (Freeman, 1999). This cognitive process is essentially a coping mechanism for working in new environments (Freeman, 1999; 2003). Interpreting students' intentions, ability to derive meaning from experiences, and perceptions of self and the world around them are critical components in the vast body of knowledge on college adaptation.

## **Research Purpose**

The purpose of this phenomenological study was to investigate how first-year music students adapt to group piano classes. The study was guided by two questions: (1) What meaning do first-year music majors ascribe to their group piano experience, especially as this pertains to the adaptation process? and; (2) What habits do students develop to succeed in group piano? Other related questions include: What is the relationship between student adaptation and measures of intention, meaning, and perception regarding group piano study? How are the needs of emerging adults met during the process of adjusting to collegiate group piano? The research was designed to provide teachers with a framework to investigate and accommodate collegiate group piano students' needs during the collegiate transition.

## **Method**

### **Research Design**

To describe the common meaning for participants of their lived experiences with collegiate adaptation/adjustment, I used a psychological phenomenological interview-based approach (Moustakas, 1994). This required that I bracket—set aside—my preconceptions to take a fresh look at this topic (Creswell, 2007, p. 80). Based on my review of existing literature, I determined that the experience of collegiate adaptation has not yet been explored among undergraduate music majors. Phenomenological research is grounded in a search for wisdom regarding a specific phenomenon, with the researcher suspending judgment until a thick, rich description has been analyzed. An important aspect is defining the phenomenon (in this case, adaptation to collegiate group piano) as a reality based on the perceptions of individuals (Creswell, 2007, p. 77-78). Prior to data

collection, I recognized that my college transition experiences as an undergraduate student influenced both my interest in this topic and my ongoing dedication to assisting group piano students in the midst of their own adaptation experiences. While I bracketed my perceptions, I recognize that findings of this research are subjective and therefore not generalizable to all music majors experiencing college adaptation, although findings may be applicable or transferable to other students.

### **Setting for This Study**

This study was conducted at a large, public research institution in the Midwest region of the United States. Approximately 23,000 undergraduate and 7,000 graduate students were enrolled at the institution at the time of this study and approximately 150 undergraduate and 55 graduate students were enrolled in music degree programs. The group piano program for music majors consisted of 4 semesters of coursework required for all Bachelor of Music degree students except for those with piano as their principal performing medium. At the time of this study, 46 music majors were enrolled in group piano coursework. With over a century of involvement in the cultural and musical activities of the region and the state, School of Music faculty members prided themselves on “preparing students to make meaningful contributions in the world as performers, composers, teachers, and scholars” (School of Music, 2018).

### **Sampling & Procedures**

The group piano level 1 course was selected for this phenomenological research by criterion sampling (Creswell, 2007) because of its role as a core music class for all incoming music majors. In addition, I believe that the practice skills required for success in group piano set it apart from other core music classes (such as theory and aural skills)

and may enhance student awareness of how the college transition affects academic and musical success. As the Group Piano Coordinator at the institution, I also had unique access to the culture because I supervised the graduate student Teaching Assistants (TAs) that taught all three sections of group piano level 1. I also had experience teaching all 4 courses in the music major sequence.

In order to study how collegiate students described their adjustment to the new demands of collegiate music coursework, I chose 6 students for interview participation using criterion sampling. After analysis, I was confident that 6 was a sufficient number because I reached saturation—by the analysis of the 6<sup>th</sup> participant's materials I found that no new themes or insights were represented. The goal of the purposeful sampling was to select a representative sample that would reflect the diversity of music majors enrolled in group piano. Two students were chosen from each of the three course sections to account for possible differences in teacher delivery and group dynamics. Half of the participants were male, the other half female. Three were in the top third (A average) of their group piano class in terms of grade. The grades of the other three participants were in the bottom third (C average) of their class section. These criteria ensured that interview participants would offer diverse perspectives on the learning process. Characteristics of the six participants who completed the study are provided in Table 1 (all names are pseudonyms).

**Table 1**  
*Descriptions of Student Participants\**

Name	Major	Primary Area of Study	High School/Community
Hannah	Music education	Voice	Private/urban
Cody	Music education	Percussion	Public/suburban
Bailey	Music performance	Percussion	Public/urban
Tim	Music education	Trombone	Public/rural
Rebecca	Music education	Voice	Private/urban
Matt	Music performance	String bass	Public/suburban

\*All student names are pseudonyms to protect the students' identity.

Participants were recruited through the group piano classes. I contacted students to determine appropriate meeting times (outside of class) in which to introduce the research study. During these meetings, I introduced the topic of the study, described how data would be collected and stored, and informed all students that their participation was completely voluntary and that identifiable student information would be made anonymous in published results, in accordance with IRB-approved procedures. After this introduction to the research, students had the option to ask questions and sign consent forms if they agreed to participate. A pilot study involving 2 interviewed participants and 24 observed participants had been conducted one year prior to the current study, in order to determine the viability of studying collegiate adaptation for music majors enrolled in group piano coursework.

Trustworthiness was established through member checks of interview transcripts as well as casual conversations with students in the weeks after their interviews. These conversations provided an opportunity to further explore student perspectives of the

college transition as the participants neared the end of the semester and prepared for final exams. Two outside reviewers also checked the data coding and themes to ensure validity and reliability. In addition, my advisor oversaw data collection and storage details in accordance with IRB approval. Student identities were never discussed with my advisor or anyone else.

### **Data Collection & Analysis**

Interviews were conducted during weeks 11, 12, and 13 of the students' first semester of piano study, in the familiar locations of their piano lab classroom or the Group Piano Coordinator's office. Students were given the choice of where they wanted to meet for the interview—four students chose the classroom and two chose the office. All interviews were tape-recorded and transcribed verbatim. At the end of the semester (after grades were posted), students completed member-checks of the interview transcripts and provided brief written summary statements that described their overall feelings about adapting to group piano level 1.

The interview participants were asked questions regarding basic demographic information, and provided verbal responses to literature-based research questions regarding intention—the “what” and “how” of the adaptation experience. Students were also asked questions about their meaning and perceptions of group piano coursework. Finally, interviewed participants were given the opportunity to describe their collegiate piano adaptation process (including their thoughts, feelings, and frustrations) in their own words. All interviews were semi-structured and guided by the research questions, which allowed for the sharing of new themes and ideas and comparisons between core tenants

of existing literature and students' individual perspectives. See Appendix C for the complete list of interview questions.

Data analysis was grounded in two strong philosophical assumptions of phenomenological research (Strauss & Corbin, 1998): that people are conscious of their own experiences, and how people “live” these experiences is a measure of reality. Thus, I sought to find the essence of the participants' lived experiences with adaptation to collegiate group piano classes for music majors (van Manen, 1990). An inductive approach to analysis was used, which allowed themes to emerge as data were coded. I started from narrow units of analysis based on existing literature to identify concepts in the initial data to ensure reliability and validity of the interview questions and protocol.

Interviews lasted from 25 to 45 minutes, and I endeavored for prolonged engagement with each participant by interacting in casual conversations in the hallway or after their group piano classes throughout the semester. These conversations kept the dialogue open as students prepared for final exams, and allowed me to witness how student adaptation processes emerged in the classroom. My involvement in supervising all group piano classes and TAs ensured that I developed a rapport with student participants that encouraged them to speak candidly with me in both interviews and casual conversations.

I analyzed the data after all interviews had been completed, expanded from the narrow units to broader units, and analyzed the written student summaries from the end of the semester to further connect, categorize, and refine themes and the detailed descriptions that depict what individuals experienced and how they experienced it (Creswell, 2007). For example, *brain readiness* was an initial narrow unit of analysis

drawn from existing literature (Derakhshanrad & Piven, 2018). From this narrow unit, I expanded to the broader unit of *mental and physical preparedness* to describe students' worry, stress, actions, and thought processes during the college adaptation transition. Then, I combined student interview and written summary data to produce the refined final theme of *preparedness*. All themes were either statements of meaning that were consistent throughout all or most of the data or minority viewpoints that carried heavy emotional or factual input (Ely, Anzul, Friedman, Garner & Steinmetz, 1991, p. 150). The final product of this study is a description of the "essence" of the phenomenon of first year music major group piano/collegiate adaptation, which explains the central themes in the data, and accounts for individual differences in collegiate music adaptation and adjustment processes.

### **Findings**

The phenomenological data coding resulted in the emergence of five themes: Preparedness, Motivation, Priorities and Expectations, Support Systems, and Accomplishment/Empowerment. Each of these themes is supported by existing literature but also revealed unique and specific qualities of the music major and group piano environment that have not been addressed previously in the research. The analysis also revealed themes that aligned with the Intention, Meaning, and Perception model of cognitive adjustment as described in adaptation literature (Derakhshanrad, Piven, & Zeynalzadeh Ghoochani, 2017; Derakhshanrad & Piven, 2018; Haltiwanger, Lazzarini, & Nazeran, 2007).

## **Preparedness**

Preparedness refers to each student's ability to prepare for college, as well as for the specific demands of group piano class. The codes that contributed to this theme include stress before starting college, mental preparation for class, worry regarding the "unknown," and identification of differences between high school and college.

The six participants varied in musical background, and represented a diverse array of high school experiences including in-state and out-of-state residence, rural, suburban, and urban communities, and public and private schools. However, they shared many common beliefs and experiences regarding preparedness. All of the students recognized changing stages and levels of preparedness, including worrying about how to prepare for college in the days and weeks prior to move-in, identifying the many differences between high school and college during the early days of the semester, wishing they could change how they had prepared themselves for class on any given day or how others had assisted in their preparation for college overall, and eventually taking ownership of the transition by acquiring study skills, practice routines, and finding ways to relieve stress. These stages and levels of preparedness were an often-mentioned aspect of the college transition during the interviews, and revealed common bonds amongst incoming music majors. As Hannah explained, "The first month was hard for everybody, especially when you're a freshman because you don't know where anything is and you don't know any of the teachers." When managing specific aspects of the transition, the group piano students also revealed traits unique to their own adaptation. According to Cody, "It's been real weird. Especially coming from such a small place, because my graduating class was 63

kids [but] coming here the freshman class is more than all the schools in my district put together.”

Several students were overcome by a sense of “I don’t know what I don’t know” that seemed to impact their practice efficiency and overall adaptation experience. The process of mental preparedness, and finding a beneficial mindset for completing daily tasks was a common takeaway for overcoming this feeling. Bailey stated that she practiced piano “more than aural and theory... a lot more just because it’s frustrating not to know what I’m doing” and Tim compared music degrees to other programs on campus by saying, “I know I’ve heard that being a music major and a music education major especially... It’s usually very difficult taking more than what’s normally allowed for credit hours.” Defining themselves as something unique or “other” set students apart, and helped them to come to grips with their new mission in college. Hannah described this process by saying, “You need to be prepared to get in that mindset. Instead of ‘I love music, but I have to do it after all these other things,’ music is the first thing you *have* to do.”

As they navigated the preparedness aspect of college adaptation, several students mentioned positive teacher actions that helped them prepare for future classes. Rebecca said, “With the professor it’s been super positive. I love her so much and she’s super understanding about other classes because [as a graduate student] she’s taking so many classes herself.” However, negative classroom experiences were also mentioned.

According to Tim, “I guess I just feel that sometimes things move a bit too quickly in terms of I’m working on something and then we move right on to the next thing. And I’m like, ‘what?’” Most often, students relied on their background knowledge and established

skills to prepare for new classes and environments. Matt explained, “I knew all of the notes [from playing marimba], but I wasn’t able to connect the dots... after awhile you can get in the flow of things and figure it out. In group piano, I had so much background knowledge.”

Acquiring study skills and self-awareness during practice also became a valuable part of group piano preparation. The following exchange highlights how Cody used practice strategies that had been mentioned in class while maintaining self-awareness for practice efficiency.

*Researcher:* Can you tell me about any habits you’ve developed to succeed and do your best in group piano?

*Cody:* Yeah, the 3x3x3 method. Do it 3 times in your right hand, 3 times in your left hand, and 3 times hands together. Sometimes it’s more than 3.

*Researcher:* Sure. Sometimes it’s 5 or 6.

*Cody:* Or 27, but you never know. But that has been really helpful just to take it one at a time, slow it down, get your muscle memory going so that you already have that because you’re trying to read the music too. It’s kind of like a back and forth and that’s been really helpful. Also just repeating measures and sections when I can’t get it right. That’s a great way that I think helps me. I hope it does. If not, I’ve been doing it for no reason.

Students also acknowledged that their lack of piano skill at the beginning of the semester contributed to difficulties in class. When describing his frustrations regarding hands together coordination, Tim said, “I guess I feel like I wish I had kept up piano lessons after middle school. Most of that knowledge has been lost to me.”

## Motivation

Participants' reactions to their group piano experiences were shaped by a myriad of motivational factors. Comments coded into this category related to a sense of value for piano skills in a music career, the relevance of using piano skills to communicate with other musicians, as well as intrinsic and extrinsic factors such as enjoyment and earning a good grade. Other codes that contributed to the motivation theme included self-reflection and awareness of personal motivation, and connecting motivation with a career goal. Motivation was strongly linked (for better or worse) to students' high school experiences. When asked about why group piano is required for music majors, Bailey responded:

That's a good question. My high school band director also taught theory, so he would play piano along with examples. And I was like, 'boy if he didn't know how to play piano then this wouldn't help us at all.' And also, it's very helpful cause teachers can be like 'guys, you're playing this,' or they can accompany if they need to.

Student responses also reflected somewhat vague or limited views of piano relevance. The following is Matt's description of how piano was used by his college theory professor:

The professor will go up and say, 'this is a dominant seventh chord,' or 'this is a major triad,' and there's a piano there so he'll go to the piano and play that dominant seventh or that major triad. I think it's just, you know, the more music and the more musical instruments you learn, the better.

Issues of motivation and procrastination often revealed student self-assessment beliefs. Some students frequently used negative statements in reference to their piano or

general music skills. Hannah described herself by saying, “I think piano is really hard and I really admire people who are good at piano because I’m not good at it.” Other students acknowledged their personal difficulties while framing obstacles in a growth mindset. Rebecca described piano skill development as follows: “I am not that person that thinks ‘I can’t get this’ because with a little bit of practice, anyone can get anything.”

Although all students related their success to various motivational factors, “getting good grades” was not mentioned in student interviews. It was only at the end of the semester, when students completed their summary statements, that grades were mentioned in the context of motivation. According to Hannah, “This semester, my grades were not quite where I wanted them to be in this class, but I hope that, with what I’ve learned, I’ll be able to be as successful as I want to be going forward.” Far more often, the relevance and value of group piano as a stepping stone to career success, overall musicianship, or as a release and escape from other more stressful music activities were the dominant features of student motivation. Cody described his motivation to use piano in the context of overall musicianship when he said, “Showing [future choir students] what notes are what and letting them hear the chords that they’re all making together is really important, and playing the accompaniments for them when you don’t have an accompanist in class.” Hannah described her use of piano skills in her chamber choral ensemble as follows: “The music is really hard and I’m by myself on a part a lot. So I have to be able to know my stuff and be able to plunk it out on the piano.” Rebecca explained that, “Group piano, choir, and guitar are the three classes that I can relax in because I just kind of show up, I sing or I play, I do my thing, and then I leave.”

Another striking motivational trend was the prevalence with which students struggled with time management and arriving on time to class throughout the semester. According to Matt, “Waking up and arriving on time, it’s been a big struggle for me even through high school.” Although other aspects of his academic and social life drastically improved throughout the semester, completing tasks on time was a difficulty that persisted. Tim also expressed feelings of frustration regarding motivation when he said, “It’s a lot of just making myself get it done. It’s something I’ve struggled with and I still am, just finding the motivation to not procrastinate, which I don’t find very often [laughs]. I am a procrastinator. It’s not fun.” Comments like these represent the complex motivational challenges that students must address as they adjust to the academic, social, and environmental demands of the college transition.

### **Priorities and Expectations**

Another theme that emerged from this study was the snapshot of priorities and expectations that group piano students had as they adapted to college life. Time management is an important skill for students as they transition from high school to college. However, student conceptions of time management and priorities showcased how varied aspects of the students’ backgrounds contributed to diverse opinions on this topic. Codes that contributed to the priorities and expectations theme include work/school balance, prioritizing physical and mental health, developing schedules and routines, and using coping strategies to manage stress.

Some students had difficulty finding time to practice for their various classes and ensembles. Bailey explained, “I’ve never really been a fan of practicing. So that’s hard, and most of my work is practicing. That’s like 90% of what I’m supposed to do.” Others

expressed that even though they were trying their best to plan ahead, assignments were still forgotten until the last minute. According to Tim, “Writing things down in a planner, or setting reminders in my phone, that’s been how I keep track of time. Most of the time I still realize ‘oh, I have to do this *right now!*’ 20 minutes before class starts.”

Several students realized that their priorities had affected their academic success. Cody explained that when he first arrived on campus, “I liked being with people, talking to people, making new friends. So that’s what I did the first three weeks of school. But I didn’t focus on my schoolwork and I started realizing that when I saw my grade.”

Time management and the unfamiliar pace of the college schedule were also a cause of frustration when setting priorities. Rebecca stated, “I’m very comfortable in piano, but it’s still frustrating because I know I can be better than this. But there are only 24 hours in a day and I would prefer if at least six of those were sleep.” Hannah described the shift in priorities from high school as follows:

In high school your music stuff comes after your academic classes, but here, music *is* my academic classes! So making sure I spend as much time with music practice as I do with written work is hard to figure out. I’m still trying to figure that part out.

Student priorities were often based on previous or ongoing life experiences. Some students prioritized work in addition to school. Cody said, “I had to get a job because I realized I have bills to pay. I have to go to work. I have to go to class. Do I have time for a nap? Do I have time to eat?” In contrast, other students specifically mentioned that they had not pursued a job to ensure that they had enough time for school. Matt explained, “I

decided that I want to focus on school, and get in that routine before I try and throw work or another stressor in.”

There was common acknowledgement that high school experiences shaped collegiate priorities. In Hannah’s words, “I went to a college prep high school and they had really high standards for us and what we needed to be doing. So I feel like I really know how to study and do my work and work hard.” However, creating a new identity distinct from past experiences was also a priority for Rebecca when she said, “It was super lonely at first, but then exciting not having to be the person that I was in high school.”

Challenges related to balancing priorities and expectations during the college adaptation process were also evident in students’ feelings of exhaustion and physical health issues. Many students knew that being a music major would require a lot of work, but were confused by how that work load translated into credit hours. Bailey described her confusion when she said, “I’m taking 11 classes, but I have below minimum credit hours for a full time student. That’s weird.” Others felt overwhelmed trying to balance homework with their physical health and wellbeing. Cody described the situation as follows: “I have classes I have to get to, I have homework I have to get done, but I also have things I have to do just to live, like eating and sleeping.” The simple act of introducing themselves was at times exhausting. Hannah explained that, “Something surprising that takes a lot of energy is anytime you tell a story, you have to say, “I’m from Oklahoma City, blah, blah, blah” and give so much background. It’s almost exhausting.” Similar feelings of adaptation exhaustion were evident, in some form or another in every interview. However, even when posed in a follow-up question by the

researcher, there was very little mention of specific strategies for how to deal with such feelings. The few strategies that were mentioned were taking breaks during practice and homework periods, making friends outside of the school of music as a form of escape, and studying in groups instead of alone. These group piano students struggled to balance priorities and expectations throughout their first semester.

### **Support Systems**

Each of the participants acknowledged various support systems as a key ingredient to adaptation success. Codes that contributed to the support systems theme include: sense of belonging, relying on peers as accountability partners, specific teacher guidance, and the ability to work in small groups and pairs during class.

Some students looked to people off campus for support. According to Cody, “My older brother was really helpful because he had already been through [college]. And a lot of my closest friends from back home have been real supportive and that’s been great, especially when I have no idea what I’m doing.” Others acknowledged that making friends on campus was essential to their success. Rebecca explained, “Another voice major keeps me accountable. We’re constantly meeting up to study. It’s really good cause I would not study as much as I do if it weren’t for him.” Most of the support systems described by participants were informal friendships or familial relationships as opposed to formal academic support (e.g. tutoring, office hours, campus writing center, etc.)

Some support systems may have been more effective than others. A few participants mentioned that instead of taking the group piano instructor’s advice, they would often try to adapt instructions to their own specific needs. In Rebecca’s words, “When she’s talking, I try to figure out what she’s saying and, no offense to her, but

instead of doing exactly what she says, I find a more efficient way to do that.” Rebecca went on to say the following about the need to include more self-paced activities in group piano:

There will be times when I feel like I have this down pat and I would rather be using this time to work on my project or a different aspect of the day’s tasks, rather than continuing to practice this thing that I’ve got. I wish it was a little bit more self-paced, even though it is group piano.

Asking for help or guidance from instructors and advisors was not frequently mentioned in student interviews. However, several students recognized that additional support was indeed available to them, but they had not yet taken advantage of potential opportunities outside of class (including office hours, tutoring, and open piano lab hours). Finding peers to use as accountability partners was the most frequently cited evidence of group piano student support systems. Because of his prior piano experience, Matt was able to assist other students in his group piano class. In addition, several students recognized positive teacher traits such as understanding, empathy, flexibility, and professionalism that helped them gain confidence in group piano and ensured that even if they didn’t always take advantage of it, they knew they had a network of instructors and classmates to serve as their support system through the first semester and beyond.

### **Accomplishment/Empowerment**

Students expressed feelings of accomplishment and empowerment in reference to completing specific group piano assignments and mastering various techniques. Building confidence, the need for appropriate challenges, and students’ desire for regular feedback

opportunities were all codes that contributed to the accomplishment/empowerment theme.

Several students indicated that there was a sense of confidence inherent in group piano because as Tim stated, “It’s a class where you’re supposed to learn. People may have prior experience, they might be really good or they might not be, but it’s technically a beginner’s level class so there’s really nothing to worry about.” Others acknowledged the mutual benefit of building confidence to accomplish tasks as a group. Matt explained that, “Everybody pretty much is struggling because in the beginning class everybody’s learning. But it’s not as bad as if they were alone. I think it’s about camaraderie.” The evidence of accomplishment differed for each student. Hannah recognized that piano was a challenge for her, but felt empowered by the progress she had made when she said, “I could barely find middle C when I started. Even figuring out this is an A, that’s a B, that’s really hard. But it’s gotten noticeably better, and once I figure it out, I’m fine.” Cody described his accomplishment with pure joy when he said, “I like when I finally get it right and it sounds like it’s supposed to sound. It’s just that moment of ‘oh my god, I did it!’ and the feeling of completion. That’s my favorite thing about group piano—accomplishment.” Students were often emboldened by these small moments of success.

Along with the sense of accomplishment/empowerment that emerged when they completed specific tasks, group piano students also recognized that their newfound confidence in class motivated them to practice more. Rebecca stated, “I love getting paired because it lets me play for only one person instead of the whole class. And once I get feedback from my partner, I want to go and work on things.” Students agreed that daily tasks and challenges should be accessible so that small tasks could be accomplished

quickly in service of a larger goal. However, participants also liked assignments that were interesting and difficult enough to foster excitement as opposed to boredom. According to Matt, “The reading exercises are nice because they’re short. We can figure them out quickly. But it’s the real, melodic, well-written stuff that helps me learn. Real music is exciting.” Hearing noticeable instances of success and progress in every class and practice session was a powerful experience that students expected during their course of study. Tim explained that he felt most successful when “starting with smaller, more manageable, easier chunks” to gain momentum that he could “build on for the whole.”

### **Discussion**

In this phenomenological study, I investigated the experience of college adaptation from the perspective of music majors enrolled in group piano level 1 by asking the following primary research question: What meaning do first-year music majors ascribe to their group piano experience, especially as this pertains to the adaptation process? The analysis revealed five core themes that can be related to existing literature: (a) Preparedness, (b) Motivation, (c) Priorities and Expectations, (d) Support Systems, and (e) Accomplishment/Empowerment. These themes emerged from the data after careful consideration of student viewpoints, existing literature, and the bracketing of my own experiences.

The findings of this study indicate that participants placed high value in piano as both an essential skill that would influence their future careers, and as an important social support opportunity. The specific struggles that students faced during their college transition were often related to their high school experiences. Similarly, frustrations in group piano were often related to limited music experiences (apart from their primary

instrument) in high school. Some students recognized the challenges of adaptation and overcame them with optimism, but negative self-talk was also evident.

Many of the codes that contributed to each of the five themes overlapped in some form as students often ascribed meaning to their experiences by connecting their past, current, and future successes and failures. How students prepared for college was often related to the support systems they had developed in high school. Similarly, how they prepared for group piano classes was connected to peer support systems on campus. Student descriptions of preparing for college and group piano classes by engaging in a state of “mental-readiness” is similar to the “state of brain readiness” or “intention” that other authors have indicated is related to motivation (Derakhshanrad & Piven, 2018). Students’ motivation for practicing piano was linked with the priorities and expectations they set for themselves, as well as those set by their family, high school teachers, and peer groups. Evidence of student intention included a search for motivation, identification of meaningful experiences, and perceptions of themselves as individuals who were mostly satisfied with their academic performance. These processes are similar to those described by other college students (Karp, 2011; Lehmann, 2014) and adult piano students (Cooper, 2001). The varying sources of student motivation are also consistent with theories of emerging adulthood, specifically qualities of identity exploration, feeling “in-between” or “other,” and self-focus (Arnett, 2007).

The students expressed feelings of accomplishment and empowerment as they analyzed how class activities motivated them to develop new skills and routines, overcome physical and mental barriers, and evaluate how they could continue to improve in future semesters all contributed to components of the first four themes. These group

piano students' search for purpose and meaning in order to feel accomplishment and empowerment supports the connection in existing literature between finding meaning in life and self-evaluation, establishing routines, and other psychological processes (Deci & Ryan, 2000; Steger Frazier, Oishi, & Kaler, 2006). Words such as *overwhelmed*, *exhausted*, and *frustrated* illustrated emotions experienced by the group piano students during the college adaptation process, especially in regards to balancing priorities and expectations. These words align with the experiences of perceived music major burnout (Christian, 2007), and collegiate coping (Pritchard, Wilson, & Yamnitz, 2007) described in existing literature.

The second research question that guided this study was designed to investigate the habits that students developed to succeed in group piano. Individual habits differed greatly based on student priorities. However, all of the students recognized consistency, time management, and a reliance on peer support as fundamental to piano success. As described in the literature review, results of extant research have shown that the campus demands faced by college students affect not only their academic success, but also the ability to form relationships, adjust to new experiences, and cultivate beneficial habits. The noticeable differences between requirements of music degrees and those of other college majors led group piano students to compare their experiences to their peers', search for meaning in their past, and rely on support systems on and off campus. The diverse high school music contexts of these participants fostered different habits within the adaptation process. Each student prioritized different aspects of college life. Some felt that they had been adequately prepared for the adjustment, while others struggled with numerous facets of college adaptation on a daily basis. Overall, these students were

aware of the importance of a successful transition, and were empowered by moments of accomplishment, but had a somewhat limited view of the specific habits that may help them take ownership of the adaptation process.

Peer groups dominated the various support systems that group piano students relied on throughout their college transition. Academic success was often linked to developing new relationships and navigating campus, which supports the findings of Karp (2011). Students reported using their friends as accountability partners, similar to the peer support described by Isbell (2008) and Gavin (2016). The attitudes, feelings, and beliefs of peers often contributed to student practice habits and perceptions of self. It seems that students' ability to adapt to group piano is closely related to the support systems that they rely on for guidance, and this finding is consistent with existing cognitive frameworks regarding how perceptions of others shape one's own cognitive development (Derakhshanrad & Piven, 2018).

Feelings of accomplishment and empowerment among the group piano students were also closely aligned with those described in existing literature. Cody's desire to "accomplish something new" in every class led him to adopt a positive outlook and dedicate increasing amounts of practice time to piano throughout the semester. This coincides with literature on the relationship between achievement motivation, optimism, and self-esteem (Hermans, 1970; Pritchard, Wilson, & Yamnitz, 2007). A sense of completion and work satisfaction inspired constructive student practice habits, but a sense of perfectionism, criticism, and isolation resulted in feelings of frustration. This pattern supports the findings of Pritchard, Wilson, & Yamnitz (2007) and Puff, Kolometer, McSwiggan, Pearte, Lauer, & Renk, (2016) who connected feelings of perfectionism

with depression amongst new college students. The essence of the experience of college adaptation for group piano music majors is best characterized by the complex interactions of student preparation, motivation, priorities and expectations, support systems, and accomplishment/empowerment that contribute to success. Individual student experiences differ greatly depending on background, but the common experience for all participants was a search for meaning and purpose that occurred as students balanced numerous priorities and expectations.

### **Implications**

Music majors entering their first semester of collegiate coursework will likely face a myriad of auditions, performance tests, and other assessments before they are permitted to enroll in coursework and ensembles (Lehmann, 2014). All of the participants in this study experienced stress and worry about how to prepare for college in the days and weeks prior to move-in, and even those who felt prepared for college in general were unsure of the specific skills they would need for individual classes (including group piano). Even in beginning level, basic classes such as group piano level 1, students worried about their lack of experience or felt unsure about how to prepare for assessments. This may explain my observation that students sometimes chose to listen, instead of play, during “out loud” activities in class. This should raise concern for group piano teachers, especially those who teach large classes and are unable to provide individual student check-ins on a regular basis. Instructors who teach other beginning level music courses (including theory, history, aural skills, and ensembles) may also need to address specific practice habits and coping strategies to manage student stress and worry in the early days of the semester. In addition, literature on the development of

effective music practice behaviors may provide strategies that could be applied in group piano coursework. Promoting frequent hands-on experiences and practical application of various practice strategies (based on individual student needs) throughout students' first semester of college will likely reduce student stress, and may promote a relaxed classroom environment to foster effective adaptation.

These freshmen music majors were relatively aware of the importance of group piano study as well as the value of piano skill development for a variety of music careers. The specific skills of tuning, accompanying, warming up an ensemble, and demonstrating pitch and rhythm patterns at the piano were mentioned by students as examples of how they could use piano in the "real world". One interviewed student also recognized the importance of using piano to communicate ideas with other musicians. These findings are encouraging because they suggest that early on in their collegiate experience, students are already aware of how their coursework can be applied to practical job skills. Because of the changing music marketplace, it is important that instructors continue to review curriculum to ensure that students develop the skills that are most relevant in 21<sup>st</sup>-century society. Students in this study made little mention of how improvisation, harmonization, and other piano skills may be used in their future careers, and it is likely that these creative skills are increasingly important for all modern working musicians.

### **Suggestions for Future Research**

Results from this qualitative study may not be generalizable to a broader population, but the findings discussed may be used to recommend future research that will help guide curricular decisions in group piano and other core music classes. For example, how do systematic intervention programs such as tutoring, open lab hours, or

mentor programs impact the college adaptation experience? The participants in this study attended a large public university with a medium sized school of music. Would adaptation experiences be different for students enrolled at institutions of different types and sizes, such as a small private college or conservatory? Participants also recognized numerous career applications for their piano skills. Are incoming music majors aware of the specific skills that are developed in their group piano curriculum? If so, how do they explore individual interests and applications for piano skills within the course sequence? Research to explore whether similar results emerge when music majors learn other new psychomotor skills also would be informative (e.g. the adaptation of string majors in a woodwind methods class, or how students learn to use their two hands for different tasks in basic conducting).

The findings of this study also highlighted numerous challenges that were common among students during the collegiate adaptation process. Do faculty members understand the scope and diversity of challenges that students face during this transition? If so, how do instructors cater to individual student needs while maintaining high standards? Understanding perceptions of the college adjustment process from family members of new music majors may also provide valuable insight on how familial relationships guide students' learning behaviors. Dialogue between group piano instructors and students as well as the continued involvement of group piano students in research are encouraged. Participants from this study recognized the benefit to teachers of identifying individual student differences and adjusting course requirements and activities to meet the needs of all.

## **Conclusions**

Students from a variety of backgrounds often face similar challenges related to the college adjustment process. Individuals are only able to overcome those challenges when they adopt productive educational habits (Credé & Niehorster, 2012). There is a plethora of literature regarding collegiate adaptation, but this study addressed the previously unexplored topic of music major adjustment. The themes of preparedness, motivation, priorities and expectations, support systems, and accomplishment/empowerment are consistent with previous findings in other social sciences, but the complexity of relationships evident in these themes highlights the importance of adaptation as a framework for planning curriculum. Teachers and students may be better equipped to address challenges if they recognize the common obstacles and related solutions within group piano study and prepare for class accordingly.

## **Chapter Four**

### **Exploratory Investigation of Technology-Assisted Practice:**

#### **A Study of Collegiate Group Piano Students**

Technology-assisted practice has become increasingly prevalent in music education over the past several decades. Supplementing practice with metronomic, electronic, and online materials is a common occurrence among today's musicians and teachers, but the availability of research regarding the effectiveness of various technologies remains limited (Bauer, Reese, & McAllister, 2003; Dorfman, 2016; Whitaker, Orman, & Yarbrough, 2014). Numerous types of technology, including computer software, mobile device apps, and MIDI keyboard tools have been widely used in music education, but little is known about the instructional strategies that educators use to facilitate technology-assisted practice (Bauer, Reese, & McAllister, 2003). Investigations have focused on the long-term implementation of technological tools in the music classroom, with results indicating that teacher participants share concerns about technical and pedagogical support, and about the authenticity of integration (Bauer, 2012; Dorfman, 2016). Student motivation and preferences may affect technological implementation in some circumstances (Kang, 2018). However, in the context of technology-assisted practice, research indicates that music teachers generally use technological tools more for administrative duties such as attendance and grading than for strategic classroom and practice implementation (Bauer, Reese, & McAllister, 2003; Bauer, 2012).

Music education literature includes extensive research regarding two components of technology in the context of effective practice (Cash, Allen, Simmons, & Duke, 2014;

Duke & Pierce, 1991; Henley, 2001; Hewitt, 2001; Morrison, Montemayor, & Wiltshire, 2004; Pierce, 1992; Rosenthal, 1984). These studies have investigated aural modeling and tempo control as critical factors related to effective and efficient practice. A brief review of popular technological tools used by music educators suggests that many of the functions of available programs relate to the provision of an aural model and tempo control assistance for students; however, research concerning the effectiveness of technology as a model and tempo helper in music practice has not yet emerged (Hahn, in press). This current study will contribute to the need for research in this area, specifically in the context of reaching today's digital native students.

There are many differing types of technology applicable for music study on the market today, so it is important to understand the underlying effects of specific features of technological tools, rather than comparing the types of technology themselves (Crowe & Rio, 2004). Because of the limited amount of research pertaining to technology-assisted practice, it seems necessary to understand the most basic and fundamental components of these tools and how specific features are used by students before more advanced capabilities can be investigated. Although researchers cannot keep pace with studying the diverse variety of new practice tools used in music classrooms, this study is based on the premise that identifying the central components of various technological practice aids is critical to categorizing technology into a framework usable for music educators. Understanding the potential pedagogical implications of applying various apps and technologies in the collegiate group piano setting is critical to future research and practice. Therefore, I identified tempo control and aural modeling as two of the most pervasive and fundamental capabilities of popular technological practice assistants.

Educators can gain valuable insights on the efficacy of technology use by analyzing the effects of these components within the context of effective strategies already described in research on practice. This generalized approach for discussing the relationship between music education, technology, and pedagogy is recommended in existing literature (Bauer, 2012; Crowe & Rio, 2004; Dorfman, 2016).

## **Review of Literature**

### **Technology Use in Music Education**

Rapid changes in technology have encouraged music educators to use new, and in some cases untested, tools in many classroom contexts. In the collegiate setting, the National Association of Schools of Music (NASM) requires accredited schools to educate students on how technology serves music (Crowe & Rio, 2004), but little research has been conducted to understand the specific and diverse technological practices of NASM accredited schools in the United States. Much of the existing technology research in music education has focused on implementation (Dorfman, 2016), but research findings indicate that educators in a variety of fields are still in the earliest stages of understanding the effects of digital technology on student success (Foldnes, 2016). In higher education settings, researchers found that self-learning technology use in the classroom was associated with increased student satisfaction, self-evaluation, and progress tracking (Gilboy, Heinerichs, & Pazzaglia, 2015; Kim, Kim, Kheara, & Getman, 2014). Survey results of K-12 teachers indicated that there was increased student-to-teacher interaction and more time for a variety of instructional techniques to be used in self-learning technology classrooms when compared to traditional classrooms (Gough, DeJong, Grundemeyer, & Baron, 2017). Although these findings were not specific to music

education settings, they may help to identify the potential impact of individual technology use in the music classroom.

Several important discoveries have been identified in the small amount of existing research surrounding music education and technology implementation. A study of upper-grade elementary programs found that students generally preferred acoustic instruments to tablet-based instruments, and that their level of motivation was associated with the degree of preference ratings (Kang, 2018). This suggests that although technological tools may be beneficial in certain learning contexts, it may not be ideal to replace acoustic instruments with digital alternatives in music study. Individual student technology preferences may need to be taken into account when making curricular decisions. This finding is supported by the proposed technological pedagogical and content knowledge (TPACK) conceptual framework, which may be used to identify the teacher knowledge necessary to effectively integrate technology into the classroom (Bauer, 2012). The TPACK framework may be increasingly relevant in higher education, because current and future students represent a digital native generation that distinguishes them from their pre-digital peers, instructors, and mentors. Although the importance of a diverse set of technological tools has been identified in a study of music education researchers (Bauer, 2016), a survey of music teachers found that self-reported TPACK scores were generally lower than content, pedagogical, or pedagogical content knowledge ratings (Bauer, 2012). These studies have illuminated important insights to the field, but there is a need for more systematic lines of research to investigate the use of technology in music classrooms, home practice, and research settings.

## **Aural Modeling and Effective Practice**

Aural modeling is an important and widely used feature in technology-assisted practice. Anecdotal and research-based evidence in support of aural modeling as a guide for student practice (with or without technology assistance) is commonplace in music education literature (Dickey, 1992; Rosenthal, 1984; Rosenthal, Wilson, Evans, & Greenwalt, 1988; Sang, 1987). The author of a study of collegiate music education students reported that an aural model was a more effective practice aid than a combined aural model and verbal explanation, a verbal explanation alone, and practice without any model or explanation (Rosenthal, 1984). The effectiveness of an aural model for college musicians learning a novel keyboard melody, both in their active practice as well as in consolidation of procedural memory during sleep, is also supported in the literature (Cash, Allen, Simmons, & Duke, 2014). The success of aural model applications may be closely related to specific practice strategies and the formation of clear performance goals that are required for music students to develop effective habits and fluent performance skills. Results of research in this area indicated that the strategies employed by graduate and undergraduate pianists during practice were a better indicator of performance quality than the length of practice or number of practice repetitions (Duke, Simmons, & Cash, 2009). Investigators have also found positive significant correlations between performance scores and students' ability to imagine an aural goal (Coffman, 1990) and a possible connection between self-regulated practice ability and performance achievement (Bartolome, 2009).

The history of learning music with digital and acoustic aural models is extensive. The Suzuki Method was the first widespread approach that emphasized sound recordings

for the purposes of learning an instrument—utilizing the recording as a teacher is a central strategy in Suzuki instruction (Thibeault, 2018). When employed effectively, student imitation of teacher modeling has been affirmed as a vital teaching tool in the works of Edwin Gordon, Daniel Kohut, and Shinichi Suzuki (Haston, 2007). However, research that compares the effectiveness of digital aural models and live teacher performance models is still in its infancy. Results of a study of instrumental music students learning English choral pronunciations transcribed in the International Phonetic Alphabet (IPA) indicated that participants who used computer software without teacher assistance expressed feelings of frustration and demonstrated significantly less improvement than students who had learned IPA from a teacher, with or without computer assistance (Dekaney, 2003). Although these findings are specific to choral pronunciation, they suggest the importance of understanding how human and digital aural models affect the emotions and achievement levels of music students in various contexts.

Aural modeling not only impacts the ability to practice, but also the expressive quality of the resulting performance. Research indicates that collegiate music students were able to reproduce more detailed features of a model performance after they heard an expressive aural model compared to a “deadpan” aural model (Woody, 2003). In a study of novice teachers in high school band rehearsals, participants’ rehearsal verbalizations and actions reflected a greater concern for accuracy and were less self-directed and more critical of the ensemble when a recording and score were utilized in conductor preparation versus when only a score was used (Montemayor & Moss, 2009). Aural imagery may affect motivation, goal setting, strategy use, and self-assessment in instrumental music practice (Oare, 2016). Aural modeling has complex effects on

instructional and performance quality, and further research to examine these interactions is needed.

### **Tempo Control and Effective Practice**

Tempo control is synonymous with technology-assisted practice if we consider that one of the first music “technology” tools was the metronome. The influence of various practice strategies related to tempo control has also been a popular topic in music education literature. Music educators commonly associate metronome usage with the ability to develop tempo control skills, and prescribe a variety of metronome activities in their students’ assignments. These types of assignments are supported by the findings of a study of high school wind players, which indicated that participants who reported higher percentages of formal practice (including practice based on specific musical or technical goals and metronome work) tended to have the highest performance achievement scores (Miksza, 2007). However, other studies have indicated that students self-reported using more practice strategies than were actually observed in recorded practice sessions (Pike, 2017), and that although students have knowledge of various practice strategies, they may lack an understanding of the appropriate use of such strategies (Oare, 2012). Research studies have also indicated that music learners increased their total amount of practice as their level of expertise developed, and that learners at higher levels of expertise adopted more effective practice strategies and reported an enhanced ability to recognize errors (Hallam, Rinta, Varvarigou, Creech, Papageorgi, Gomes, & Lanipekun, 2012). Therefore, music educators should ensure that students are equipped with the knowledge and skills to effectively use tempo control assistance tools before metronome practice or a similar

activity is assigned. Further investigation is needed to understand the impact and specific usage of metronome and tempo control activities in student practice.

Tempo control has been used as an indicator of success for various practice and rehearsal strategies. Based on a study of ten musicians of various voice and instrument types, Johnson (2011) concluded that mental practice of technical excerpts resulted in less tempo variance than lyrical excerpts, and that as musicians of varying experience levels continued to mentally rehearse tempo, model tempo replication became more precise. Authors of another study found that the eye-hand span of pianists (the time between the eye's fixation of a note and the finger tapping the corresponding key) significantly changed in response to changes in tempo and complexity of the music in sight-reading activities, but seemed to be unique for each musician participant rather than being affected by other variables in a short practice phase (Rosemann, Altenmüller, and Fahle, 2016). These findings suggest that tempo control skills are developed over years of practice and may be explored in the context of music fluency and skill development.

Perceptions of tempo may also be related to other music factors. Results of a study of collegiate music majors indicated that articulation style affected participants' ability to discern subtle changes in tempo—staccato stimuli were judged as increasing in tempo more frequently than legato stimuli (Geringer, Madsen, MacLeod, & Droe, 2006). Furthermore, authors of a study that involved graduate and undergraduate music majors practicing multiple one-measure target tasks found that subjects' tempo accuracy and pitch accuracy were adversely affected by differences between the tempo at which passages were originally learned and the tempi at which they were subsequently performed (Duke & Pierce, 1991). Learning more about how specific practice strategies

to develop tempo control may assist music students and teachers in avoiding these and other obstacles associated with tempo accuracy would be valuable. Further investigation of how performance tempo control is affected by musical factors such as articulation, pitch, and practice tempi, as well as technology-assistance seems warranted.

### **Combining Aural Models & Tempo Control Tools**

Aural modeling and tempo control are not separate and distinct variables. Instead, they are two factors that are closely related in the context of effective practice and performance outcomes, and often overlap in technology-assisted practice. Some researchers have chosen to investigate the combined effects of modeling and tempo patterns on performance achievement and growth (Henley, 2001), while others have isolated these two variables and analyzed them in several studies within a single line of research (Miksza, 2006; Miksza, 2007; Miksza, Prichard, & Sorbo, 2012; Miksza & Tan, 2015). Although both of these research designs have defined critical information regarding effective practice, the existing research has not yet provided a clear picture of how technology-assisted practice includes the provision of aural models and tempo control features that may be related in student practice.

Research indicates that participants who heard sound sequences that changed from slower to faster tempi responded with accelerated behavioral pace on a motor skills line-tracing task. However, when the sound sequences returned to a slower tempo, participant behavior pace did not change (Kuribayashi & Nittono, 2015). This finding underscores the importance of combining effective aural models and tempo control technology tools in student practice. It is unlikely that students who begin their practice with a tempo guide or aural model that is too fast will be able to effectively slow down

their practice behavior, even if a slower tempo is selected for subsequent practice activities. Researchers investigating music instruction and subsequent practice have reported a prevalence of the use of aural modeling and tempo control activities (Cash, Allen, Simmons, & Duke, 2014; Miksza, 2007; Rosenthal, 1984; Thibeault, 2018). Even when equipped with appropriate practice strategies, students may lack an understanding of how to successfully apply those strategies in their home practice (Oare, 2012). Further studies to investigate the coordination of aural modeling and tempo control in technology-assisted music practice are needed.

### **Suggested Research Methodologies**

Numerous research methodologies have been employed to study the specific practice habits and related performance results of instrumental music students (Miksza, 2007), but these methods have not yet been used in coordination with technology-assisted practice. Lehmann and Ericsson (1997) utilized the concept of deliberate practice, which includes effortful, goal-directed, and intentionally structured activities to study the acquisition of musical expertise. The use of student self-reports to investigate music practice behavior is a well-established strategy in music education research (e.g., Byo & Cassidy, 2008; Hamann, Lucas, McAllister, & Teachout, 1998; Smith, 2002). To investigate the relationship between practice behaviors and achievement, researchers have examined expert performance evaluations in conjunction with observed practice behavior (Miksza, 2006), expert performance evaluations along with student self-reports of practice (Jørgensen, 2002), and a combination of observed practice behaviors, self-reported practice habits, and expert performance achievement evaluations (Miksza, 2007). Most notably, Miksza (2006) studied the relationships between observed practice

behaviors and pre-test and post-test measures of performance achievement using a sample of collegiate brass students. He found that those who took a more strategic approach toward practicing (e.g., breaking the piece into manageable chunks, practicing small chunks within a larger context, and identifying “trouble spots”) achieved the highest performance scores. Similar examination of student goals, practice behaviors, and achievement through self-reports and expert evaluation is needed to understand the effects of technology-assisted practice.

Various methods have been employed to study the use of technology implementation in the classroom, but no particular method has found widespread support and success in music education settings (Dorfman, 2016). Given this lack of a common methodology, the present study sought to combine the advantages of student goal and practice behavior self-reports and teacher/expert performance achievement ratings in the context of understanding how technology-assisted practice with various aural modeling and tempo control capabilities impacts student outcomes. This investigation will explore the long-term implementation of proposed technologies (Dorfman, 2016), the impact of facilitating deliberate practice in music education settings (Lehmann & Ericsson, 1997) and the time constraints of instruction and practice time in the collegiate environment. A combination of self-reports and expert ratings may be a beneficial and practical foundation for studies related to technology-assisted practice.

### **Central Questions**

In an initial study of one-to-one technology use in collegiate group piano (Hahn, in press), I became interested in the unique combination of aural modeling and tempo control that seemed to inhibit student practice. Observations from that study indicated

that many students had difficulty selecting appropriate practice tempi, despite experience with tempo selection activities in related coursework, and the availability of tempo selection and aural model tools in their assigned technology. A review of available technology apps indicated that aural modeling and tempo control components were the most pervasive features of music practice apps. Exploring the aural modeling and tempo control factors of various tools is necessary in order to understand the complexities of these interactions in technology-assisted practice and how that practice collectively impacts student outcomes. Therefore, the primary research question for this study was: How does the use of technological tools with varied capabilities of providing aural modeling and tempo control features affect collegiate group piano students' achievement in the context of in-class practice sessions?

In order to investigate aural modeling and tempo control as distinct but interactive factors, I chose three technological tools for use in this study based on their prevalence in teaching practice and previous research examinations. These included the metronome, YouTube app, and the Tempo SlowMo app. Metronomes have been employed in previous research because of the widespread use of these tools in tempo control activities (Egger, Springer, & Gooding, 2015). In a content analysis of music education videos on YouTube, Whitaker, Orman, & Yarbrough (2014) identified the pervasive nature of this platform in educational settings, and its capability to disseminate aural models for practice. I selected the Tempo SlowMo app because of its hybrid capabilities to combine an aural model with a tempo control tool using MIDI-inspired technology in an accessible mobile device platform for students. In this study, I sought to explore student

practice behaviors and investigate achievement of a non-technology control group, a metronome group, a YouTube group, and a Tempo SlowMo group.

The purpose of this study was to compare students' use of technology tools that provided varied aural modeling and tempo control capabilities with a non-technology control group in order to investigate how these features affected collegiate group piano students' achievement during in-class practice sessions. Type of technology used in practice was the primary independent variable. Each technology is unique based on what it can or cannot do regarding aural modeling and tempo control. For this reason, it was important to study these tools collectively to understand their interactions and individual capabilities. However, research indicates that other factors may affect student technology preferences, practice, and use (Abramo, 2011; Hahn, in press; Hallam, Varvarigou, Creech, Papageorgi, Gomes, Lanipekun, & Rinta 2017; Miksza, 2006). The mixed results of this previous research indicate that the effects of numerous demographic variables were largely interrelated with other individual differences (Miksza, 2006). It is difficult to isolate technology-assisted practice from the individual effects of specific student background variables. I chose to investigate the effects of two of these variables, students' developmental level and prior piano experience, because these factors are likely to impact group piano outcomes. This led to the second research question: What are the effects attributable to students' developmental level or prior piano experience on achievement in a technology-assisted practice setting? Thus, student developmental level and prior piano experience both served as independent variables. The dependent variable was student achievement level (as measured by initial sight-reading achievement and final performance achievement scores). Data regarding self-reported practice behaviors

and demographic/background information were also gathered to provide context for technology-assisted practice environments in collegiate group piano.

## **Method**

### **Participants**

The participants in this study were 43 music majors enrolled in group piano coursework at a large, public research institution in the Midwest region of the United States. All participants were enrolled in level 1 or level 3 of Group Piano for Music Majors during the semester in which this study took place. Four semesters of group piano were required for all students enrolled in Bachelor of Music degree programs in performance or music education, and were typically completed by students during their freshman and sophomore years. Throughout the semester, all participants were introduced to the three technology tools used in this study, in coordination with the development of pedagogically-sound practice routines. After five weeks of introductory activities with the technology, students were randomly assigned to one of four treatment groups (control, metronome, YouTube, Tempo SlowMo). Each participant used their assigned technology in both the week 5 and the week 10 research participation sessions.

Participants were enrolled in one of three sections of level 1 ( $n=22$ ) and two sections of level 3 ( $n=21$ ). Student assignment to treatment groups was random, but stratified for each piano level and class section. A graduate teaching assistant enrolled in the first year of the Master of Music in Piano Pedagogy (MM) degree taught two sections of the level 1 course. A graduate teaching assistant enrolled in the first year of the Doctor of Philosophy in Music Education (PhD) degree taught one section of level 1 and one

section of level 3. The author taught the remaining section of group piano level 3, and supervised both graduate TAs involved in teaching the other sections.

The curriculum for each course had been designed by current and former faculty members and revised by the Group Piano Coordinator (the author). Common course calendars and content, syllabi, exams, and final projects were used in the three sections of group piano level 1. The two sections of group piano level 3 also shared common materials and content. Although the level 1 and level 3 courses for music majors were different in terms of scope, content, and pace, participants utilized the same recommended practice strategies in both courses. These practice routines were based on practical piano applications in students' future careers and focused on analysis, rhythm, pitch, and harmony pattern isolation, as well as various techniques designed to "break apart" a music score into manageable chunks, "block" passages, "ghost" hand position changes, and alter rhythms. The following practice behaviors as described by Miksza (2006, p. 314) were also identified and observed by the instructors in all participant classes: (1) singing/whistling, (2) frustration, (3) self-guiding, (4) repeat section, (5) repeat measure, (6) repeat piece, (7) slowing, (8) quickening, (9) silent fingering, (10) varying the articulation, (11), varying the dynamic, (12) informal, (13) whole-part-whole, (14) use of metronome, and (15) marks part. Practice behaviors and skills were developed and taught to all students in sight-reading, transposition, technique, harmonization, improvisation, accompaniment, and solo repertoire activities.

The level 1 and level 3 students were chosen for participation because they represented all of the institution's undergraduate music majors enrolled in group piano at the time of this study. Although content and pacing between level 1 and level 3 courses

differed, the ability to compare music major practice behaviors and achievement in technology-assisted practice with two different groups added a valuable independent variable (developmental level) to the study. Demographic data pertaining to students' background experiences with music, practice, and technology were gathered during an introductory session to the research study and are reported in the results section. The students' rights as research participants in this Institutional Review Board-approved study were also explained during this session, and permission forms were signed and collected.

### **Research Design**

Subjects in this study participated in two practice sessions. Each session occurred during their normal class time during weeks 5 and 10 of the semester. All participants practiced individually (with headphones) during each 25-minute research participation session in their usual electronic piano lab classroom. The sessions were broken into six parts that lasted the following approximate lengths of time: (a) 4 min pre-test survey, (b) 1 min sight-reading pretest performance, (c) 13.5 min practice, (c) 1 min posttest performance, and (d) 5 min self-evaluation survey. This resulted in a total of 50 minutes of practice and associated reflection activities across two sessions (five weeks apart). The research yielded four measures of student performance achievement – a sight-reading (pre-test) and final performance (post-test) score for each of the two practice sessions.

The length of practice time was selected based on previous research (e.g., Fortney, 1992; Miksza, 2005) and a preliminary study of brief (5-10 minute) periods of technology-assisted practice (Hahn, in press). Evidence from these studies indicates that short practice sessions are an accurate means of investigating student practice behaviors because students tend to repeat the same behaviors over and over after their first few

minutes of practice. The practice session length was also appropriate for the level of difficulty and length of each repertoire selection, and the length of practice activities in typical class sessions. The group piano instructors at the host institution had observed that similar short practice sessions (10-15 minutes in length) were effective in facilitating student growth and achievement during in-class activities.

I was available in the classroom during all investigation sessions to assist with the technology if needed, but sat in the back of the room to limit distractions. A pilot study was conducted with non-music major group piano students to test out the technological logistics, Qualtrics survey procedures, and research design. Four repertoire selections were chosen for use in this study (a week 5 repertoire piece and a week 10 repertoire piece for each level of participants) based on length, technical difficulty, musical/expressive requirements, and similarity to other repertoire used in the 5 and 10-week exams for group piano level 1 and level 3. All participants received an unmarked copy of the score, a pencil, and access to their assigned treatment technology in each session. The following instructions based on those used by Miksza (2007) were given to participants after they completed a pre-test survey and recorded themselves sight-reading the piece:

Practice the piece for the next 13.5 minutes in any way that you want – you may write on the score if you want – the piece is designed to allow for both musical/expressive and technical improvement to be made – try to make as much improvement as you can.

After the 13.5-minute practice session, students were instructed to perform the repertoire piece to the best of their ability and record their performance. Both the sight-reading performance recording and the post-practice performance recording were cut off after 1 minute in order to measure how much of the piece the student completed during

that time. When played up to tempo, each repertoire piece lasted roughly 45 seconds, so the 1-minute time requirement was a way of measuring student tempo and continuity. After the final performance recording, participants completed a post-test survey on Qualtrics using the desktop computers at their keyboard stations. The music scores were collected at the conclusion of each session to ensure that students in other research groups did not get an advance look at the repertoire prior to their own participation.

The independent variables used for comparison were type of technology (no technology, metronome, YouTube, and Tempo SlowMo), developmental level (level 1 versus level 3), and prior piano experience before enrolling in collegiate group piano (yes or no). The metronome group used only a metronome for purposes of tempo control. The YouTube group used pre-recorded YouTube videos with audio only (no keyboard or music visual) for purposes of aural modeling, and the Tempo SlowMo group used a mobile device app that combined an aural model with the ability to adjust/control tempo. These three tools were chosen because they provided the simplest, most accessible, popular, and versatile tools on the market that demonstrated aural modeling and tempo control capabilities. With respect to developmental level, Miksza (2012) suggested that using this factor in the study of self-regulated practice behaviors would be a productive direction for future research. Based on my experience teaching group piano, I believed that prior experience was a reasonable factor to examine in the context of overall student achievement.

The metronome was selected for its widespread use in tempo control activities (Egger, Springer, & Gooding, 2015). The YouTube website/app was selected because of the prevalence of music education, piano performance, and tutorial videos on that

platform (Whitaker, Orman, & Yarbrough, 2014). For the YouTube group, I created four aural model videos (one for each piece at each level at week 5 and 10) for student use.

This ensured that students had access to high quality recordings at appropriate tempi.

In selecting a technological tool that combined aural modeling and tempo control capabilities, I initially reviewed multiple practice apps including Piano Maestro, Piano Marvel, Wolfie, Amazing Slow Downer, and Tempo SlowMo. Each app was assessed based on adaptability to course content, user friendliness, age appropriate graphics, affordability and equipment requirements, and diversity of repertoire. Based on these criteria, I selected the Tempo SlowMo app for use in this study because (a) any course content could be uploaded directly to the app, (b) the interface proved user friendly to students of similar age and level as the participants, (c) the graphics were designed for adults rather than cartoon-based images for young children, (d) the app was free and available on any mobile device, and (e) there were no restrictions based on availability of repertoire in the app because any content could be uploaded directly, whereas other options limited users to a library of repertoire contained in the app or available for purchase. The repertoire recordings that students accessed on the Tempo SlowMo app were the same as the YouTube audio files that I created for this study.

The dependent variable was student performance achievement, as measured by both sight-reading and final performance scores. The participants used the internal recorder of the Yamaha Clavinova keyboards in the piano lab classroom to digitally record pre-test and post-test performances. Data on practice behaviors and goals were collected via student self-reports, as supported in previous literature (Byo & Cassidy, 2008; Hamann, Lucas, McAllister, & Teachout, 1998; Smith, 2002) to provide a more

complete picture of the technology-assisted practice environment. In contrast to previous studies of performance achievement, which have used a combination of objective and subjective measures to quantify achievement (Miksza, 2006; Miksza, 2007), this study used a multidimensional assessment rubric, based on that of Ciorba & Smith (2009). This was chosen because of the authentic nature of rubric use in higher education to measure student progress in a consistent and empirical manner, while supplying student feedback (Ciorba & Smith, 2009). Adjustments were made to the rubric in consideration of the specific goals of a sight-reading/practice activity in group piano (see Appendix K for rubric). Two expert judges rated 100% of the recordings to determine the reliability of the rubric. Judges were blind to participant identity during the scoring process. The judges scored each performance separately, and the initial interjudge reliability was 0.82. Judges then conferred to discuss any differences until one agreed-upon score had been assigned to each performance.

Students self-reported their practice behaviors and goals using a Qualtrics survey completed at the end of each treatment/practice session. The items allowed participants to rate the percentage of practice time that they spent on the following habits: (a) singing/humming/whistling, (b) frustration, (c) self-guiding, (d) repeat section, (e) repeat measure, (f) repeat piece, (g) slowing, (h) quickening, (i) silent fingering, (j) varying the articulation, (k), varying the dynamic, (l) informal, (m) whole-part-whole, (n) marks part, (o) “blocks” passages, (p) “ghosts” hand position changes, (q) alter rhythms, and (r) hands separate practice. This list was based on the practice behaviors identified by Miksza (2006) with the addition of the last four strategies, which were specific to piano and introduced as part of the curriculum of each class.

## Results

### Self-Reported Demographic and Background Information

Descriptive analyses of the pre-test demographic survey data revealed the diverse cross-section of music majors represented by the sample population. Primary instruments represented included voice ( $n=16$ ), brass ( $n=9$ ), woodwind ( $n=8$ ), string ( $n=5$ ), and percussion ( $n=5$ ). The average length of primary instrument study was 7.08 years ( $SD = 2.79$ ). The majority of the sample (86%) identified as freshman or sophomores. Over half (60.5%) were music education majors, 23.5% were music performance majors, and 16% identified themselves as “double majors” or “other.” Approximately 25.5% of the population was enrolled in more than 18 credit hours, 39.5% were enrolled in 16-18 credit hours and 35% were enrolled in 12-15 credit hours. Descriptive analyses of self-reported items revealed that the mean length of time spent on academic work (e.g. homework and practice) outside of class was 14.56 hours per week and was quite varied across the sample ( $SD = 9.37$ ). The average number of hours spent on non-academic tasks (e.g. work, volunteering, and internships) was 8.30 hours per week and reports for that category were also quite varied ( $SD = 8.97$ ). About 53% of participants reported having prior piano experiences before enrolling in collegiate group piano. Of those with prior experience, approximately 60% described their background as “private lessons,” while 22% said they were self-taught, 13% took piano classes and/or music theory in high school, and 5% had experienced piano in a group class setting.

When asked how many hours they spent practicing piano per week, 25.5% said they practiced less than 1 hour, 60.5% said 1 to 3 hours, and 14% reported that they practiced more than 3 hours. None of the participants selected the “I don’t practice piano

outside of class” option. In describing their practice plan, 18.5% reported that they had a regular routine, 21% replied that they were unsure, and 60.5% did not have a regular routine. Representative practice routines described in response to an open-ended prompt included designated piano time in a practice room, interspersed piano and primary instrument practice, night-time practice, a set routine of technique, repertoire, and other exercises, prioritization of trouble spots, playing through everything, and practicing the day before and/or the morning of their group piano class. The majority of participants (65%) reported that practice strategies were discussed frequently or very frequently in their current group piano class. In addition, students reported the following about how often they used technology in their piano practice: Never (9%), Rarely (19.5%), Sometimes (53.5%), Very often (9%), and Always (9%). Students reported using metronomes, MIDI keyboards, YouTube, Tempo SlowMo, online resources, personal recording devices, and a Learning Management System in their technology-assisted practice. A metronome was by far the most popular technology tool (reported in more than 50% of responses).

### **Self-Reported Practice During Treatment**

Descriptive analyses were also conducted for the practice habit items completed by students immediately after their 13.5-minute technology-assisted practice sessions. Mean reports for average percentage of time spent on informal and formal practice during the week 5 treatment were 35.33% ( $SD = 23.11$ ) and 64.67% ( $SD = 23.11$ ), respectively. Mean reports of the same items from the week 10 treatment were almost identical (see Table 2). Most students (93.93%) indicated that technology helped their practice in some way.

**Table 2***Descriptive Statistics for Self-Reported Practice Perceptions During Treatments*

Item	Week 5 <i>M</i>	Week 5 <i>SD</i>	Week 10 <i>M</i>	Week 10 <i>SD</i>
How much did the assigned tool help you practice (all groups except control)? (a).	2.94	1.10	2.97	1.19
% of time spent on informal practice	35.33	23.11	36.58	28.45
% of time spent on formal practice	64.67	23.11	63.41	28.45
After today, how likely are you to use a metronome in your own practice? (b).	7.05	2.73	7.02	2.50
After today, how likely are you to use YouTube in your own practice? (b).	5.40	2.63	4.37	2.39
After today, how likely are you to use TempoSlowMo in your own practice? (b).	4.63	3.03	3.51	2.82

a. Scale is 1 = no help, 2 = a little help, 3 = moderate help, 4 = much help, 5 = very much help

b. Scale is 1 = not at all likely to 10 = extremely likely

Students had responded to each item in the list of strategies provided by selecting from the responses *frequently*, *sometimes*, or *never*. The participants' responses indicated that "repeat section" and "repeat piece" were amongst the most popular strategies, followed closely by "repeat measure," "slowing," "self-guiding," and "hands separate." Descriptive statistics for all practice behaviors can be found in Table 3.

**Table 3***Self-Reported Frequency of Practice Behaviors During Week 5 and 10 Treatments*

Behavior	Week	Frequently	Sometimes	Never
Repeat section	Week 5	79.07%	16.28%	4.65%
	Week 10	83.73%	13.95%	2.32%
Repeat piece	Week 5	74.42%	20.93%	4.65%
	Week 10	81.40%	16.28%	2.32%
Repeat measure	Week 5	62.79%	34.89%	2.32%
	Week 10	76.75%	20.93%	2.32%
Slowing	Week 5	69.76%	25.58%	4.65%
	Week 10	53.50%	39.53%	6.97%
Self-guided	Week 5	48.84%	48.84%	2.32%
	Week 10	69.76%	20.93%	9.31%
Hands separate	Week 5	48.84%	37.21%	13.95%
	Week 10	44.19%	48.84%	6.97%
Quickening	Week 5	37.21%	39.53%	23.26%
	Week 10	37.21%	37.21%	25.58%
Whole part whole	Week 5	32.57%	34.89%	32.57%
	Week 10	23.26%	41.86%	34.89%
Informal Strategies	Week 5	27.91%	58.14%	13.95%
	Week 10	23.26%	48.84%	27.91%
Blocking	Week 5	25.58%	18.60%	55.80%
	Week 10	13.95%	23.26%	62.79%
Vary dynamics	Week 5	25.58%	41.86%	32.57%
	Week 10	11.63%	41.86%	46.51%
Marks part	Week 5	18.60%	13.95%	67.45%
	Week 10	13.95%	11.63%	74.42%
Vary articulation	Week 5	9.31%	34.89%	55.80%
	Week 10	9.31%	30.23%	60.46%
Frustration	Week 5	11.63%	32.57%	55.80%
	Week 10	2.32%	32.57%	65.11%
Silent Fingering	Week 5	11.63%	16.28%	72.10%
	Week 10	2.32%	32.57%	65.11%
Ghosting	Week 5	6.97%	30.23%	62.79%
	Week 10	2.32%	23.26%	74.42%
Alter rhythms	Week 5	2.32%	11.63%	86.05%
	Week 10	2.32%	11.63%	86.05%
Sing, hum, whistle	Week 5	2.32%	25.58%	72.10%
	Week 10	2.32%	4.65%	93.03%

## **Performance Achievement**

Sight-reading and final performances during weeks 5 and 10 were evaluated by two independent judges who rated the execution of each musical example in terms of overall accuracy (including pitch, rhythm, and continuity), degree of hands separate versus hands together playing, and performance completion (measured as the percentage of the piece that was completed in 1 minute). Performance on each of the three evaluation variables (accuracy, hands separate vs. hands together, and performance completion) was coded as “weak” (1), “satisfactory” (2) or “excellent” (3). Initial interjudge reliability was 0.82.

The mean performance achievement scores increased between the week 5 sight-reading session ( $M = 5.95$ ,  $SD = 1.31$ ) and the week 5 performance session ( $M = 7.88$ ,  $SD = 1.24$ ). The mean performance achievement scores also increased between the week 10 sight-reading session ( $M = 6.56$ ,  $SD = 1.15$ ) and the week 10 performance session ( $M = 8.09$ ,  $SD = 0.86$ ). The level of growth during the week 5 treatment/practice session ( $M = 1.93$ ,  $SD = 1.13$ ) (measured as the difference between the sight-reading and final performance score) was higher than the rate of growth during the week 10 treatment ( $M = 1.53$ ,  $SD = 0.97$ ). Standard deviations showed that the scores were least varied during the week 10 final performance ( $SD = 0.86$ ) and most varied during the week 5 sight-reading performances ( $SD = 1.31$ ).

## **Relationships Between Independent Variables & Performance Achievement**

To determine whether technology group affected students' performance achievement, analyses of covariance were used and all assumptions for the test were met. The use of one-way ANCOVAs allowed for initial student sight-reading scores to be

considered a covariate when examining the differences between technology groups on final performance achievement. The results of a one-way ANCOVA indicated that final performance achievement for week 5 was not significantly different with regards to treatment group when controlling for sight-reading achievement;  $F(1, 40) = 0.074, p > .05$ . Similarly, results for the analysis for week 10 were also not significant;  $F(1, 40) = 0.931, p > .05$ . Therefore, it may be concluded that performance achievement scores did not differ significantly for the four technology treatment groups.

To examine possible relationships between students' developmental levels, prior piano experience, and performance achievement, at both week 5 and week 10, two-way ANCOVAs were used. Using week 5 and week 10 growth (as measured by the difference between sight-reading and performance scores in each of those weeks) as the dependent variable allowed for both performance scores to be taken into account. The two-way ANCOVAs also allowed for the combining of two factors (developmental levels and prior piano experience) in a single experiment to explore the main effects of each and their interaction.

All assumptions of the analysis of covariance statistical test were met. For the week 5 analysis, there were significant effects of prior piano experience (ANCOVA:  $F(1, 39) = 4.38, p < .05$ ) and non-significant effects of developmental level ( $F(1, 39) = 2.32, p > .1$ ) on performance growth. The interaction between prior piano experience and developmental level was not significant;  $F(1, 39) = 1.27, p > .1$ .

To further explain these results, one-way ANOVAs were used to isolate the independent variables and sight-reading and final performance outcomes. The results of the ANOVA comparing level 1 and level 3 scores on week 5 sight-reading indicated that

there was no significant difference,  $F(1, 41) = 0.59, p > .05$  (week 5  $M = 5.95, SD = 1.33$ ). However, when comparing final performance achievement after practice, results indicated that level 1 students had significantly higher week 5 final performance scores ( $M = 8.32, SD = 0.97$ ) as compared with level 3 students ( $M = 7.43, SD = 1.33$ );  $F(1, 41) = 6.0195, p < .05$ . The level 3 average was approximately 1 point lower than that of level 1, and included more variation.

The results of the one-way ANOVAs also indicated that prior piano experience was a significant indicator of week 5 sight-reading achievement;  $F(1, 41) = 7.52, p < .01$ . Students who had prior piano experience ( $M = 6.43, SD = 1.31$ ) scored significantly higher than students who had no prior piano experience ( $M = 5.40, SD = 1.07$ ). However, prior piano experience was not a significant indicator of final performance achievement in week 5;  $F(1, 41) = 0.79, p > .05$  (week 5  $M = 7.88, SD = 1.26$ ).

In week 10, there were significant effects of prior piano experience (ANCOVA:  $F(1, 39) = 3.29, p < .1$ ) and non-significant effects of developmental level ( $F(1, 39) = 2.57, p > .1$ ) on growth between sight-reading and performance scores. The interaction between prior piano experience and developmental level was also significant ( $F(1, 39) = 6.01, p < .05$ ). To further explain these results, analyses of individual variables using one-way ANOVAs is included in the following paragraph.

There was no significant relationship between developmental level and sight-reading achievement in week 10;  $F(1, 41) = 0.20, p > .05$  (week 10  $M = 6.56, SD = 1.16$ ). Developmental level also did not significantly affect week 10 final performance scores;  $F(1, 41) = 0.51, p > .05$ . However, prior piano experience was a significant indicator of week 10 sight-reading achievement;  $F(1, 41) = 8.43, p < .05$ . The week 10 sight-reading

achievement level of students with prior experience ( $M = 7.00$ ,  $SD = 1.32$ ) was significantly higher than that of students who had no prior experience ( $M = 6.05$ ,  $SD = 0.59$ ). Prior piano experience was not a significant indicator of final performance achievement in week 10;  $F(1, 41) = 3.08$ ,  $p > .05$  ( $M = 8.09$ ,  $SD = 0.87$ ).

## **Discussion**

### **Technology-Assisted Practice**

The purpose of this study was to explore the effects of technology tools that represent different possibilities for aural modeling and tempo control on piano achievement during in-class practice sessions. No significant differences were found among the technology treatment groups or control group in terms of final performance achievement during the 13.5-minute practice sessions, either in week 5 or week 10. This lack of significant differences between technology groups may be surprising given the strategic implementation of technology that had occurred throughout the entire semester. However, these results are consistent with a previous pilot study that found no significant differences between static and interactive technology tools on student perceptions of performance achievement (Hahn, in press). In addition, these results underscore the importance of ongoing research regarding technology implementation in music education settings. A growing, but still small body of literature suggests that little is known about the instructional strategies that teachers use to facilitate technology-assisted practice (Bauer, Reese, & McAllister, 2003). Systematically assessing teacher actions and student outcomes in a technology implementation environment would help music instructors to understand the complex realities of authentic, practical, and pedagogically excellent technology use (Bauer, 2012, 2016). Researchers and educators may also consider the

impact of previous educational and technology experiences on college students' practice behaviors and achievement outcomes. This study did not include so-called "interactive" apps that claim to replace or supplement the role of a teacher. That is an avenue for future research.

Student choice and technology preferences should also be viewed in the context of these results. Although students in this study were introduced to three different technology tools in their group piano classes, they were randomly assigned to only one of those tools or the control group for the treatment sessions. I observed that most students expressed strong opinions about their research group, either showing excitement when they were assigned their favorite technology tool, or disappointment when they realized that they would be practicing with a tool that was not their favorite, or with no technology at all. The appeal of technology may lead students to focus too much on what the technology does, to the detriment of the music. Therefore, instructors and students implementing technology in the classroom should proceed with caution. By acknowledging student preferences, personal choices, and motivation, instructors may increase the impact of technology in music learning settings.

There is much evidence that aural modeling and tempo control practices assist students in a variety of music learning contexts (Cash, Allen, Simmons, & Duke, 2014; Duke & Pierce, 1991; Henley, 2001; Hewitt, 2001; Morrison, Montemayor, & Wiltshire, 2004; Pierce, 1992; Rosenthal, 1984). However, further research that combines these topics with technology implementation and recommended pedagogical practices is still needed (Bauer, 2012; Bauer, Reese, & McAllister, 2003; Dorfman, 2016). Technology implementation is a relatively new field of study in music education, and given the

scarcity of research in college group piano contexts (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014) continued work in this area seems important. The results of this study indicated that there were no performance achievement differences between students who used a metronome, YouTube, Tempo SlowMo app, or no technology in their piano practice. However, future studies may find significant differences between these groups if individual student differences and preferences are also considered. In addition, the work of Duke, Simmons, & Cash (2009) indicates that the strategies employed by pianists during practice were a better indicator of performance quality than the length of practice or number of practice repetitions. Therefore, addressing the “how” of student practice seems more important than the “how long.” Technology that supplements pedagogically sound practice techniques will likely serve students well.

### **Student Background Differences**

Background experience variables did have a significant impact on students’ sight-reading and final performance achievement during treatment. Of particular interest are the significant differences between level 1 and level 3 students during the week 5 final performance recording. The level 1 students scored significantly higher on this task than their older and more experienced peers. This may suggest that the more difficult curricular and repertoire objectives of the higher-level course outpaced the developmental skill level of those students. Instructors should consider that the fast-paced nature of the collegiate group piano curriculum (in which students progress from beginner to intermediate level over the course of only 1 or 2 years) might not fit the needs of all students. Although music majors enter college with advanced-level skills on their primary instrument, these may not translate to new and unfamiliar instruments such as piano

(Koster, 2010). In addition, students' individual differences may have impacted the level 3 class more than the introductory class. Specific mental and physical challenges (such as performance anxiety or tension) may not impact students in the very early stages of piano study, but might come to the forefront as they progress to more difficult course requirements. Such individual characteristics may account for the significant differences between level 1 and level 3 final performance scores. Future studies can investigate these factors separately or in the context of a framework that describes the complex interactions that affect group piano students' classroom outcomes.

The results of this study also indicated significant differences between students who had prior piano experience and those who did not in the context of week 5 and week 10 sight-reading scores. Although it is logical that more experienced students would score higher on initial sight-reading, it is notable that these differences did not extend to week 5 and 10 final performance scores. This may suggest that short technology-assisted practice sessions are beneficial in helping those students with less experience "catch up" to their more experienced peers. This result should encourage group piano instructors to continue investigating technology implementation and how specific tools may help struggling students in particular. The sight-reading and final performance results also indicate that music majors who already have prior piano experience when they enter college may not find substantial benefit in technology use since they have already developed some piano practice behaviors. However, these students will likely need additional teacher guidance to polish and refine their existing skills. Future studies may explore specific technology for students who do or do not have prior piano experience. In either case, helping students to develop consistent piano practice routines is an important

ongoing consideration for all instructors (Duke, Simmons, & Cash, 2009; Simmons, 2012; Stambaugh, 2011). The pervasive nature of technology in 21<sup>st</sup> century higher education (Whitaker, Orman, & Yarbrough, 2014) may indicate that certain tools still hold potential to level the playing field of individual student differences related to prior piano experience if appropriate technologies and strategies are coordinated.

### **Limitations**

There are several limitations that should be evaluated in the context of this study. The sample size was somewhat small ( $N=43$ ), and it is conceivable that a larger sample of group piano students may yield different results. Because of the varied and representative nature of the current sample, however, it is likely that the results are typical of freshmen and sophomore music majors attending state universities of a similar size. A larger sample from different institutions could provide a broader view of how technology-assisted practice impacts student performance achievement. Another limitation relates to the practice environment itself. Students in the current study participated in two in-class practice sessions. Asking students to use the technology in their authentic practice environments (i.e. in a practice room or at home) may yield different results.

### **Conclusions**

It may be difficult to separate student preferences and background experiences from authentic technology use in order to understand how technology-assisted practice affects performance achievement (Kang, 2018). This consideration is especially relevant in a collegiate setting because music majors enter their degree programs with a variety of background experiences and many preconceptions of how to practice and use technology.

It might be beneficial to explore technology in the context of curriculum alignment across the group piano sequence and the music core, while factoring in a plethora of variables.

There are many factors that affect student achievement. Continued exploration of technology-assisted practice and how specific component tools relate to group piano students' skill development may provide insights that will help instructors design curriculum to improve music major outcomes. Career preparation skills such as fluent piano and technology use are essential for music students and teachers in the 21<sup>st</sup> century.

## **Chapter Five**

### **Summary and Conclusions**

Group piano research has explored valuable curricular topics, including proficiency skills, teaching strategies, and student practice habits, beliefs, and perceptions (Betts & Cassidy, 2000; Cremaschi, 2012; Jutras, 2006; Pike, 2014). However, there is still disagreement about which pedagogical practices assist today's digital native music majors in being most successful in group piano classes. How do individual differences and student adaptation processes affect classroom outcomes? How can technology assist students in developing consistent practice habits? What routines can teachers use to facilitate success in class, in the practice room, and in career applications? The decisions surrounding curricular best practices are complex and involve numerous factors, such as teacher preparation, university resources and administrative support, classroom equipment and technology, and the learning habits and prior background of students.

### **Research Questions and Method**

The purpose of this dissertation was to better understand today's digital native music majors and their needs within the undergraduate group piano curriculum. The following primary research question was used to guide this investigation: How can university-level piano pedagogues best meet the needs of today's digital native undergraduate music majors in group piano classes? I divided this question to create two separate research studies. In the first study, I conducted student interviews with first-semester music majors to address the following: (a) the meaning first-year music majors ascribe to their group piano experience, especially as it pertains to the adaptation process, (b) the habits students develop to succeed in group piano, (c) potential relationships

between student adaptation and measures of intention, meaning, and perception regarding group piano study, and (d) the needs of emerging adults during the process of adjusting to collegiate group piano. For the second study, I conducted a technology-assisted practice experiment and posed these questions: (1) How does the use of technological tools with varied capabilities of providing aural modeling and tempo control features affect collegiate group piano students' achievement in the context of in-class practice sessions? and (2) What are the effects attributable to students' developmental level or prior piano experience on achievement in a technology-assisted practice setting? To answer the primary and individual investigation research questions, I completed a comprehensive review of literature (Chapter Two), a phenomenological study of first-semester group piano students experiencing the collegiate adaptation process (Chapter Three), and an experimental study involving undergraduate music majors' use of technology tools and subsequent group piano achievement and practice behaviors (Chapter Four). The following section highlights major findings from each of these investigations.

### **Summary of Major Findings**

#### **Review of Group Piano Literature**

Although group piano courses remain a key component of most undergraduate degrees in music (College Music Society, 2015; NASM Handbook 2018-2019), there are numerous components of group piano curricula and pedagogical practice research that have not yet been explored with undergraduate music majors (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014). Researchers have previously investigated how proficiency skills such as sight-reading and harmonization (Betts & Cassidy, 2000), student practice habits (Cremaschi, 2012), student beliefs and perceptions (Jutras, 2006), and teaching

strategies (Pike, 2014) have contributed to group piano students' performance achievement and classroom behaviors. Instructors can build upon this existing literature to develop a broad and deep understanding of group piano history, standard practices, and research applicable to classroom outcomes. Educators also must consider how to best meet the needs of contemporary students. Therefore, in the review of literature I summarized what is currently known about group piano at the collegiate level and identified common characteristics of 21<sup>st</sup>-century learners and how they adapt to coursework requirements. The resulting discussion regarding development of 21<sup>st</sup>-century skills, learner characteristics, technology implementation, and how students prepare for the evolving job marketplace provides a snapshot of modern collegiate group piano.

The group piano environment is naturally suited to meet the needs of 21<sup>st</sup>-century learners. Equipping group piano instructors with curricular guidelines based on qualitative and quantitative research may assist them in being most successful reaching the contemporary generation of collegiate students. Teachers may be able to facilitate highly efficient and effective classroom routines if they understand topics related to collegiate student adaptation and adjustment processes. These topics could include digital nativism, TPACK, 21<sup>st</sup>-century skills, emerging adulthood, and other factors that impact student success (see Arnett, 2000, 2004, 2007; Bauer, 2012; P21 Framework, 2019; Prensky, 2001). Students would likely benefit from "career-ready," hands-on piano practice instruction in their degree programs. Enhanced piano fluency may result from experiences in which music majors are able to apply the skills and strategies that they have learned in group piano coursework to "on-the-job" tasks.

## **Phenomenological Study of Collegiate Group Piano Adaptation**

To investigate group piano students' experiences during the college adaptation process, I interviewed first-semester music majors at a large, public research institution in the Midwest region of the United States. Respondents ( $N = 6$ ) were enrolled in group piano level 1 at the time of data collection and were selected for this research by criterion sampling (Creswell, 2007). The practice skills required for success in group piano and the students' diverse backgrounds and first-semester status ensured that this sample would yield an array of perspectives regarding the phenomenon of collegiate adaptation. By the analysis of the 6<sup>th</sup> participant's materials I found that no new themes or insights were represented (i.e. theoretical saturation had been reached). Participants were recruited through the group piano classes, and the purposeful sample represented the diversity of music majors enrolled in coursework at the time of this study. Trustworthiness was established through member checks of the interview transcripts and casual conversations to further explore student perspectives after the initial interviews were completed. Outside reviewers also checked the data coding and themes.

Five themes emerged, which describe the essence of collegiate adaptation for music majors enrolled in group piano level 1: Preparedness, Motivation, Priorities and Expectations, Support Systems, and Accomplishment/Empowerment. Although the students varied in musical background, they shared many common beliefs and experiences regarding preparedness for college. Findings indicate that participants viewed piano as a valuable career skill and an opportunity to develop relationships with their peers. Many of the struggles that students faced in group piano related to their high school experiences (or lack of experiences). Some students demonstrated outlooks that

were optimistic and consistent with a growth mindset, although negative self-views were also evident in several responses. Many of the codes that contributed to the final analysis overlapped. It is clear from this study that how students prepare, motivate themselves, and define personal priorities and expectations is impacted by their support systems. Feelings of accomplishment and empowerment resulted from feelings of balance and comfort related to the other themes. The five themes also aligned with the Intention, Meaning, and Perception model of cognitive adaptation as described in existing literature (Derakhshanrad, Piven, & Zeynalzadeh Ghoochani, 2017; Derakhshanrad & Piven, 2018; Haltiwanger, Lazzarini, & Nazeran, 2007).

Student interviews revealed that motivation and procrastination issues were closely linked to habits from high school, as well as each individual's ability to self-assess progress. The value of group piano for "real-life" applications was often mentioned, but several students provided only vague examples of how piano skills may be used in their future careers. Student priorities and expectations in college were also reliant on past experiences and all participants focused in some way on time management. Adaptation exhaustion impacted students' priorities and contributed to less-than-ideal practice and homework habits. A few students tried to overcome obstacles by relying on support systems outside of campus (e.g. family and friends from high school), while the majority built new support systems with their college peers. Most importantly, students were motivated to achieve at a higher level when they were able to accomplish short tasks on a regular basis. The feelings of empowerment that resulted from completing an assignment or practice module often led to more consistent practice and subsequent higher achievement.

The five themes that emerged from this study were largely consistent with previous literature. The challenges faced by these music majors during their college adaptation period aligned with the challenges described by other college students (Karp, 2011; Lehmann, 2014). All of the participants recognized the importance of adopting productive educational habits (Credé & Niehorster, 2012), and findings from this study and existing literature indicate that there is a strong relationship between achievement motivation, optimism, and self-esteem (Hermans, 1970; Pritchard, Wilson, & Yamnitz, 2007). In essence, the experience of collegiate adaptation for music majors in group piano level 1 is best characterized by the complex interactions of student preparation, motivation, priorities and expectations, support systems, and accomplishment/empowerment. These five themes contributed to students' success despite individual differences. The common experience for the six participants was a search for meaning and purpose within piano study that coincided with their college adjustment period.

### **Experimental Study of Technology-Assisted Practice in Group Piano**

I investigated the effects of technology tools representing different possibilities for aural modeling and tempo control on group piano student achievement during in-class practice sessions. Four comparable groups of level 1 and level 3 students ( $N=43$ ) participated in this experiment. Each group completed two technology-assisted practice sessions (during weeks 5 and 10 of the semester). During these practice sessions, students sight-read an unfamiliar piece of music and recorded their sight-reading, practiced that same piece of music for 13.5 minutes with their assigned technology (control, metronome, YouTube, or Tempo SlowMo), and then recorded a final performance. Two

expert judges rated the sight-reading and final performance recordings using a multidimensional assessment rubric, based on that of Ciorba & Smith (2009). Students also self-reported their practice behaviors, goals, and demographic information using pre-test and post-test surveys. No significant differences were found among the technology treatment groups or control group in terms of final performance achievement (when sight-reading scores were considered a covariate), either in week 5 or week 10.

Background experience variables (developmental level and prior piano experience) did have a significant impact on students' sight-reading and final performance achievement scores. A one-way analysis of variance revealed that level 1 students scored significantly higher on week 5 final performance recordings than their level 3 peers. Another one-way ANOVA indicated that students who had prior piano experiences scored higher than their non-experienced peers on initial sight-reading in weeks 5 and 10. However, there were not any significant differences between those students who had prior piano experiences and those who did not in the context of week 5 and 10 final performance achievement scores.

### **Discussion**

The investigations in this dissertation were conducted to better understand the needs of today's digital native music majors within the undergraduate group piano curriculum. Through the three investigations, I sought to answer my primary research question in multiple ways. The experiences of music majors in the group piano sequence seem to reveal common trends while also highlighting the impact of individual differences on student success. Instructors should be well versed in research regarding effective practice habits and classroom routines for undergraduate students, as well as

literature describing the unique characteristics of this age group. However, teachers can ultimately best reach students by attending to individual differences and adapting existing materials and methods to ensure that everyone has the tools to succeed.

### **Implications and Suggestions for Group Piano Teachers**

Several challenges were common to the college adaptation experiences of all participants. Given these commonalities, teachers may find creative solutions to assist all students during their adjustment to group piano. In order to address challenges related to motivation, instructors should make explicit how and why students need piano skills. Highlighting the value of piano skills in a variety of careers may encourage students to prioritize their piano practice and coursework requirements. Pairing freshmen with junior or senior mentors may help new students to see how piano skills apply to upper level courses such as conducting and rehearsal techniques. In addition, interviewing program alumni, elementary, middle, and high school music teachers, or current applied instructors may help students to see the “big picture” of how piano will affect their professional career plans. College students value choice and options in their coursework, and group piano projects can facilitate opportunities for students to explore individual interests (including specific styles or genres of music, different “gig” settings, and other piano applications outside of traditional group piano textbooks). Instructors should address motivation, as it is likely to impact other adaptation challenges such as procrastination, time management, preparation for class, priorities, and expectations. This investigation did not explore student differences in physical coordination during the adaptation process, but given the precise technical demands of piano playing, this may be a valuable avenue for further research.

Results from the phenomenological adaptation study indicated that students' high school music background heavily influenced their college experiences, and that views of self and others were in some ways defined by existing beliefs and routines. Perhaps those students who have an introduction to music major life in high school (through Advanced Placement courses, university outreach programs, family, friends, teachers, counselors, etc.) may be more ready to face the complex challenges of collegiate music study. Today's students are likely to benefit from preparation activities that address the broader demands of college adjustment for music majors, in addition to the specific technical demands of piano playing. For students who have not had an introduction to music major life in high school, it may be difficult to complete an undergraduate music degree in the traditional four years. However, teachers and advisors can help students overcome the challenges associated with limited prior experiences by offering outreach programs in local public high schools, expanded summer orientation programs for new music majors, and hands-on, detailed degree planning so that students are provided with the resources to succeed despite individual differences.

How students receive grades and feedback in group piano courses is another important topic for further consideration. The summary statements participants wrote at the end of the semester for the adaptation study indicated that they felt motivated by "getting good grades." But, in their prior interviews, feelings of accomplishment and/or the desire to avoid disappointing members of their support system were the factors most often mentioned in the context of student priorities and motivation. The fact that undergraduate music majors were not overly concerned with grades during the semester may suggest that students were unaware of their grades, and thus their progress. Teachers

might need to assist and remind students to track their grades from week to week. Instructors may also consider if current grading systems are the most effective means of facilitating feedback, motivation, and support for students in group piano. Self-assessment and peer-assessment activities may provide valuable opportunities for students to reflect on piano fluency, progress, and specific goals. Communicating with students regarding what is being graded is also necessary. Daily grades, quizzes, exams, and projects should all be graded according to clear policies and standards so that grading is not a mysterious or confusing process. Most importantly, grades should always be accompanied with detailed feedback so that students know how they can improve. Group piano instructors should find it encouraging, though, that students were far more concerned with the value of group piano and their ability to succeed instead of limiting themselves to the extrinsic motivation of grades.

In Chapter Four, I experimented with the use of various technological tools to provide aural modeling and tempo control features for piano practice. Although the different technologies used did not affect post-test results for piano performance, the findings may have been influenced by student technology preferences. Before utilizing various technology tools in class, group piano instructors should consider how each tool meets specific student needs. Presenting numerous technologies with accompanying high-quality pedagogical practice strategies and allowing students to choose their own tools based on personal preference may be the best plan for successful implementation. Although teachers do not have to be experts in every single technology, they should be equipped with the knowledge and skills to assist students with troubleshooting for both technological and pedagogical issues. Technology is not a magical cure to solve student

problems, but when combined with thoughtful curricular planning, various technologies may assist students and teachers in developing successful practice habits.

Nearly all of the group piano students (93.93%) who participated in my technology-assisted practice experiment indicated that technology helped them in some way. Technology likely has a positive effect on student perceptions and feelings of accomplishment, even if those perceptions do not translate to actual differences in achievement or more effective practice behaviors. Digital tools may assist students in building confidence, but they could also act as a distraction when students are working to manage their practice time in order to maximize achievement. Teachers should discuss these issues candidly with students to ensure that their technology use is most effective. Providing students with research results pertaining to the specific technology tools used in group piano may help them to understand how such tools can impact practice.

Background experience variables did have a significant impact on students' performance achievement in this study. When considering the impact of developmental level on performance achievement, exploring the specific curricular demands of each course in the group piano sequence is essential. The fast-paced nature of the curriculum for music majors may not fit the needs of all students. Although students generally succeed in entry-level group piano courses, piano pedagogy faculty need to consider if subsequent levels of the curriculum progress at a pace that is reasonable considering the many curricular demands and time constraints placed on the typical music major. Educators may view the prior piano experience finding as encouraging, because it suggests that although more experienced students score higher on initial sight-reading activities, less experienced students are able to catch up to their peers in a short amount

of time. Future studies may investigate how specific technology tools can be assigned to match individual student differences so that the needs of all students are met in a dynamic group piano environment.

Expert piano pedagogues agree that additional research is needed to fully understand the complexities of teaching group piano (Betts & Cassidy, 2000; Cremaschi, 2012; Pike, 2014). Perhaps as Pike (2014) suggested, group piano instructors have relied on anecdotal and experience-based evidence to guide their curricular and pedagogical decisions, but additional empirical studies are needed to contextualize and support best practices. Understanding the history and standard practices of collegiate group piano as well as the specific needs of today's learners might help instructors navigate the difficult task of preparing students for 21<sup>st</sup>-century careers. Given the many complex factors that impact student success, music educators may consider the following questions: To what extent is group piano instruction in its current form relevant to today's university curriculum or are these courses simply meeting the bare minimum of National Association of Schools of Music (NASM) standards? If group piano courses are indeed valuable, how can research findings be used to support relevant pedagogy for the 21<sup>st</sup> century? How can course goals be communicated to students to help them plan ahead for a variety of career applications? Are there any common obstacles in group piano teaching that necessitate curricular change? I suggest that group piano instructors collaborate with other collegiate music faculty to explore comprehensive and cohesive core curriculum options that prepare students for the skills they will need in the 21<sup>st</sup>-century workplace. It may also be beneficial to reach out to alumni, industry experts, and other musicians outside of academia to assist students in developing career-minded practice skills early on

in their degree programs. Additionally, it is reasonable to believe that group piano students require more individualized guidance both during and outside of class. Future researchers might consider expanding the present studies into longitudinal investigations in order to understand how individual student careers are affected by group piano coursework. Following students from high school through college and on to a variety of careers in music may contextualize research findings regarding collegiate adaptation and technology-assisted practice. A longitudinal view may also help group piano instructors to better understand and cater to individual student needs.

### **Limitations**

Several limitations with these investigations should be noted. First, I recognize that the experiences described by the small sample of participants in each study are not representative of all music majors. However, these initial explorations did provide a thick, rich description of the adaptation phenomenon, as well as a “first-look” at technology-assisted practice in group piano that can be used as a basis for future research. Larger numbers of participants in both qualitative and quantitative research studies of group piano music majors are needed to further explore this core course within the collegiate curriculum. Authors of future studies might investigate other aspects of group piano curriculum, sequence length, group piano applications in a variety of music careers, and how course content is utilized in different types of degree programs at different institutions.

The way the technology was implemented in the Chapter 4 experiment is another limitation. For the sake of control, participants were randomly assigned to one of the four treatment groups. Perhaps allowing students to choose their own group (based on

personal preferences and past experiences) would have a noticeable impact on student achievement and practice behaviors. Students may also need the freedom to explore and use multiple technologies in their piano practice. In addition, those participants who had prior piano experience before entering college may respond better to teacher guidance compared to digital/technology assistance. Teacher-assisted practice may provide an additional group to study alongside technology-assisted practice groups.

The use of in-class practice sessions in this study also warrants caution regarding the generalizability of the results. Investigating how students use technology in their authentic practice environments (i.e. in a practice room or at home) may yield different outcomes. Group piano instructors should consider how to demonstrate practice strategies that apply in many different contexts. Such contextual planning/teaching could include sight-reading and score-reading activities that are useful for music educators, performers, therapists, and other careers. Combining technology implementation with creative endeavors such as harmonization, improvisation, collaboration, and individualized student projects may offer flexibility for students as they prepare for a job market that increasingly values communication, innovation, and adaptability.

### **Conclusions**

This dissertation was designed to investigate how university-level piano pedagogues can best meet the needs of today's digital native music majors in group piano classes. Based on the data collected, there seems to be a need for further research in group piano contexts in order to fully understand the complex relationship between existing standards, student needs, and applications of digital technology. Furthermore, the results of both the qualitative and quantitative investigations highlighted the need for 21<sup>st</sup>-

century skill development in group piano. Instructors should encourage and promote this career-minded view of the curriculum with activities that are directly applicable to 21<sup>st</sup>-century jobs. Group piano instructors interact with the majority of music majors, no matter which specific major they may be pursuing. Given this impactful position, there are several questions that may assist instructors in reaching future performers, composers, teachers, and therapists. For example, what is the most efficient balance of group and individual work time in piano classes? What skills will students utilize most in their future careers? What practice routines will serve students (and their own future students) well after graduation? The field of group piano would likely benefit from large-scale examination of these and other topics.

Students' prior experiences and developmental level significantly impacted their performance achievement in the technology experiment conducted here. The phenomenological analysis conducted revealed that students were aware of their own individual differences and cognizant of how high school habits and routines impacted the adaptation process. Viewing these results collectively, further research to clarify what specific factors, such as teacher accommodations, technology implementation, and 21<sup>st</sup>-century skill development, best meet the needs of today's digital native students who come from diverse backgrounds seems warranted. Future studies may help educators to explore high standards for promoting effective technology-assisted practice routines for students. Also, the majority of group piano investigations in existing literature focus on student and teacher perspectives (Betts & Cassidy, 2000; Cremaschi, 2012; Jutras, 2006; Pike, 2014). Perhaps expanding these investigations to include the perspectives of student family members, support systems, and those who assist with student college preparation

(teachers, guidance counselors, etc.) could help fill gaps in the research about group piano.

Group piano activities and environments are conducive to the development of students' 21<sup>st</sup>-century skills, including creativity, critical thinking, communication, and collaboration. To accomplish this, educators may need to facilitate flexible classroom practices to ensure that students with individual priorities, skills, adaptation strategies and technology preferences develop the tools they need to be successful. The findings from the studies reported here can help instructors and researchers further their understanding of characteristics of digital native undergraduate music majors, and may serve as a basis for refining current teaching practices and developing new strategies designed to most effectively meet contemporary students' learning and adaptation needs.

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## Appendix A



Rachel D. Hahn  
Ph.D. Candidate in Music Education  
College of Arts & Science, School of Music  
University of Missouri - Columbia  
xxxx@xxxxxxx.edu

Dear Student:

I am a doctoral candidate in music education under the direction of Dr. Wendy Sims at the University of Missouri-Columbia. I am conducting a research study to examine how non-keyboard music majors adapt or acculturate to the new demands of music coursework in college, specifically how they adapt to group piano study. I am writing to ask you to assist by being a participant in this study.

You will be asked to participate in an audio recorded interview. I will ask you about your personal experiences in group piano. I would also like to be able to contact you with follow up questions if necessary. The data you provide will be used in my dissertation, and may also be submitted as an article for publication in a music education research journal. I would appreciate your full participation.

This project will be used only for educational purposes. To share the data you provide will enrich music educator's understanding of how group piano students adapt to college courses and assist us as we develop instructional methods. Your participation would be greatly appreciated.

Permitting your interview or focus group recordings and the accompanying transcripts to be used in this study is completely voluntary, and you are free to request that your data be excluded from the project without suffering any consequences. Your assignment or course grade will not be affected in any way by your decision. All records and information collected in this study will be confidential. Please be assured that I will not disclose any individual's results or identity, or any identifying information in any format.

Thank you for considering this request. If you have any questions regarding the study, please contact me, Rachel Hahn, at xxxx@xxxxxxx.edu. You may also contact my faculty advisor, Dr. Wendy Sims, at xxxx@xxxxxxx.edu. If you have questions regarding your rights as a participant in research, please feel free to contact the Campus IRB.

Sincerely,

Rachel D. Hahn

I agree for my interview recordings and transcripts to be used for the purposes stated above.

Participant's Name \_\_\_\_\_

Participant's Signature \_\_\_\_\_ Date \_\_\_\_\_

## Appendix B



**Institutional Review Board**  
University of Missouri-Columbia  
FWA Number: 0002876  
IRB Registration Numbers: 00000731, 00009014

482 McReynolds Hall  
Columbia, MO 65211  
573-882-3181  
irb@missouri.edu

October 08, 2018

Principal Investigator: Rachel Danielle Hahn  
Department: School of Music

Your IRB Application to project entitled Adaptation Processes in Undergraduate Group Piano: Investigating Music Major Acculturation was reviewed and approved by the MU Institutional Review Board according to the terms and conditions described below:

IRB Project Number	2012752
IRB Review Number	241705
Initial Application Approval Date	October 08, 2018
IRB Expiration Date	October 08, 2019
Level of Review	Exempt
Project Status	Active - Exempt
Exempt Categories	45 CFR 46.101b(1)
Risk Level	Minimal Risk

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

1. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
2. All changes must be IRB approved prior to implementation utilizing the Exempt Amendment Form.
3. The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date to keep the study active or to close it.
4. Maintain all research records for a period of seven years from the project completion date.

If you have any questions, please contact the IRB at 573-882-3181 or irb@missouri.edu.

Thank you,  
MU Institutional Review Board

## Appendix C

Qualitative Dissertation Study: Interview Protocol (citations in parentheses indicate specific literature upon which the question was based)

Time & Date: TBD

Place: Piano Lab Classroom or Group Piano Coordinator's Office

**Briefing:** Review consent form, confidentiality assurances, and introduction to the research study. Turn on recording once the participant has signed the consent form.

### Demographic Questions

1. Where are you from? Where did you go to high school?
2. Tell me about your music background.
  - a. What instruments do you play?
  - b. How long have you taken lessons or were you self-taught?
  - c. What music classes did you take in high school?
  - d. Do any of your family members have music degrees or work as music teachers?
  - e. What's your current major?

### Intention Questions

1. Let's talk about your first semester of college. How have you felt as you adjust to college life? (Arnett, 2007; Baker & Siryk, 1989; Deci & Ryan, 2000; Pritchard, Wilson, & Yamnitz, 2007)
  - a. How have you balanced your academic and social life? (Karp, 2011)
  - b. What (if anything) about the college transition has been stressful? (Christian, 2007; Pritchard, Wilson, & Yamnitz, 2007).
  - c. Tell me about your college schedule. What is a typical day like and how do you manage your time? (Cooper, 2001)
  - d. Who has helped you work through the challenges of the college transition? (Gavin, 2016; Isbell, 2008)
2. Now let's also talk about your transition to group piano. How have your prior music experiences helped you in this class? (Derakhshanrad & Piven, 2018)
3. Adapting to any new experience requires that you find the most productive and successful habits. Can you tell me about the habits you've developed to succeed in group piano and how you've felt as you adapted to the class? (Credé & Niehorster, 2012)
4. What would you tell an incoming freshman about achieving a smooth transition to group piano and college? What do you wish that someone had told you at the start of the semester? (Credé & Niehorster, 2012; Pritchard, Wilson, & Yamnitz, 2007)
5. Let's talk about the types of activities that happen in your group piano class. Can you describe what goes on in a typical class?
6. What aspect of group piano do you feel the least secure in?
  - a. What do you do to prepare for that challenge? (Hermans, 1970)

### **Meaning Questions**

1. Let's talk about the purpose of group piano in college. Why do you think all music majors need piano skills? (Steger, Frazier, Oishi, & Kaler, 2006)
2. How might you use piano skills in your future career? (Steger, Frazier, Oishi, & Kaler, 2006)
3. How do you think your current class helps you meet these future goals?

### **Perception Questions**

1. Let's talk about how group piano compares to your other music and gen ed classes. How much time do you spend preparing for this class versus your other classes?
  - a. How do you feel about your quality of work in this class compared to other classes? (Derakhshanrad & Piven, 2018; Pritchard, Wilson, & Yamnitz, 2007)
2. Tell me about the social aspect of group piano. What has it been like interacting with your teacher and peers in class?
3. Let's talk about what you enjoy in group piano. What has been fun for you? (Pritchard, Wilson, & Yamnitz, 2007)
4. Finally, what can instructors do to help you achieve at a higher level? (Cooper, 2001; Jutras, 2006; Pritchard, Wilson, & Yamnitz, 2007)

**Debriefing:** Thank you for participating in this interview. I want to assure you again that your responses will be kept completely confidential. Is there anything else that you think I should know in regards to your group piano study? May I contact you for a follow-up interview if I have questions about your responses?

### **Researcher Writes Reflections**

## Appendix D

Dear [Student's Name],

Thank you for participating in my research interview earlier this semester. The ideas you shared are crucial to my research and I greatly appreciate you taking time out of your busy schedule to meet with me.

I am now in the process of reviewing all of the data and have two follow-up requests for you.

1. Please read through the attached transcript of our interview and let me know if there is anything you would change. I want to make sure that this transcript accurately reflects your thoughts and feelings.
2. Now that the semester has come to an end, please write 2 or 3 sentences as a "summary statement" that describes your feelings toward the adaptation process. This statement should reflect your feelings, whether positive or negative, as you look back on how you adapted and succeeded in group piano level 1 this semester. Reply to this email with your summary statement in the body of the email. Don't think about it too much (I don't want this to be a burdensome task), but just jot down whatever thoughts come to mind.

Thank you again for your participation in this study. I greatly appreciate it and hope that my research findings help group piano instructors improve their teaching in response to the challenges faced by students during their transition to college.

RH

**Rachel Hahn, NCTM**  
PhD Candidate & Instructor in Piano  
Doctor of Philosophy, Music Education  
University of Missouri

## Appendix E

### Qualitative Dissertation Study: Data Coding

#### *Narrow Units of Analysis Based on Existing Literature*

- “Autonomy, competence, and relatedness” (Deci & Ryan, 2000, 2002).
- “Brain readiness” (Derakhshanrad & Piven, 2018 p. 3).
- IMP Framework: Intention – state of brain readiness that motivates one to fulfill his or her needs and desires. Meaning – the ability to assimilate meaning following one’s performance. Perception – others’ attitudes, feelings, and beliefs that contribute to your own self-perceived concept (Derakhshanrad et al., 2017).
- “Purpose and meaning” vs. “searching for meaning” (Steger, Frazier, Oishi, & Kaler, 2006, p. 14).
- “Perfectionism” (Pritchard, Wilson, & Yamnitz, 2007)
- “Academic success:” linked to developing new relationships, navigating campus, etc.” (Karp, 2011), peer support (Gavin, 2016; Isbell, 2008), individually-tailored interventions, (Clark & Cundiff, 2011), frequent and specific praise (Cooper, 2001), and meeting students’ needs (Jutras, 2006).
- “Achievement motivation” (Hermans, 1970, p. 4; Pritchard, Wilson, & Yamnitz, 2007).

#### *Initial Codes*

- Technology addiction
- Time management
- Priorities
- Stress/Worrying about college before arrival
- Transitions – changes – worry
- Worry being unnecessary
- Amazement at “busyness” and pace of college schedule. – scheduling conflicts
- Stress of moving between buildings on campus
- Wishing something beyond student control would change
- Comparing music majors to other majors on campus
- Awareness of how music is different or “other”
- Making time for relaxation, social, friends
- Figuring out ways to make the most of resources
- Blocks of work time
- Piano specific challenges – hand – eye coordination
- Comparisons between piano and primary instrument and piano and theory
- Acknowledged difficulty
- Coping strategy – taking breaks from practice/homework
- Motivation = Positive outlook = enjoyment
- Life Balance – social versus or with music
- Self-reflection/awareness
- Support system of people – home – new home – new friends, old friends
- Adaptation Exhaustion

- Sense of belonging
- Negative self-assessment – “I can’t” versus “I’m still working on”
- Awareness of use of background knowledge in college adaptation
- Comprehensive musicianship
- Student individuality/unique needs
- Mental preparedness – finding a beneficial mindset
- Acquiring Study skills
- Differences between high school and college
- Respect - Appreciation for individual differences
- Staying on top of assignments – consistency
- Addressing physical health
- View of what we do in group piano
- Overwhelmed feeling
- Accomplishment/confidence/challenge/opportunities for hearing success
- Limited practice strategies
- Acknowledgement of how little they knew to begin with – related to prolonged difficulty/hardship
- Value of piano skills – group piano
- Value of piano – related to general musicianship, practicality
- Awareness of negative views of group piano amongst peers
- Relevance of group piano
- Correlation between past experience, practice time, and quality of work
- Positive social experience – teacher and student qualities
- Teacher traits clear vs. unclear directions
- Negative teacher traits – private shaming/yikes moment
- Negative teacher traits – public shaming
- Positive teacher traits – offering redo, professionalism
- Positive teacher traits – understanding, not shaming
- Sense of “don’t know what I don’t know”
- Music at home
- New identity
- Peers as accountability partners
- Logical progression
- Asking for help
- Expectations
- Student as teacher
- Small group/pair work
- Self-consciousness playing in front of others

## *Categorizing Codes into Themes*

- **Preparedness –**
  - Mental preparedness
  - Stress/worrying about college before arrival
  - Comparisons between music majors and other majors
  - Sense of “don’t know what I don’t know”
  - Amazement at “busyness” and pace of college schedule. – scheduling conflicts
  - Stress of moving between buildings on campus
  - Wishing something beyond student control would change
  - Comparing music majors to other majors on campus
  - Awareness of how music is different or “other”
  - Awareness of use of background knowledge in college adaptation
  - Mental preparedness – finding a beneficial mindset
  - Acquiring Study skills
  - Differences between high school and college
  - Acknowledgement of how little they knew to begin with – related to prolonged difficulty/hardship
  - Correlation between past experience, practice time, and quality of work
  - Sense of “don’t know what I don’t know”
  - **Existing Literature**
    - “Autonomy, competence, and relatedness” (Deci & Ryan, 2000, 2002).
    - “Brain readiness” (Derakhshanrad & Piven, 2018 p. 3)
    - IMP Framework – Intention – state of brain readiness that motivates one to fulfill his or her needs and desires (Derakhshanrad et al., 2017).
- **Motivation**
  - Largely related to what they knew in high school
  - Motivation not really linked to grades until the end of the semester, but to personal expectations and the expectations of others.
  - Self-assessment: “I can’t v. I’m still working on” – growth attitude
  - Largely linked to enjoyment, and sense of accomplishment.
  - Motivation = Positive outlook = enjoyment
  - Life Balance – social versus or with music
  - Self-reflection/awareness
  - View of what we do in group piano
  - Value of piano skills – group piano
  - Value of piano – related to general musicianship, practicality
  - Awareness of negative views of group piano amongst peers
  - Relevance of group piano
  - **Existing Literature**
    - “Purpose and meaning” vs. “searching for meaning” (Steger, Frazier, Oishi, & Kaler, 2006 p. 14).

- IMP Framework – Intention – the state of brain readiness that motivates one to fulfill his or her needs and desires (Derakhshanrad et al., 2017).
- **Priorities & Expectations**
  - Time management
  - Priorities based on previous life experiences – recognizing need for a job, need to succeed in school, need to make friends, etc.
  - Health
  - Overwhelmed feeling/Adaptation exhaustion – lots of mention of the “lots of stuff I have to do” in college, but very little mention of specific strategies for how to deal with it. Clearly a major part of the college transition that students are still working on.
  - Time management
  - Priorities
  - Making time for relaxation, social, friends
  - Figuring out ways to make the most of resources
  - Blocks of work time
  - Coping strategy – taking breaks from practice/homework
  - Staying on top of assignments - consistency
  - Addressing physical health
  - Overwhelmed feeling
  - Logical progression
  - Expectations
  - **Existing Literature**
    - “Perfectionism” (Pritchard, Wilson, & Yamnitz, 2007)
    - IMP Framework – Meaning – the ability to assimilate meaning following one’s performance (Derakhshanrad et al., 2017).
- **Support Systems**
  - On v. off campus
  - Informal versus formal
  - Not much mention of “asking for help”
  - Peers as accountability partners
  - Support system of people – home – new home – new friends, old friends
  - Sense of belonging
  - Student individuality/unique needs
  - Respect - Appreciation for individual differences
  - Limited practice strategies
  - Positive social experience – teacher and student qualities
  - Teacher traits clear vs. unclear directions
  - Negative teacher traits – private shaming/yikes moment
  - Negative teacher traits – public shaming
  - Positive teacher traits – offering redo, professionalism
  - Positive teacher traits – understanding, not shaming
  - Peers as accountability partners
  - Asking for help

- Student as teacher
- Small group/pair work
- Self-consciousness playing in front of others
- **Existing Literature**
  - “Academic success:” linked to developing new relationships, navigating campus, etc.” (Karp, 2011), peer support, (Gavin, 2016; Isbell, 2008), individually-tailored interventions (Clark & Cundiff, 2011), frequent and specific praise (Cooper, 2001), and meeting students’ personal needs (Jutras, 2006).
  - IMP Framework – Perception – others’ attitudes, feelings, and beliefs that contribute to your own self-perceived concept (Derakhshanrad et al., 2017).
- **Accomplishment & Empowerment**
  - Need to hear success. Make accomplishment visible in every class.
  - Fosters sense of confidence and belonging
  - Challenges must be reasonable, but motivating.
  - Piano specific challenges – hand – eye coordination
  - Comparisons between piano and primary instrument and piano and theory
  - Acknowledged difficulty
  - Comprehensive musicianship
  - Accomplishment/confidence/challenge/opportunities for hearing success
  - New identity
  - **Existing Literature**
    - “Achievement motivation” (Hermans, 1970 p. 4; Pritchard, Wilson, & Yamnitz, 2007)
    - IMP Framework – Meaning & Perception – connection between assimilating meaning of your performance and your own self-identity. Also one’s attitude, feelings, and beliefs that form one’s self-perceived concept (Derakhshanrad et al., 2017).

*Written Student Statements from the End of the Semester*

**Bailey:** I’m really glad that I had the opportunity to improve my piano skills. I feel as though I did well in the class, but for exams I prepared well but did poorly based on nerves and so that lowered my grade in the end. I just need to work on performing my material in front of the instructors but overall I’m happy with what I accomplished in my piano class.

- Themes: Motivation (grades), priorities and expectations (expect to do better in the future), and accomplishment/empowerment (content/happy with what was accomplished).

**Tim:** This semester was rough and I felt overwhelmed in a lot of my classes. But I definitely improved in piano and I think that I can do better now that I know what college is like. Staying on top of assignments was definitely by biggest challenge, but without marching band in the spring I should be able to prepare myself better for classes.

- Themes: Preparedness (planning ahead and staying on top of assignments) and priorities and expectations (prioritizing piano now that band is over for the year).

**Cody:** This semester was really great for group piano. I adapted fairly well and pretty quickly I would say. My success in there is due to practice and all the help [my instructor] provided for myself. I do hope to continue growing my skills in piano thanks to the ones that have been provided to me already. It was such a great experience. I hope future students have the same opportunity as I did in Group Piano 1. I'm glad I was able to help you with your dissertation (I think that's how it is spelled). Thank you for letting me be a part of it!

- Themes: Motivation (growing skills in future), priorities and expectations (getting along with others and reaching personal goals), support systems (instructor), and accomplishment/empowerment (hope that future students experience the same success and opportunities).

**Rebecca:** I enjoy coming to group piano because it doesn't stress me out like some of my other classes. But I feel like I could do better in this class if I had more time to work by myself at my own pace. I adapted well to the course requirements, but I think I could accomplish more in the future.

- Themes: Motivation (class isn't stressful), priorities and expectations (I could be doing more), and accomplishment/empowerment (I can do more if given the chance to work on my own).

**Hannah:** I feel I have done an okay job of adapting to Group Piano. I think I definitely have a better idea of the kind of prep I need to be doing to be successful in this class. This semester, my grades were not quite where I wanted them to be in this class, but I hope that, with what I've learned this semester, I'll be able to be as successful as I want to be going forward.

- Themes: Preparedness (what she needs to do to be successful), motivation (earning better grades), priorities and expectations (have been adjusted based on what she now knows about this class), accomplishment and empowerment (hope that she now has tools to be more successful next semester).

**Matt:** The transition from high school to college was hard, but it's definitely worth doing. Group piano was a nice stress reliever for me though. Being able to start playing an instrument I played when I was younger really helped me step back and look at everything else as a learning process I could understand.

- Themes: Preparedness (hard transition, maybe harder than expected), motivation (stress relief), priorities and expectations (using group piano as a learning opportunity to help guide learning in other classes), and accomplishment (that this endeavor was worth doing).

## Appendix F



Rachel D. Hahn  
Ph.D. Candidate in Music Education  
College of Arts & Science, School of Music  
University of Missouri - Columbia  
xxxx@xxxxxxx.edu

Dear Student:

I am a doctoral candidate in music education under the direction of Dr. Wendy Sims at the University of Missouri-Columbia. I am conducting a research study to examine the effect of aural model and tempo control tools in technology-assisted piano practice. I am writing to ask you to assist by being a participant in this study.

You will be asked to participate in technology-assisted piano practice, record your playing, and complete questionnaires to describe your experiences. The data you provide will be used in my dissertation, and may also be submitted as an article for publication in a music education research journal. Most importantly, this study is also designed to benefit you and help prepare you for our upcoming exam. I would appreciate your full participation.

This project will be used only for educational purposes. To share the data you provide will enrich music educator's understanding of how group piano students practice new music and assist us as we develop instructional methods. Your participation would be greatly appreciated.

Permitting your questionnaire responses to be used in this study is completely voluntary, and you are free to request that your data be excluded from the project without suffering any consequences. Your assignment or course grade will not be affected in any way by your decision.

All records and information collected in this study will be confidential. Piano audio recordings will be shared with expert judges during the scoring process. Please be assured that I will not disclose any individual's results or identity, or any identifying information in any format.

Thank you for considering this request. If you have any questions regarding the study, please contact me, Rachel Hahn, at xxxx@xxxxxxx.edu. You may also contact my faculty advisor, Dr. Wendy Sims, at xxxx@xxxxxxx.edu. If you have questions regarding your rights as a participant in research, please feel free to contact the Campus Institutional Review Board at (xxx) xxx-xxxx.

Sincerely,

Rachel D. Hahn

I agree for my questionnaire answers and piano audio recordings to be used for the purposes stated above.

Participant's Name \_\_\_\_\_

Participant's Signature \_\_\_\_\_ Date \_\_\_\_\_

## Appendix G



**Institutional Review Board**  
**University of Missouri-Columbia**  
FWA Number: 0002876  
IRB Registration Numbers: 00000731, 00009014

482 McReynolds Hall  
Columbia, MO 65211  
573-882-3181  
irb@missouri.edu

September 14, 2018

Principal Investigator: Rachel Danielle Hahn  
Department: School of Music

Your IRB Application to project entitled Effect of Aural Model and Tempo Control in Technology-Assisted Practice: A Study of Collegiate Group Piano Student Practice Behaviors and Performance Achievement was reviewed and approved by the MU Institutional Review Board according to the terms and conditions described below:

IRB Project Number	2012519
IRB Review Number	241091
Initial Application Approval Date	September 14, 2018
IRB Expiration Date	September 14, 2019
Level of Review	Exempt
Project Status	Active - Exempt
Exempt Categories	45 CFR 46.101b(1) 45 CFR 46.101b(2)
Risk Level	Minimal Risk

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

1. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
2. All changes must be IRB approved prior to implementation utilizing the Exempt Amendment Form.
3. The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date to keep the study active or to close it.
4. Maintain all research records for a period of seven years from the project completion date.

If you are offering subject payments and would like more information about research participant payments, please click here to view the MU Business Policy and Procedure:

[http://bppm.missouri.edu/chapter2/2\\_250.html](http://bppm.missouri.edu/chapter2/2_250.html)

If you have any questions, please contact the IRB at 573-882-3181 or irb@missouri.edu.

Thank you,  
MU Institutional Review Board

## Appendix H

Qualitative Dissertation Study: Pre & Post-Test Survey Questions (citations in parentheses indicate specific literature upon which the question was based)

### *Pre-Treatment Survey Questions*

- What city name was written on your notecard? (Confidentiality/anonymity assurance)
- What is your primary instrument or vocal part? (Kostka, 2002)
- How many years have you studied your primary instrument (counting this year)? (Kostka, 2002)
- What is your year in school?
  - Freshman
  - Sophomore
  - Junior
  - Senior
- What is your major?
  - Music Performance
  - Music Education
  - Double Major (music education plus another major)
  - Double Major (music performance plus another major)
  - Other
- How many credits are you enrolled in this semester? (Simon, Diaz, Costa, 2017)
- How many hours of academic work do you complete outside of class per week? (Simon, Diaz, Costa, 2017)
- How many hours of non-academic work (job, volunteer, internship) do you complete per week? (Simon, Diaz, Costa, 2017)
- What level of group piano are you currently enrolled in?
  - Level 1
  - Level 3
- Did you have prior piano experience before enrolling in group piano at Mizzou?
- Briefly describe your prior piano experience (age/grade, level(s), number of years, etc.)
- Approximately how many hours do you spend practicing piano per week? (Kostka, 2002)
  - I don't practice piano outside of class
  - Less than 1
  - 1 to 3
  - More than 3
- Do you have a regular plan or routine for practicing piano? (Kostka, 2002)
- Briefly describe your practice plan or routine (Kostka, 2002)
  
- How often have practice strategies been discussed in your group piano class this semester? (Kostka, 2002)
  - Never

- Very rarely
- Rarely
- Occasionally
- Frequently
- Very frequently
- Do you use technology in your piano practice?
- Briefly describe how you use technology.
- Briefly describe how you, personally, feel about practicing piano (Kostka, 2002)

*Post-Treatment Survey Questions*

- What city name was written on your notecard?
- What was your assigned practice tool?
  - Control
  - Metronome
  - YouTube
  - Tempo SlowMo
- Did you use your assigned tool at least once during your practice session?
- Perceptions of technology-assisted learning (adapted from Guertin, Zappe, & Kim, 2007). How much did the assigned tool help you practice?
  - No help
  - A little help
  - Moderate help
  - Much help
  - Very much help
- How did you practice in the previous 12 minutes? How often did you exhibit each of these practice behaviors? a) singing/whistling, (b) frustration, (c) self-guiding, (d) repeat section, (e) repeat measure, (f) repeat piece, (g) slowing, (h) quickening, (i) silent fingering, (j) varying the articulation, (k), varying the dynamic, (l) informal, (m) whole-part-whole, (n) marks part, (o) “blocking”, (p) “ghosts” hand position changes, (q) alter rhythms, and (r) hands separate (adapted from Miksza, 2006)
  - Never
  - Sometimes
  - Frequently
- Describe the tempo of your final performance compared to the suggested performance tempo of this piece. My performance was:
  - Significantly slower
  - Somewhat slower
  - The same
  - Somewhat faster
  - Significantly faster
- Based on your previous 13.5-minute practice session estimate the percentage of practice time you spent ...
  - In formal practice (with a specific technical or musical goal in mind)
  - In informal practice (without a specific technical or musical goal in mind) (Miksza, 2007)

- After today, how likely are you to use each of these technology tools in your own practice? (0 = Not at all likely, 10 = Extremely likely)
  - Metronome
  - YouTube
  - Tempo SlowMo
- Please provide any other comments about practicing with technology that may be useful to collegiate group piano teachers and students.

## Appendix I

### Quantitative Dissertation Study: Treatment Repertoire

Level 1 Week 5 Repertoire: *The Shepherd Pipes* by Tat'iana Salutrinskaya

- Measures 1-12 (no repeats)

Level 1 Week 10 Repertoire: *Song from The First Term at the Piano* by Béla Bartok

- Measures 1-16 (no repeats)

Level 3 Week 5 Repertoire: *Song from For Children, Volume 1* by Béla Bartok

- Measures 1-25 (no repeats)

Level 3 Week 10 Repertoire: *Fanfare* by Johann Philipp Kirnberger

- Measures 1-18 (no repeats)

## Appendix J

### Quantitative Dissertation Study: Treatment Session Procedures

Welcome students! Today we will explore 3 different technology practice tools. I'm conducting a research study to explore technology use in group piano, and the activities we do today will not only help you to use these tools in your future practice, but will also give you ideas for how to prepare for our next exam. The data you provide today is completely anonymous and will not affect your grade in any way.

Take a look at the notecard on your keyboard. This notecard lists a city on the left side, and a technology tool on the right side. I am using the names of cities to keep your information anonymous. The technology tool is what you will use today to practice. Take a moment to make a mental note of your city and technology tool. Then write your name on the notecard and place it in this envelope where it will remain anonymous and secure throughout this study.

Now, if your card said control, you will not use any technology in your practice today. If your card said metronome, you'll use the metronome on your keyboard. If your card said YouTube, you'll use your phone to access the videos on our Canvas Announcement page, and if your card said Tempo SlowMo, you'll use that app. Test out your technology to make sure it works and let me know if you have questions about how to use it to practice piano. [Students test technology].

Now, click on the pre-test survey announcement on Canvas and follow the instructions to complete the survey. If you have any questions, please let me know. [Students complete pre-test survey].

When I tell you to start, you are going to sight-read the piece of music in front of you and record your sight-reading. You will have 1 minute to play as much of the piece as you can. Your goal is not to practice, but to play without stopping through the entire piece. This is not like our exams, when you get time to prepare. Just go for it when I tell you and if you miss notes, leave notes out, or don't get through the entire piece that is okay. Try to play hands together to the best of your ability. This recording will serve as a baseline to determine your level of accuracy before practice. Are there any questions?

Take a moment to find the record and stop buttons on your piano. After you have recorded your sight-reading run-through, you must push the stop button to stop the recording. Now, go ahead and push the record button, and begin playing. Go! [Students record sight-reading performance].

[After 1 Minute] - Press the stop button if you have not already done so.

Okay, now leave your keyboard exactly like it is. Do not turn it off or you will erase the recording. Take your music, your phone, your headphones and move to a keyboard on the other side of the room.

Practice the piece for the next 13.5 minutes in any way that you want – you may write on the score if you want – the piece is designed to allow for both musical/expressive and technical improvement to be made – try to make as much improvement as you can. During your practice session, you must use your assigned technology in some way at least once. At the end of the practice session, I will ask you to record a final performance of your piece. Does anyone have any questions about your technology or the instructions before we begin? Please begin your practice now, and remember to use your assigned technology in some way. [Begin student practice session].

[After 13.5 minutes]. We have now completed the timed practice session. Move back to your original piano. In a moment, you will record a final performance of this piece, playing to the best of your ability. Remember that when you are done performing the piece, you must press stop to end the recording. Are there any questions? If not, press record, and then play the piece to the best of your ability. [Students record final performance].

[After 1 minute] Press the stop button if you have not already done so. Do NOT turn off your keyboard. That will erase your recording.

Thank you for your diligent work during this practice session. Please go back to your desktop computer and click on the post-test survey announcement on Canvas. Follow the instructions to complete the survey.

[After students have completed the post-test survey]. We have now finished the research task. Thank you for your participation. We will repeat this process with a new repertoire piece during week 10. Your identities will remain in this sealed envelope until that time so that you can refer to your same city name and technology group during the second research session. For today, you are free to go!

## Appendix K

### Quantitative Dissertation Study: Multidimensional Assessment Rubric & Instructions

**Note to reviewers:** Keep in mind that this is a sight-reading activity. Recordings marked “sight-reading” were students’ initial performances when seeing the piece of music for the first time. Recordings marked “performance” were made after students had 13.5 minutes to practice the piece of music. Rating a recording as “weak” indicates that the student struggled throughout the performance (i.e. was not able to string together even the shortest of phrases without some kind of mistake in pitch, rhythm, or continuity). Rating a performance as “satisfactory” indicates that some sections of the piece were accurate, but others weren’t (i.e. it’s still a work in progress). Rating a recording as “excellent” does not mean that it displayed perfect accuracy, but that the accuracy was proficient and well established through MOST or ALL of the recording.

Finally, please note that for the accuracy rating, you should only rate what you hear. It is conceivable that a student will get an “Excellent” for their accuracy rating (if what they played was accurate and proficient), but a 1 for only playing hands separately, and a 1 for demonstrating less than half of the piece.

	1 point <b>Weak</b>	2 points <b>Satisfactory</b>	3 points <b>Excellent</b>
Accuracy: Only take into consideration these 3 elements: pitch, rhythm, and continuity. Only rate what you hear (not the missing parts of the piece).	Accuracy does not meet minimal expectations (many noticeable mistakes throughout the performance)	Accuracy is achieved some or much of the time, but is still a work in progress	Accuracy is proficient and well established through most or all of the performance
HS versus HT playing	The recording only demonstrated hands separate playing.	The recording included some hands separate and some hands together playing	The recording demonstrated all hands together playing
Performance Completion	The recording demonstrated less than half of the piece.	The recording demonstrated more than half of the piece (but not all).	The recording demonstrated all of the piece.

## VITA

Rachel D. Hahn is a doctoral candidate and Coordinator of Group Piano at the University of Missouri. She received her Master of Music degree in Piano Performance and Pedagogy from Southern Methodist University in 2016 and graduated *summa cum laude* with a Bachelor of Music in Piano Performance and a Concentration in Pedagogy from Vanderbilt University in 2014. Ms. Hahn is a Nationally Certified Teacher of Music (NCTM) through Music Teachers National Association (MTNA). At the University of Missouri, she teaches and develops curriculum for collegiate group piano and keyboard skills courses, undergraduate and graduate pedagogy, applied collegiate lessons, and community music programs for children and adults. She also supervises graduate teaching assistants. An active performer, teacher, and researcher, Ms. Hahn's interests include one-to-one technology, community and non-profit music initiatives, and adapting curricula and pedagogy to the needs of today's digital native students. Her career combines piano performance and pedagogy with research applicable to all music fields. Her work has been published in *Clavier Companion*, *Piano Pedagogy Forum*, *American Music Teacher*, and *Missouri Journal of Research in Music Education*. Recent conference presentations include a session at the MTNA Collegiate Chapters Piano Pedagogy Symposium in January 2019, the National Association for Music Education National Conference in November 2018, the Group Piano and Piano Pedagogy Forum in August 2018, and the National Conference on Keyboard Pedagogy in July 2017. Ms. Hahn has taught at the Missouri Fine Arts Academy, Pianos for People, and W.O. Smith Community Music School, founded a piano outreach program in Dallas public schools, and is a frequent adjudicator at local festivals and competitions. Beginning in June 2019,

she will serve as the Associate Director of Music Education and Worship at Immanuel Lutheran Church and School in St. Charles, Missouri.