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Musical achievement and attitude of beginning piano students in a synchronous videoconferencing lesson environment

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MUSICAL ACHIEVEMENT AND ATTITUDE OF BEGINNING PIANO STUDENTS IN A SYNCHRONOUS VIDEOCONFERENCING LESSON ENVIRONMENT

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ABSTRACT

The purposes of this study were to examine the effects of an online synchronous lesson environment on beginning piano students' musical achievement, time spent in target behaviors across the study period, and attitude toward piano lessons. Beginning piano students ($N = 19$) between ages 6-9 with no prior private music instruction served as participants, receiving 30-minute weekly lessons throughout a 7-month period. Participants were grouped into one of the two lesson groups: a face-to-face traditional lesson group or distance lesson group.

Pre-treatment assessments included a beginner readiness assessment and online attitudinal survey. The post-treatment musical achievement tasks (a prepared performance task, sight-reading task, aural memory, visual memory task), final interviews, and attitudinal survey were conducted after lessons concluded and comparisons were made between the lesson environments. Each lesson was videoed in order to analyze how time was spent in the different lesson environments in a beginning, middle, and ending lesson during the treatment period.

A multivariate ANOVA found no significant difference due to the main effect of lesson environment on the musical achievement tasks. However, participants in the traditional group scored slightly higher than the distance group in all four achievement tasks.

A three-way repeated measure ANOVA found a significant interaction effect due to the effects of Lesson Time (beginning, middle, and ending) x Behaviors (15 target behaviors) x Lesson Group (traditional and distance). This indicates that lesson time spent in some target behavior categories were disparate between the lesson groups across the beginning, middle, and ending lesson combinations, such as the categories of student performance, interactive performance, feedback instruction, transitions, and technology issues. Despite these differences in the way time was spent in the lesson, there was no effect on musical achievement.

Attitudinal questionnaire items' total scores were compared pre-lesson to post-lesson to note changes in attitude across time and between lesson groups. Traditional students remained more consistent in answer responses than distance students from pre- to post-lesson. Online students reported gaining confidence in their music reading and playing abilities after lessons.

This study offers empirical evidence to support online learning in piano instruction for beginning students.

CHAPTER 1
INTRODUCTION AND REVIEW OF LITERATURE

Introduction

Since the 19th century introduction of written correspondence courses as the first model of distance education (Gunawardena & McIsaac, 2004; Phipps & Merisotis, 1999), distance learning as a form of educational instruction has become commonplace in schools, universities, and workplaces (U.S. Department of Education, 2008, 2012; Wang, Jaeger, Guo, Liu, & Xie, 2013). Through developments such as email, electronic message boards, instant messaging, and desktop videoconferencing programs, distance learning experiences have expanded beyond simple written correspondence courses. Recent multimedia technologies can simulate traditional classrooms by providing synchronous videoconference distance education courses to anyone regardless of location (Simonson, Schlosser, & Hanson, 1999). The cutting edge of distance learning developments is massive open online courses (MOOCs), taught by experts at elite universities and reaching thousands of enrollees (Heller, 2013).

The initial motivation for students enrolling in correspondence courses was accessible, independent study, and this remains true for students today. Other factors that have contributed to the growth of distance education include its supposed classroom effectiveness, student and teacher satisfaction, and low cost (Roberts, 1996). In this context of growth and widespread popularity, policy-makers, school administrators, and teachers crave information about the effectiveness of distance education practices (Palloff & Pratt, 2002); however, due to rapid growth and year-to-year changes in technology, classroom application generally has not been research driven (Meyer, 2002).

The concern about the effectiveness of distance education (commonly referred to as DE in the literature) has resulted in thousands of research studies that have compared technology-

driven or technology-assisted education to traditional (no- or low-technology) education. When one considers the great variability in media-types, pedagogies, learning environments, and teacher effect, it is not surprising that distance education compares anywhere from superior to inferior to classroom instruction (Bernard et al., 2009). Current thinking on the overall state of the research has revealed a basic problem in the question: How does DE compare to classroom instruction (CI)? The sharply different delivery mode (comparing DE to CI) creates "apples to oranges" comparisons, which are ripe with confounds. What makes DE effective, when it is effective, tends to be lost in broadly comparative DE to CI research.

This research comparing DE to CI has focused on a variety of academic disciplines: science, math, economics, engineering, computer training, business, and foreign language. Since there is a lack of distance research specific to music education, the research from the other disciplines has largely informed music teachers who use distance education techniques (Dammers, 2009; Orman & Whitaker, 2010; Pike, 2012; Pike & Shoemaker, in press). A deeply entrenched apprenticeship model may explain, in part, the slow appearance of DE in applied music study (Gardner, 2000).

The traditional approach to learning to play an instrument is grounded in a long history of apprenticeship learning. In this one-to-one setting, the teacher has been regarded as the authority for all aspects of music learning: musicianship, music theory, instrument technique, and repertoire selection. Pianists-turned-teachers have been influence by the way they were taught (the apprenticeship model), and may resist distance education as a new instructional method beyond what they experienced as a student (Gumm, 2003). For the same reasons, serious-minded piano students and their parents may be reticent to consider distance education. Accessibility, transmission quality, reliability, and the nature of the personal relationship between teacher and

student are other major concerns that can cast doubt on distance education as a viable alternative for the private lesson model.

On the other hand, there may be situational advantages that corroborate distance education as a worthwhile substitute for live music study (Ajero, 2010). Learners in remote areas, who have limited transportation or require specialized instruction, would have the opportunity in a distance environment to study music with a qualified instructor. Artist teachers who travel for their own performance obligations could maintain a teaching studio through distance education. University teachers could use this venue as a recruitment tool to work with prospective students. Music departments could coordinate partnerships to expand educational opportunities with students or professors at other major universities. Students might gain access to performances or seminars not otherwise accessible because of geographic barriers. The possibilities of connecting with any location that has Internet access can promote cultural exchange through a distance learning environment. Distance educational opportunities seem plentiful.

Piano pedagogy is leading the movement in distance music instruction as a growing number of independent piano teachers have reported using online instruction (Ajero, 2010; Romney, 2013; Saint Louis, 2012; Sick, 2009; Snow, 2009;), and national conferences are promoting accessible tools for long distance teaching (Pike & Shoemaker, in press). This growth in distance piano lessons is likely due to the technological advancements available to students and teachers, such as laptop computers, videoconferencing programs (*Skype* and *iChat*), MIDI-equipped pianos and keyboards, and the software program *Internet MIDI,* which allows a keyboard-to-keyboard connection to solve the problem of audio compression (Sick, 2009).

As distance educational opportunities materialize in the music field (Kirk, 2011), the need for research specific to distance, applied music instruction is exposed. The teaching and learning experiences in distance, applied music instruction should be thoroughly and systematically examined in order to develop appropriate materials or adaptive resources, enhance or improve pedagogy, and extend research beyond simple, comparative study. The purpose of this investigation was to explore the instructional elements, musical development and achievement, instructor and student behaviors, and student attitude in distance piano lessons involving beginning, traditional-aged students. The extent to which distance lessons may be a viable alternative to traditional, face-to-face piano instruction was explored.

Review of Literature

This literature review begins with brief coverage of the historical evolution of distance education. From this, I narrow a vast field involving great variety of technology implementation, class structures, academic disciplines, and student orientation to online, synchronous distance education. I build a review that starts broadly with coverage of recent meta-analyses that synthesize the results of thousands of studies. I narrow further by focusing on the performing arts, i.e., music, dance, drama, and art, examining these fields for engagement in DE. Compared to education in other academic disciplines, education in the performing arts has been much slower to implement DE. Recent documentation supports that the performing arts are investigating potential uses for DE, and audiences are using electronic mediums for engaging in the arts. Research most closely related to my topic, DE in applied music study, will be extensively examined and presented in this chapter as influential in the development of the present study. I close with a review of the research on the traditional, private music lesson, as it presents a model for private music instruction in the distance environment.

Distance Education: Brief History and Contemporary Context

Formal education in every academic field involves some type of interaction between a teacher and student. Since the beginning of schooling, students have worked with teachers towards achieving educational and societal goals. Providing educational opportunities to all is perhaps the essence of a democracy. In the early 1900s, the traditional face-to-face classroom changed in order to provide schooling to all. Written correspondence courses came into existence using printed materials delivered through the mail system to provide communication between teachers and students. Included in the development of technology between the World Wars (1918-1946) was instructional radio. From 1928-1942, music appreciation was broadcasted for school-aged and collegiate-aged students from the popular radio series "The RCA Educational Hour" (Howe, 2003). The radio show host Walter Damrosch was interested in the uses of radio for teaching and playing live, classical music to an audience that might otherwise not have access to a program in the local school. Marguerite Hood was another radio broadcaster on another music appreciation radio program, the *Montana School of the Air Broadcasts*, with similar educational purposes to that of the Damrosch show (Cooper, 2005). By mid 20th-century, the growth in educational television used in schools to deliver instruction was largely an outgrowth of educational radio broadcasts.

During the 1960s and 1970s, distance education alternatives to traditional higher education developed. With the establishment of the Open University in Britain in 1970, distance education was given a newfound confidence as a viable, alternative form of traditional education because of the accessibility to anyone regardless of time, location, or even cultural barriers. Countries such as America and Japan were able to model and develop open universities because of the success of Britain's Open University. In the United States, innovative uses of media by

Charles Wedemeyer at the University of Wisconsin and Gayle Childs at the University of Nebraska led the growth of correspondence study and advancement of distance education. Both Wedemeyer and Childs were recognized as leaders in their universities' correspondence programs and also used developing technologies to provide more effective distance education (Gunawardena & McIsaac, 2004). In 1982, the International Council for Correspondence Education changed its name to the International Council for Distance Education to reflect technological changes and more options for developments in the form of telephone, television, and other multimedia-enhanced environments. In the late 1980s in pre-college schools, teacher shortages in science, math, and foreign language, combined with state mandates to rural schools produced a climate ripe for the growth of commercial courses, such as those offered via satellite by the TI-IN network in Texas and in Oklahoma State University. By 1989, almost all states were involved in distance learning programs. In the last 20 years, advancements in technology have made it possible for students to access educational institutions from almost anywhere in the world.

Today, there are distance educational courses offered by public and private schools, higher-educational institutions, the military, and large corporations. According to a National Center for Education Statistics report (U.S. Department of Education, 2012), during 2009-10, about 53% of public school districts had students enrolled in distance education courses. This increased from 2002-03, during which approximately 30% of public school districts had students enrolled in technology-based distance education courses.

Similar to the nation's public schools, many universities have made a substantial investment in new technologies for teaching and learning (Phipps & Merisotis, 1999). In 2006–07, 66% of the 4,160 2-year and 4-year Title IV degree-granting postsecondary institutions

offered college-level distance education courses. The overall percentage included 97% of public 2-year institutions, 18% of private for-profit 2-year institutions, 89% of public 4-year institutions, 53% of private not-for-profit institutions, and 70% of private for-profit 4-year institutions. Sixty-five percent of the institutions reported college-level, credit-granting distance education courses, and 23% reported noncredit distance education courses. There was an estimated 12.2 million enrollments in college-level credit-granting distance education courses. Of these enrollments, 77% were reported in online courses, 12% were reported in hybrid/blended online courses, and 10% were reported in other types of distance education courses. There were approximately 11,200 college-level programs designed for completion totally through distance education. Sixty-six percent of these programs were reported as degree programs and the remaining 34% were reported as certificate programs (U.S. Department of Education, 2007).

The original motivation for developing correspondence courses (distance education's first model) was to provide accessible, equal education for every person. This motivation remains the same for distance education programs today. The more specific goals of distance education, as an alternative to traditional education, have been to offer degree-granting programs, promote literacy in developing countries, provide training opportunities for economic growth, and offer curriculum enrichment in non-traditional educational settings (Gunawardena & McIsaac, 2004). Distance education offers a convenient and flexible delivery option that can accommodate students' work and family lives. Distance education offers individuals access to courses that might not be available locally, allowing students to avoid commuting by studying at home. Distance education can be a means of providing instruction to populations of learners with disabilities, those who are homebound, or those who are non-native speakers. Distance education can offer students experience with technology, access to outside experts, and interaction with

students outside an immediate learning circle (Salas, Kosarzycki, Burke, Fiore, & Stone, 2002). Distance education offers a way for school districts to deal with challenges, such as overcrowding and student demand for Advanced Placement (AP) and college-level courses (National Center for Educational Statistics, 2008).

The delivery of education has been changed by distance education, due to the affordability and user-friendliness of personal computers, growth of content on the Internet, innovative, educational delivery methods, and financial support from the corporate sector (Gunawardena & McIsaac, 2004; Salas et. al, 2002; Zhang, Zhao, Zhou, & Nunamaker, 2004). Technological advances, including various forms of computer-based instruction, electronic mail, teleconferencing, videoconferencing, and the World Wide Web, have allowed distance learning to provide innovative and convenient ways to personally deliver and distribute education (Bernard et al., 2004; Coventry, 1995; Johnson, 2003). The rate of change has been greater than in any other phenomenon in education, and technology has forever changed educational institutions and the traditional classroom (Johnson, 2003). In the *Handbook for Research for Educational Communications and Technology*, Gunawardena and McIsaac (2004) affirm the effect that distance education has had on our educational environment:

> One of the reasons for this growth [of distance education programs] is related to the ever growing global need for an educated workforce combined with financial constraints of established educational systems. Distance education offers life-long learning potential to working adults and will play a significant part in educating societies around the world. Distance education will become of far greater importance in the United States in the years ahead because it is so cost efficient and because it allows for independent learning by working adults. If society is to cope with this growing need for an educated workforce, distance education must continue to make its place in the educational community (p. 389).

Defining Distance Education

Various researchers have provided explanations of distance education, including which technologies encompass the learning environment (Keegan, 1996; Rice, 2006; Salas et al., 2002). Terms often associated with distance education are distributed, online learning, web-based learning, networked learning, e-learning, or cyberlearning (Allen et al., 2004; Bernard et al., 2004; Bernard et al., 2009; Sitzmann, Kraiger, Stewart, & Wisher, 2006). These are frequently used interchangeably to describe training, education, learning, or instruction. Even the same term might be used to describe different technology contexts (Salas et al., 2002). Other terms that refer to distance learning are correspondence study, home study, independent study, and external study (Spooner, Jordan, & Algozzine, 1999).

Interactive learning is described as either synchronous or asynchronous. Synchronous, or real-time communication, is defined as simultaneous feedback, between two or among more environments, involving two-way audio and/or visual links. This setup involves a "live" teacher so that students may be involved instantly with direct communication. Asynchronous, or time-shifted communication, is when the student cannot directly communicate with the instructor, such as exchanged lessons through pre-recorded videos (Allen et al., 2004). Any of these distance alternatives can be blended with the traditional classroom instruction as the primary or supplemental instructional method.

Keegan (1996) offered an expansive definition of DE commonly cited in the literature. Its five basic elements are: the separation of teacher and learner, which distinguishes it from face-to-face learning; the influence of an educational organization in planning, preparation, and provision, which distinguishes it from private, personal study; the use of technical media, typically print, to unite teacher and learner and carry the educational content; the provision of

two-way communication so that the student may benefit from dialogue; and the possibility of occasional meetings due to only quasi-permanent absence (Keegan, 1996). Underlying all of these definitions and descriptions of distance education is that some type of technology is used in the learning process to connect teacher and student, who are not otherwise face-to-face, in a online environment (Bernard et al., 2004; Johnson, 2003; Zhang et al. 2004). For the purpose of the present study, the definitions outlined by Keegan (1996) were the requirements of the distance education environment, specifically the synchronous, videoconferencing distance environment. The remaining sections from here on out refer to this environment by the term distance education (DE).

Comparison of Distance Education to the Traditional Classroom

As a nontraditional method of instructional delivery, distance education has been at the center of considerable attention and debate. The speed at which the distance education movement has grown and the constant change and improvement of technology means that the technology has been implemented faster than the research effort could lead in educational practices. Policy-makers, school administrators, and teachers have been concerned with examining and evaluating effective distance education practices and its impact on learning (Lockee, Burton, & Cross, 1999; Paloff & Pratt, 2002). The advent of distance education initiated what has become an international question that weighs on the minds of educators and researchers: Can students learn as well at a distance as they can face to face (Cogner, 2005)?

Directly comparing the two learning mediums of distance education to classroom instruction has comprised the majority of research (Bernard et. al, 2009). Since the 1980s, there have been thousands of articles and books written on research in the distance education field. Encyclopedia entries, journal articles, manuals, and Internet websites address distance education

across primary, secondary, collegiate, and graduate school settings. Numerous databases, journals, websites, and bibliographic resources were searched for studies that could provide insight about the state of distance education and its effectiveness. Electronic searches were conducted using the search terms "distance education" and "distance learning" in the following databases: Dissertation Abstracts, JSTOR, RILM, and ProQuest Education. Web searches were performed using the Google Scholar tool. Abstracts in the following distance education electronic journals were examined: *American Journal of Distance Education, Computers & Education, Distance Education, Journal of Distance Education, and Open Learning.* Abstracts in the following educational technology journals were examined: *British Journal of Educational Technology; Canadian Journal of Educational Communication; Canadian Journal of Learning and Technology; Journal of Educational Technology & Society; Educational Technology Research and Development; Journal of Research on Technology in Education.* Abstracts in the educational journal *American Educational Research Journal* were also examined.

Experimental research studies, descriptive studies, and evaluation reports have formed the majority of the research in distance education (Phipps & Merisotis, 1999). These studies have focused on comparisons between distance education, such as television, video, or computer, to traditional face-to-face education. Several researchers have employed meta-analysis techniques to synthesize this literature comparing distance education to traditional, face-to-face classroom instruction. In fact, since 2000, there have been more that 15 meta-analyses of the DE literature. Some of the analyses have focused on DE research of a target audience, ranging from K-12 grades (Cavanaugh, 2001; Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004), to postsecondary students (Jahng, Krug, & Zhang, 2007), to health science programs and health care professionals (Cook et al., 2008; Cook et al., 2010; Williams, 2006), to address particular

forms of DE (Machtmes and Asher, 2000; Olson & Wisher, 2002; Sitzmann et al., 2006; U.S. Department of Education, 2009). Some studies have looked at achievement outcomes (Allen et al., 2004; Shachar & Neumann, 2003) and satisfaction measures in addition to outcome achievement (Allen, Bourhis, Burrell, & Mabry, 2002). Others examined these variables in addition to reporting dropout statistics (Bernard et al., 2004). More recent studies have made attempts at finding exact pedagogies that are successful in DE classes (Lou, Bernard, & Abrami, 2006) and even comparing DE to DE (Bernard et al., 2009).

One of the largest summaries of comparative distance education research literature is by Russell (2001) in his annotated bibliography of 355 studies. The book, *The No Significant Difference Phenomenon*, contained media comparison studies from the 1920s through the 1990s. Russell's findings supported the argument that attitudes of students using distance learning are generally positive, with high student satisfaction, and that learning outcomes of distance students are similar to the learning outcomes of students who participate in face-to-face classroom instruction. These compiled studies supported that distance education courses compare favorably to classroom-based instruction and resulted in high student satisfaction.

In the meta-analysis by Allen et al. (2004), results showed that students in distance education courses demonstrated a slight improvement in performance on exams and course grades compared to students in a traditional classroom. The researchers examined 39 studies investigating synchronous and asynchronous distance education courses in natural sciences, military, foreign language, social sciences, and education. After calculating effect sizes based on performance scores, the researchers concluded that distance education is as effective as traditional, face-to-face education, and could possibly enhance effectiveness in foreign language courses using distance education technologies (Allen, et al., 2004). Variables not considered in

this meta-analysis were the combination of or quality of specific technologies, student motivation, student learning styles, student ages, and other course evaluations beyond tests or grades.

Another large meta-analysis by researchers Bernard et al. (2004) assessed the effectiveness of distance education in comparison to the face-to-face classroom. The researchers examined 232 studies, published between 1985 and 2002, in which DE was compared to CI on measures of achievement, attitudes, and course completion. Studies included all age groups and synchronous or asynchronous instructional methods, Results were mixed, with instances of distance education being more effective than traditional classroom instruction, and other cases of the opposite occurring. The range of effect sizes (−1.31 to +1.41) indicated that some applications of distance education are better than classroom instruction. There was a small and significant effect favoring distance education in terms of overall achievement scores. A small, significant negative effect was found for synchronous distance education, and a significantly positive effect was found for asynchronous distance education. Similar, mixed results were found for overall attitude and retention outcomes. A small negative and significant effect favoring face-to-face classroom instruction was found. Because of the wide variability on effect size on all measures, such as synchronous and asynchronous outcomes, methodology, pedagogy, and media usage, the authors concluded the impossibility of drawing a definite conclusion about what works or does not work in distance education.

Many researchers have encouraged that the direction of future distance education research extend beyond simple, comparative research in order to answer more sophisticated research questions about the quality of distance education design and pedagogy (Bernard et al., 2009; Hannum, 2009; Lou et al., 2006; Meyer, 2002). Some authors have accepted that proposal

and have shifted the focus of research from merely student achievement to examination of learning attitudes, perceptions, and interaction patterns of DE (Simonson, Schlosser, & Orellana, 2011). Researchers Lou, Bernard, and Abrami (2006) analyzed 218 findings from 103 studies in a meta-analysis. The undergraduate studies examining types of media-supported DE were coded for the following: one of three pedagogies of instructor-directed learning, individualized learning, or collaborative discussion among students; interactivity between instructor and students and among students, synchronous or asynchronous communication; and flexibility for active and individualized learning. Overall, it was concluded that undergraduate students had similar learning results, whether learning in distance education or a face-to-face, traditional classroom. Of the three distance education pedagogies, the mean effect sizes of instructor-directed learning mediums and individualized learning mediums showed comparable achievement between DE students and classroom students. The third category of discussion among students, which employed media to support student discussion in asynchronous DE, showed mean effect sizes that indicated superior achievement of DE students over classroom students. Lou, Bernard, and Abrami concluded with recommendations for asynchronous DE pedagogy, such as interactive student-content exchanges, student-student discussion via asynchronous media, more student-instructor interactions, and advanced student preparation for DE courses prior to enrollment.

Bernard et al. (2009) furthered DE research by examining the different types of interaction treatments with other DE interaction treatments (i.e., DE to DE). In the meta-analysis, researchers examined 74 studies for a variety of interactions in DE courses: among students, between the student and teacher, and between students and course content. The main conclusion drawn from the study was that any form of interactions designed into DE courses was shown to

positively effect student learning. Asynchronous, synchronous, and mixed or blended DE was also investigated in the study, with regard to the interactions. The different DE courses were all found comparable to each other on measures of achievement.

Two noteworthy variables in these reviewed meta-analyses are the ages of participants and the classroom settings. Participants in the reviewed studies were ages 18 and older, and classroom settings consisted of more than one student to teacher. Of related interest to the present study are the research findings by Jopling (2012), who reviewed research studies of one-to-one tuition in schools and higher education. The 17 studies reviewed included elementary, secondary, and higher education private online tutoring. After analyzing the core studies with a grounded theory approach for similarities and differences, Jopling provided a conceptual framework for the pedagogies applied in the one-to-one online tuition. Four interdependent domains were identified in the conceptual framework as fueling the engagement and integration of learners: relevance by linking new learning to the student's experiences; co-construction of courses between teacher and learner; learner-tutor mix of varying relationships and roles; and in-and-out of school/higher education contexts, to include the different learning experiences online. Jopling recommended a balance of these domains to ensure a sound, pedagogical approach to DE. He also reported that a common finding from all 17 studies is the need for training of tutors. Suggestions made were that better training is needed in order for tutors to conceptualize one-to-one online tuition as an alternative and different experience than the face-to-face model.

Another article of particular interest to the present study examined instructional design for online synchronous cyber classrooms of younger-aged students of 5-8 years (Hastie, Chen, & Kuo, 2007). As mentioned, the previous studies and meta-analyses largely examined distance education in collegiate settings. This study offered findings that were specific to elementary-aged

children who were involved in a synchronous cyber classroom for a six-year period. The trial period was an international collaboration between Brisbane School of Distance Education in Australia, and the National Sun Yat-sen University in Taiwan. The researchers identified successful practices of online instructional design in order to achieve higher learning outcomes of students and maximize student interaction. This research served as a manual for new online teachers and identified the most effective instruction design as a simple or "minimalist" approach, which included an intense focus on clarity of communication and use of concrete technological tools to promote abstract thinking in students (p. 286). Students were reportedly involved in high levels of learning and engaged visually, aurally, and kinesthetically, due to a learning environment purposefully crafted for these online classroom interactions.

In summary, these meta-analyses concluded that distance education courses compare quite favorably with classroom-based instruction and result in high student satisfaction. In fact, the recent meta-analyses supported that effective DE principles recommended for optimized student learning, such as active learning engagement, interactions among students, and instructor guidance, are the same principles of all good instruction, regardless of distance or face-to-face (Lou et al., 2006). Even though there appear to be definitive results relative to DE's effectiveness, researchers like Farber (1997) have suggested that substituting the "the screen" for the classroom should be abandoned. He suggested using technological resources only to support classroom learning, not replace it. Researcher Coventry (1995) stated that "video conferencing was not designed as a method for educating the masses. It is an intimate method of communication on an individual or small group basis…There is a cost efficiency argument for using technology for distribution but this should not be confused with the argument of using technology to provide more effective learning" (p. 23).

These researchers may have cause for concern, as Phipps and Merisotis (1999) revealed several problems associated with previous DE research, including: control for extraneous variables; non-random sampling; validity and reliability of the instruments used to measure student outcomes and attitudes; control of "reactive effects" for students and faculty; emphasis on student outcome rather than the total academic program; and accountability for differences among students such as learning styles and use of particular technologies. Like Phipps and Merisotis, other researchers have concerns with previous DE studies only examining achievement outcomes, such as final grades or test scores (Russell, 2001), which cannot measure a total educational experience (Lockee et al., 1999; Salas et al., 2002). Farber (1998) questioned whether academic performance, such one final grade or test score, can adequately measure effective education. He proposed three categories by which learning can be evaluated: measurable competence, competence, and education. Measureable competence is academic performance and proficiency through attainment of specific subject-matter knowledge. Competence is a broader, less easily measured expertise that is rarely measured by assessment instruments. Education deals with more of the general effect of the education on students. According to Farber, learners can experience growth in attitudes and values, psychosocial changes, and moral development, all as outcomes of the educations experience and as a result of interactions with their instructors and peer. Education is much more than just conveying information, which is implied when DE achievement measures are based on only one final test or grade.

Researchers have strongly urged the field to look beyond simple, comparative studies and towards investigating distance education learning and instructional design and theory frameworks (Bernard, et al., 2009; Gunawardena & McIsaac, 2004; Hastie et al., 2007; Lou et

al., 2006). Bernard et al. (2004) suggested: "it is simply incorrect to state that DE is better than, worse than, or even equal to classroom instruction," confirming the need for research to answer specific questions beyond comparative studies (p. 406). A case for deeper research in distance education effectiveness is stated by Coventry:

> We cannot simply assume that a 'virtual' situation will be the same as a face to face [sic] situation. If it is not the same we must find out how it differs and if these differences have a significant effect on the communication and learning process. The dynamics of educational and interpersonal interactions are dramatically changed when mediated by technology (1995, p. 27).

DE research is slowly seeing a shift in moving towards learner-centered research efforts (Simonson et al., 2011) as the recent meta-analyses by Lou et al. (2006) and Bernard et al. (2009) aimed to answer specific research questions about DE, such as how best to incorporate media attributes and interactions into effective DE design. More specific research is warranted on how DE should be implemented, about learning styles of the distance student, about effective DE course design and pedagogy elements, and how the relationship among media, social, and cultural effects DE students. That more research is needed examining specific questions about distance education serves as the maxim for this present study, which explored a unique discipline of one-to-one music instruction for children ages 6-9 years.

Arts Participation and Technology Use

Digital media has changed the way we participate in education, and this change is also reflected in society's participation in the arts. One of the art's first experiences of this shift was that of radio broadcast music appreciation classes (Cooper, 2005; Howe, 2003). Since 1982, the National Endowment for the Arts (NEA) has conducted a benchmark survey of Americans' involvement in arts activities. Researchers with the National Endowment for the Arts (2009, 2010) examined how Americans participated over a one-year period in one or more of these

performing arts events: jazz, classical music, opera, musicals, non-musical plays, ballet, dance other than ballet, and Latin/Spanish/salsa music. Both the 2009 and 2010 reports on electronic media use were based on the NEA's 2008 *Survey of Public Participation in the Arts* of over 18,000 adults. While the lifetime participation rates of all respondents decreased between 1982 and 2008, there was a substantial decrease in most arts activities among the survey's youngest age bracket of 18- to 24-year olds.

Along with the decline in arts participation, the report showed a shift in the ways that adults are engaging in the arts. In fact, the statement was made in the report, "Many Americans use the Internet to engage with artworks or performances, and those who participate with the Internet do so frequently" (p. 4). In 2008, 41% of U.S. adults watched, listened to, or otherwise explored the arts through some form of electronic media. About 5% of adults reported watching or listening to opera via recorded or broadcast media. For jazz and Latin music, the electronic media participation rate was higher, about 15% of all adults. For classical music performances, about 18% of adults reported watching or listening to a recording or broadcast. Electronic media are providing an alternative way to engage in the arts, as a sizeable group of Americans are engaged in art forms solely through these means.

The 2008 survey further reported statistics about those adults active in arts education. About one-third of adults (38%) reported that they had taken lessons or classes in music (voice or instrumental) at some point in their lives, compared with 61% in 1982. Only 8% of adults with school-aged children reported sending their children to arts lessons. The declining statistic in adults' participation in the arts is quite likely a direct effect on the low number of children enrolled in arts programs. Parents seem more likely to enroll their children in music lessons if they themselves studied music privately or participated in music groups (Duke et al., 1997). With

the increased use of electronic media for arts participation (NEA, 2009; NEA, 2010), perhaps the current generation's parents will seek out music education opportunities that use a technology medium for their children.

Though the growth of distance education has been noted in the vastness of research in many academic disciplines, there are limited, documented occasions of performing arts, such as dance, theatre, and drama, engaging in DE. Berge and Muilenberg (2000) conducted a survey to better understand factors that an individual may perceive as a barrier to DE. The researchers surveyed over 2500 individuals on 64 potential barriers to the implementation of DE. The strongest barriers reported were, in rank order: increased time commitment, lack of money for implementation, organizational resistance to change, lack of shared vision in organization, lack of support staff for DE development, lack of strategic planning for DE, slow pace of implementation, faculty compensation/incentives, difficulty keeping up with technological changes, and lack of technology-enhanced classrooms. Any one of these barriers could easily be a deterrent for performing arts considering DE implementation, given the unique setting of the apprenticeship model entrenched in traditional performing arts. The performing arts are institutions that have a long history in one-to-one tuition, in which the teacher is regarded as the expert for all aspects of learning. With current DE developments like MOOCs distributing lectures to thousands of students within one course (Heller, 2013), the performing arts, based in one-to-one, interactive rehearsals, may initially regard DE programs as impractical to implement. Teachers, students, and parents may have prejudiced opinions of online learning environments in the arts, due to concerns of accessibility, transmission quality, reliability, and the nature of the personal relationship between teacher and student.

On the surface, these barriers may appear to suffice as enough reason for the performing arts to disregard DE, but educational opportunities would be lost if DE were entirely overlooked in the arts. In more recent years, we are seeing a growing number of documented cases of programs making attempts to engage in online synchronous learning environments (OSLE) (Childs, 2003; Janson, 2004; Parrish, 2008). OSLE systems, such as *Blackboard* or *Adobe Connect*, allow a synchronous, two-way connection. This feature is important in order to have immediate feedback, which is an essential part of rehearsals in the performing arts. In a nine-month study by Peacock et al., (2012), researchers examined three different cases of performing arts using OSLE systems: one of dissertation supervision, one of developmental support for students in a work placement, and one of performance feedback during dance rehearsals. The synchronous dance rehearsals were investigated in the exploratory case study utilizing OSLE at Queen Margaret University, Edinburgh Scotland. Researchers concluded that of OSLE to provided a convenient and easy tool to empower learners through recording and self-reflecting capabilities. In addition, researchers reported OSLE could support a personal and dynamic learning space for both teachers and students.

It seems that the fastest-growing population of the performing arts engaging in distance education is independent music teachers. As previously discussed, one initially might assume that applied music teachers would resist distance education as a new instructional method beyond what they experienced as students (Gumm, 2003). However, distance education is increasingly becoming more common as a means of teaching applied piano. This trend is likely due to the accessible and available technologies for teaching and performing via distance, documented in recent newspaper articles, trade journals, and numerous national conferences (Ajero, 2010; Litterst, 2003; Litterst, 2007; Pike & Shoemaker, in press; Romney, 2013; Saint

Louis, 2012; Sick, 2009; Snow, 2009). A suggestion for the arts to embrace the use of technology was affirmed by Rocco Landesman, chairman of the National Endowment for the Arts:

> In the arts, we are deeply invested in the primacy of the object and the necessity of the live experience. Technology is often seen as our nemesis—a cheaper, easier, virtual version of something real. Many of us in the arts battle the technology invasion; performing our own version of the refrain that those who do not remember their own history are condemned to repeat it. The radio and the record album were once thought to herald the death of live music. The VHS tape and cable television were going to end film. Photography was going to replace painting, and color catalogues were going to obviate the need for museums. None of these innovations led to the death of the art form, but instead contributed to its spread and helped create new audiences. So now we are faced with the Internet, social media, and other new technologies, and I believe the arts field must embrace them and integrate them into our work. Not to replace it, but to extend it (2008, p. 3).

The idea that distance education can be a gateway and not a barrier to greater arts participation lends support to media-based learning and participation in the field of music. There are many situational advantages that corroborate distance education as a worthwhile substitute for live study (Ajero, 2010). Any physical separation, such as a long-distance move, a temporary sickness, or study with a remote, expert teacher, can be overcome by distance education, providing numerous educational possibilities only available through distance technology. An examination of the music research employing distance education was warranted in order to develop DE methodologies and pedagogical strategies for the present study.

Distance Education in Music

Independent piano teachers have been recognized as embracing DE in applied music instruction. Piano study has been recognized as a medium through which children, adolescents, young people, and adults can develop beginning musical skills. Students of all ages are active in piano instruction, representing a large population of music education in the United States (Cooper, 2001; Duke et al., 1997). Private piano instruction has changed over the years, in the

sense that technology has allowed for development of the instrument from an acoustic piano to digital pianos, portable pianos, synthesizers, and MIDI-equipped keyboards and pianos capable of connecting to computers (Uszler, Gordon, & Smith, 2000). Technology has not only changed the instruments used in music instruction today, but also how we participate in the arts (NEA, 2008: Partti & Karlsen, 2010) and how students engage in music learning (Roberts, 2006).

The number of research studies in music involving distance education for applied instruction is small in number (Dammers, 2009; Orman & Whitaker, 2010; Pike, 2012; Pike & Shoemaker, in press). The music discipline has simply not been on the cutting edge of implementing technology in applied teaching and learning, despite 10 years of technological advancements after a video-conferenced piano lesson was showcased at the 2002 Music Teachers National Association Conference. Because of the unique nature of private music lessons and the infancy of music using distance education, it should not be assumed that prior DE research is applicable or generalizable to applied music teaching and learning in distance education. Research is warranted in order to determine the most appropriate strategies for distance education pedagogy specific to applied music instruction.

The following four research studies were designed to study music instruction using distance education. Riley (2009), Dye (2007), Dammers (2009), and Orman and Whitaker (2010) all designed and implemented research that utilized synchronous, video-conferencing lessons and classes in order to transmit live music instruction.

Riley (2009) explored teaching general classroom music via video-conferencing between pre-service music teachers in the U.S. and students at an elementary school located in Mexico. The study was conducted over a 2-year period with 9 pre-service teachers and underprivileged children at a school in Puebla, Mexico. Teachings episodes were approximately every other

week for half-hour classes. The technology used was a computer, iSight camera, audio speaker, projector and screen at both locations. A high speed Internet connection was used, and the video-conferencing programs *iChat* (year one) and *Skype* (year two). The data collected over the 2-year period included researcher narratives, teacher reflections, and student writings. The advantages, challenges, and progress associated with distance education were reported in this distance teaching and learning experience.

The findings revealed the technical difficulties most often experienced, including problems with the sound, problems with the picture, and interruptions due to time delay. The teaching difficulties reported were the challenges due to physical separation and the inability to sing and interact simultaneously. Teaching recommendations to overcome both technical and teaching difficulties in distance teaching included thorough planning and a flexible mindset. The positive outcomes of the study included student enthusiasm, interest in the participants' culture, and increased educational opportunities that distance education can provide. Riley encouraged that this venue be further explored for facilitating music teaching and learning between two locations to increase musical exchange and cultural interaction.

The next three research studies are more closely related to the present study in the sense that they investigate synchronous, video-conferenced one-to-one music lessons. In the dissertation by Dye (2007), the use of desktop videoconferencing was explored to conduct applied music lessons between pre-service music education majors and middle school band students. Three teachers taught two students, totaling to six participants. A total of twenty-five videoconferencing lessons were conducted, recorded, and transcribed to compare behavioral occurrences, using behaviors previously developed by Siebenaler (1997). Transcripts were analyzed for frequency of behavioral occurrences, and data were accumulated through open-

ended interviews with all participants before, during, and after the case study.

Results indicated the frequency of most behavioral occurrences observed were consistent with those in traditional applied lessons. Activity was dominated by instructional behaviors, specifically verbal behaviors. Instructor modeling was not a dominant behavior of the instructional activity, but student performance was a frequently occurring behavior. There was also a trend for all participants to engage in more music-specific questioning than in prior investigations of face-to-face lessons.

From the interviews before, during, and after the case study, students reported that they value the relationship between the instructor and student as an integral part of achieving musical learning. Of most negative concern to the instructors and students was the quality of the communication due to the videoconferencing, and the inabilities to physically assist or be assisted as a part of the instruction, as well as limited visual field. The study concluded that when key factors are considered, such as reliable technology, appropriate training, and proper instructional design, desktop videoconferencing can offer an accessible tool in substitution of live, applied music instruction.

In the case study by Dammers (2009), videoconferencing technology was used to connect one college music teacher with a middle-school trumpet student for nine, synchronous music lessons. Personal computers, the Internet, an external webcam, and *Skype* were used for the synchronous online lessons. The teacher was located on the East Coast and the student was located in the Midwest. Advantages of the online lessons were the convenience of lessons, the connection of two remote locations, and accessibility to other technologies like recording and file-sharing software. It was noted that the instructor thought lesson pacing and feedback were comparable to traditional face-to-face lessons. The connectivity was mostly positive also, with

only one instance of a failed lesson due to technological difficulties. The challenges experienced were some technological difficulties, time delay due to the Internet, impersonal connection, and limited visual field. The instructor in the study reported changes to his teaching style through online instruction, such as more planning, preparation, lesson structure, and questioning during distance lessons than traditional face-to-face lessons. Dammer's main purpose in the study was exploring the viability of the online videoconferencing software for applied music instruction. He concluded that videoconferencing is functional, but suggested that synchronous online instruction should supplement, not replace, music instruction, as the two learning environments are not equivalent.

Another study provided a large amount of data describing distance music lessons and face-to-face music lessons (Orman & Whitaker, 2010). A saxophone instructor, tuba instructor, and three middle school students were involved in the study. Students received five or six 30-minute music lessons. The equipment used included laptop computers; external webcams, microphones, and speakers; videoconferencing software, and the Internet. Data were analyzed for comparisons of time usage for the same and different students, instructors, instruments, and venues of lesson instruction. In the distance lessons, student performance time increased, instructor performance time decreased, and instructor off-task comments decreased. The field of vision was restricted because of camera angle, and the sound quality transmitted over videoconferencing was limiting. These findings were similar to the technological challenges in Dammers (2009). Orman and Whitaker suggested that though distance music lessons show potential for educational opportunities, technology must improve to ensure successful music teaching and learning in applied distance lessons.

The following research studies take the distance music lesson further by examining videoconferencing in applied lessons and also MIDI-connectivity software. Researchers Shoemaker and van Stam (2010) utilized videoconferencing and the technology of MIDI-equipped digital keyboards to connect North American piano students to students in rural Zambia. The MIDI connection between keyboards superseded the compressed sounds in video-conferencing, augmenting the sound quality that was frequently experienced negatively in previous studies (Dye, 2007; Dammers, 2009, Orman & Whitaker, 2010). These lessons were among the first documented to access long-distance MIDI connections. The technology used in this study was accessible and affordable to practically any teacher and student engaging in distance piano lessons, and, therefore, was modeled as the technological equipment for the present study. The equipment used was a computer with Internet access; built-in and external cameras and microphones; MIDI-equipment, full-sized, weighted-key digital keyboards; an interface device to connect the keyboard to computer; and the videoconferencing program *Skype* and software *Internet MIDI*. The researchers confirmed the viability of distance education through applied piano instruction and encouraged further educational possibilities through distance instruction to possibly bridge musical traditions of differing cultures.

In a similar distance environment of piano instruction described in the previous study, Pike and Shoemaker (in press) investigated sight-reading skills in beginning piano students. Two lesson groups were compared: one of students (n = 9) in traditional or face-to-face instruction and one of students (n = 10) in online instruction. Individual, weekly sight-reading sessions were held with researchers and students for 15-minute appointments for an 8-week period. A significant difference was found in both groups' gain in sight-reading abilities, but no significant difference was found between the lesson environments. Additional findings from the study in the

distance environment included higher student engagement, student independence and self-directed learning, and more varied learning possibilities and communication strategies exhibited by instructors.

Also utilizing long-distance MIDI connections for distance piano lessons, Pike (2013) investigated online instruction from the perspective of prospective piano teachers. Four piano pedagogy student teachers were introduced to the hardware and software equipment by the researcher. The prospective teachers taught three online piano lessons across one month. Data collected in the case study included videotaped lessons, research field notes, and teacher interviews. Primary themes reported included the teachers' concerns with using the technology, developing teacher and student rapport, and adapting or modifying teaching methodologies in the online lesson environment. Pike suggested that systematic teacher training in distance piano instruction is warranted in order to effectively utilize technology in piano lessons.

These studies examining applied music instruction using distance education suggest a variety of applications for videoconferencing lessons. Dye (2007) reported that videoconferencing could possibly be a substitution for live instruction. Dammers (2009) suggested online instruction should only supplement music instruction. Orman and Whitaker (2010) suggested that improvements are still warranted in technological advances in order to ensure effective online music teaching and learning. Shoemaker and van Stam (2010), Pike and Shoemaker (in press), and Pike (2013) all validated the clinical application of applied, distance piano lessons accessing MIDI connections. As distance education becomes more commonly practiced in keyboard and other non-keyboard applied instruction, thorough, extensive research should continue to pursue the viability question, as well as answer specific research questions regarding online pedagogy.

Effective Piano Instruction as a Model for Distance Piano Instruction

Piano was the instrument of choice for this present study because of the accessibility of long-distance piano teaching and learning as described in research, and also because of the prevalence of private piano instruction in the United States (Duke et al., 1997). Research on effective teaching pedagogy and lesson characteristics of the private music lesson should be examined and used as a model for developing distance piano lessons.

The most common reason for students enrolling in lessons, according to Duke, Flowers, and Wolfe (1997) is because they "wanted to learn to play" (50% of 663 students). Since playing piano was named a common goal for many students taking piano lessons, performance components outlined by McPherson (1995) were examining in the present study. McPherson identified aspects of musical performance, defined in five distinct skills: perform a repertoire of rehearsed music, sightread music without prior rehearsal, perform from memory, play music by ear both learned and reproduced aurally, and improvise. The students in McPherson's study were high-school aged, quite different developmentally and musically from the ages of students in the present study. Though differences in musical skill were expected due to the students' ages, piano pedagogue Frances Clark confirmed that performance skills, sightreading skills, aural skills, and memory skills are all possible with elementary students:

> In their first lessons our [The New School's] beginners have these experiences: They learn to read by direction- the notation is in large notes, off the staff, moving up or down or both. . .They begin ear-training through clap-backs, sing-backs, and play-backs; They even begin to compose, making pieces of their own that move up, down, using the groups of two black keys all over the piano. (1992, p. 2).

These musical skills are also the basis of the Music Teachers National Association state-sponsored Piano Rally. According to the Louisiana Music Teachers Association Rally Syllabus, "The Rally has provided an opportunity for teachers. . .to set standards of achievement for

pianists at both the pre-collegiate and collegiate levels of study" (2013, p. 2). Students are tested on their musical skills and knowledge, from a comprehensive curriculum appropriate for each level of Rally (Grades 1-12): performance, sight reading, keyboard musicianship, and written theory, history, and ear training (LMTA, 2013).

How time is spent during music teaching and learning has been analyzed either from systematic observation of teacher and student behaviors or from broad, narrative, descriptions of teaching (Duke, 1999). Teacher effectiveness can vary in behavioral measurements from frequency counts of verbal feedback to measurement of time allocated for activities to global evaluations of overall effectiveness (Duke, 1999). These examinations of lesson content provided a representation of lesson interactions, in order to compare to the unique distance lesson environment used in the present study.

A number of researchers have examined the actual instructional activities in which teachers and students engage. Kostka (1984) examined the rates and ratios of teacher reinforcements, use of lesson time, and student attentiveness in 96 audiotaped piano lessons. Activities were defined and coded for frequency counts during observation intervals. Student behaviors were largely divided between student performance (56%) and teacher talk (42%). Totals across all students, despite age differences, indicated that approvals and disapprovals were nearly equal during piano lessons, with the most reinforcements most being academic approvals.

The nature of music instruction involving an ongoing sequence of teacher presentation-student response-teacher feedback has been studied in numerous musical settings (Yarbrough & Price, 1989). Verbal instructions in the lessons of 25 independent piano teachers were examined by Speer (1994). Speer coded audiotapes for components of sequential patterns in these private piano lessons. Results indicated that overall time spent in typical piano lessons was divided

primarily between teacher presentation (42%) and student participation (47%), with a relatively small percentage of overall time spent in verbal reinforcement expressed by teachers (6%). The method of presentation used most by subjects was academic teacher talk, with a smaller percentage of both teacher modeling and teacher coaching. The majority of student participation was in student performance, a finding reinforced by other studies examining a variety of musical settings for student performance time (Duke, 1999; Costa-Giomi, Flowers, & Saski, 2005). Teacher reinforcements were primarily approving in nature (63%), but were essentially nonspecific. Speer also found a lack of specificity in teacher directives and feedback when he examined sequential patterns in piano lessons.

Siebenaler (1997) further provided analysis of piano lessons of adults and children. Teacher behavior, student behavior, and lesson progress were assessed. Lessons were videotaped, and each behavior was defined and coded for total time spent in that behavior, average duration of each occurrence of that behavior, and the behavior in relation to student performance scores. One of the conclusions of this study was that rapid rate of teacher talk is related to higher student performance ratings. This finding corroborated that inactive teacher episodes coincided with uninterrupted, struggling performance episodes for the student. Feedback providing specific information, both positive and negative, was associated with higher ratings of teaching effectiveness. Effective lessons contained very brief directives, teacher modeling, and successful student performance.

The specific behaviors of teachers and students in applied piano lessons outlined and used as an assessment tool by Siebenalar (1997) were the focus of behavioral analysis in the present study. In the distance lesson environments, teacher and student behaviors, such as

instructions, performance, or other presentations, may function differently than the previously documented piano lessons time usage.

In addition to musical achievement and teacher and student behaviors, student satisfaction is another measurement examined in prior studies of piano lessons. Student satisfaction with lessons is extremely dependent on pleasure in the activity, acting as an incentive for children to continue playing their instruments (Rife, Shneke, Lauby, & Lapidus, 2001). This aspects is important to consider, since personal pleasure has been shown to be the most important extramusical benefit in children taking private piano lessons (Duke et al., 1997; Rife et al., 2001). Feeling satisfied with music study is important, which for the present study, included the lesson environment and technology use. Because the previous research studies recognize satisfaction levels of students as highly valuable, attitude measures were examined in the present study of distance piano instruction.

Practicing is a key element in piano lessons, since students spend most of their time independent from the teacher. In the investigation of piano lessons by Duke et al., (1997), time estimates of daily practice per week and the number of days practiced each week were described. This practice record was sought in order to gain perspective regarding teachers', parents', and student's perception about time devoted to practicing. In this sample of students ($N = 663$), not a great deal of time was devoted to piano practice each day. According to parents' reports, 84% of the students in the sample practiced less than one hour each day. This result is important because it provides evidence that participation in keyboard study does not require a large investment of students' time each day, though does have a direct impact on lesson outcome. In the present study, the monitoring of practice times and days per week was documented for each participant similar to Duke's, Flowers,' and Wolfe's (1999) approach.

Purpose of the Study

In the context of the private piano lesson, this study compared synchronous distance and face-to-face teaching and learning. In each setting, I assessed the musical achievement and attitude of students, and detailed the behaviors of students and teacher. Specifically, I asked the following questions:

1. What are the effects of lesson setting on the musical achievement of traditional-aged, beginning piano students?
2. What student and teacher behaviors define the two lesson settings? Is there change over time?
3. What are students' attitudes about learning piano in the two lesson settings? Does attitude change over time?

In taking this approach, the aim was to provide empirically-derived perspective and insight on the plausibility of distance piano lessons as an effective substitute for or alternative to traditional, face-to-face methods.

CHAPTER 2
METHOD

Overview

The primary purpose of this study was to examine the musical achievement and attitude of beginning piano students who received instruction in two different settings: a traditional face-to-face lesson environment and a distance lesson environment. A secondary purpose of this study was to analyze teacher and student behaviors during lessons and to compare time spent in various activities between the two settings. Beginning piano students ($N = 20$) between ages 6-9 with no prior private music instruction served as participants, receiving weekly lessons throughout a 7-month period. Pre-treatment assessments included a beginner readiness assessment, initial interview, and online attitudinal survey. The post-treatment musical achievement performances, final interviews, and attitudinal survey were conducted after lessons concluded, and comparisons were made between the lesson environments. Each lesson was videoed in order to analyze how time was spent in the different lesson environments in a beginning, middle, and ending lesson during the treatment period. Attempts were made to control the procedures and the lesson content in order to yield model, equivalent teacher behaviors for both lesson environments.

Participants

Beginning piano students ($N = 20$), 6-9 years of age with no prior private music instruction, served as participants. Ten students participated in distance lessons, and ten students participated in face-to-face lessons. One student enrolled in face-to-face lessons was unable to complete the study and dropped out after the seventh lesson, resulting in only nine students in the traditional lesson group. This age range of 6-9 years during which many children begin taking piano lessons is also the age range of children studied in similar research exploring musical

development (Duke, Flowers, & Wolfe, 1997; McPherson, 2005). According to piano pedagogy authors Uszler, Gordon, and Smith (2000), students of this age can transfer trust from parental to teacher authority, read and deal with numbers somewhat independently, and move fine muscles physically required for piano playing. Because students of this age are comfortable with the responsibilities that school entails, this makes for "a receptive age for extraschool involvements such as piano lessons" (p. 3).

In order to recruit students who met the requirements for this study, I contacted music teachers and colleagues in the local area and other parts of the country to identify potential students who might be interested in enrolling in piano lessons. Information about the lessons was available so that parents and their children could make an informed decision about participation (see Appendix A). Prior to recruiting and gaining consent from students and their parents, the LSU Institutional Review Board for Human Subject Studies granted exemption from oversight (see Appendix B). Student and parents consented to participate by signing appropriate forms, agreeing to lessons for the length of the study, and agreeing to purchase the necessary equipment and materials outlined (see Appendix C and Appendix D). Parents and students agreed to comply with requests for formal assessment, videotaping of all lessons, and practice expectations. Participants in a face-to-face lesson group were all children living in East Baton Rouge Parish, Louisiana. An online lesson group consisted of four participants from Louisiana, two participants from Mississippi, two participants from Tennessee, one participant from Ohio, and one participant from British Columbia.

An initial beginner readiness interview was conducted with every participant, though no student was denied lessons based on the interview (see Appendix E). Interviewing beginning students and evaluating their readiness for piano study is a common practice of many piano

teachers (Clark, 1992). According to renowned pedagogue Frances Clark, this interview serves as " … an evaluation of the child's physical, mental, and emotional readiness for a discipline as demanding as music study at the piano. Beyond determining readiness, however, the interview provides insight into the child's physical size and coordination, mental and emotional development and maturity, ability to coordinate, personality, and response to a new learning situation" (p. 319). The interview for this study included the following activities: exploring the keyboard; finding black key groups and white keys; listening for sounds of up/down, high/low, and short/long; moving to music; clapping short rhythm patterns, identifying the beat in music; and singing short phrases. The student was also shown how to sit at the piano with correct body and hand positions. The readiness assessment concluded with an online attitude survey (see Appendix F) completed online, and interview questions (see Appendix G). Though it was expected that all students would have fairly equal knowledge and skill level due to no prior lesson experience, this readiness assessment allowed me to gather information about each student's prior knowledge, in addition to developing rapport with the student. This meeting also served as a brief training time for the parents and students in the experimental group. The equipment and software for online lessons were described to parents and students in an initial letter (see Appendix H), and a live connection was made at this point in the interview to work through any technology issues that needed to be addressed outside of the first lesson appointment.

Lesson Equipment and Environments

Because of the equipment required for distance lessons, children who were assigned to the experimental group of distance lessons (n = 10) were those with access to a computer, Internet, keyboard with MIDI capabilities, a computer program *Internet MIDI* downloadable for

purchase, software conferencing program *Skype*, and an M-Audio MIDISport UNO cable. The home environment served as the lesson setting for each child. The *Internet MIDI* software required for use in distance lessons was purchased by each participant for $69 from www.timewarptech.com. (As of 2013, Internet MIDI was purchasable from www.zenph.com.) Each participant also purchased an M-Audio Uno USB-MIDI Interface valued at approximately $40. Though no specific brand or model of keyboard was specified for purchase, the digital instruments students used in lessons were required to be 88-key and full-sized, MIDI-capable, and have weighted keys. This was to ensure that all students taking distance lessons were playing on digital instruments similar in sound quality and feel, and comparable to the control group's acoustic pianos or full-size digital keyboards. The laptop requirements needed for distance lessons were hard-drive space to support the videoconferencing program *Skype* (www.skype.com), a built-in or external webcam and microphone, traditional wired broadband Ethernet over the World Wide Web, and hard-drive space needed to download *Internet MIDI* software.

For distance lessons, both teacher and students had access to a MIDI-capable full-sized, weighted-key, digital piano keyboards at respective home locations. Each MIDI-capable piano keyboard was directly linked to the computer with an M-Audio Uno USB-MIDI Interface. The software program *Internet MIDI* used for these distance lessons connected the two MIDI instruments together via the Internet. This software application enabled MIDI-capable keyboards to synchronize and exchange data electronically through MIDI technology by connection via a buddy-name, a process similar to connecting to another user in an instant messaging program. When the two digital keyboards were connected and a note was played on one of the keyboards, that same note also sounded on the other keyboard. As musical data were sent out electronically

over the Internet in real-time, a piano key played on one keyboard sounded the same key on the remote partner keyboard. This program allowed for a direct two-way MIDI connection to be established between the keyboards, providing a high quality, aural model for the student.

Internet MIDI was designed to use in conjunction with a video conferencing program in order for two people to speak with and see each other outside of the keyboard connection. In order for the MIDI data to only be passed and heard through the connected keyboard's speakers, a microphone-cancelation feature was built into the program, and can be enabled to silence the audio from being picked up on the computer microphone and transmitted via Skype. This feature was designed to interact with the Skype program so that when a key is played on the keyboard, the computer microphone was muted, completely bypassing the audio connection through Skype but allowing the audio to be played by the connected keyboard. After the last note is played on either keyboard, the computer microphone is reopened after a preset number of seconds, allowing the teacher and student to communicate over Skype. It was possible to override this microphone-cancelation feature on Internet MIDI. This override was a useful tool in case of a MIDI connection problem and the keyboard audio needed to be heard over Skype or if the teacher needed to interrupt the student while he or she was playing on the keyboard.

The software also provided a visual on the computer screen through a live, musically-intelligent notation display. When the student played his keyboard, the onscreen keyboard highlighted in blue the notes played, and when the teacher played those same notes on her keyboard, the onscreen keyboard highlighted those notes in red. Internet MIDI also included other features, such as incremental pedal, which allowed the teacher to visually see when the child was using pedal and how far down the pedal was depressed. A velocity meter above each key on the interactive keyboard was a helpful visual representation of how fast or forceful a child

was pressing a key, also a visual indicator of volume. Though each student and teacher utilized only one camera for this study, Internet MIDI does have a multi-camera feature available if the teacher or student wished to set up multiple external cameras to switch to an alternate view during the lesson. Figure 1 displays a labeled screen shot of Internet MIDI.

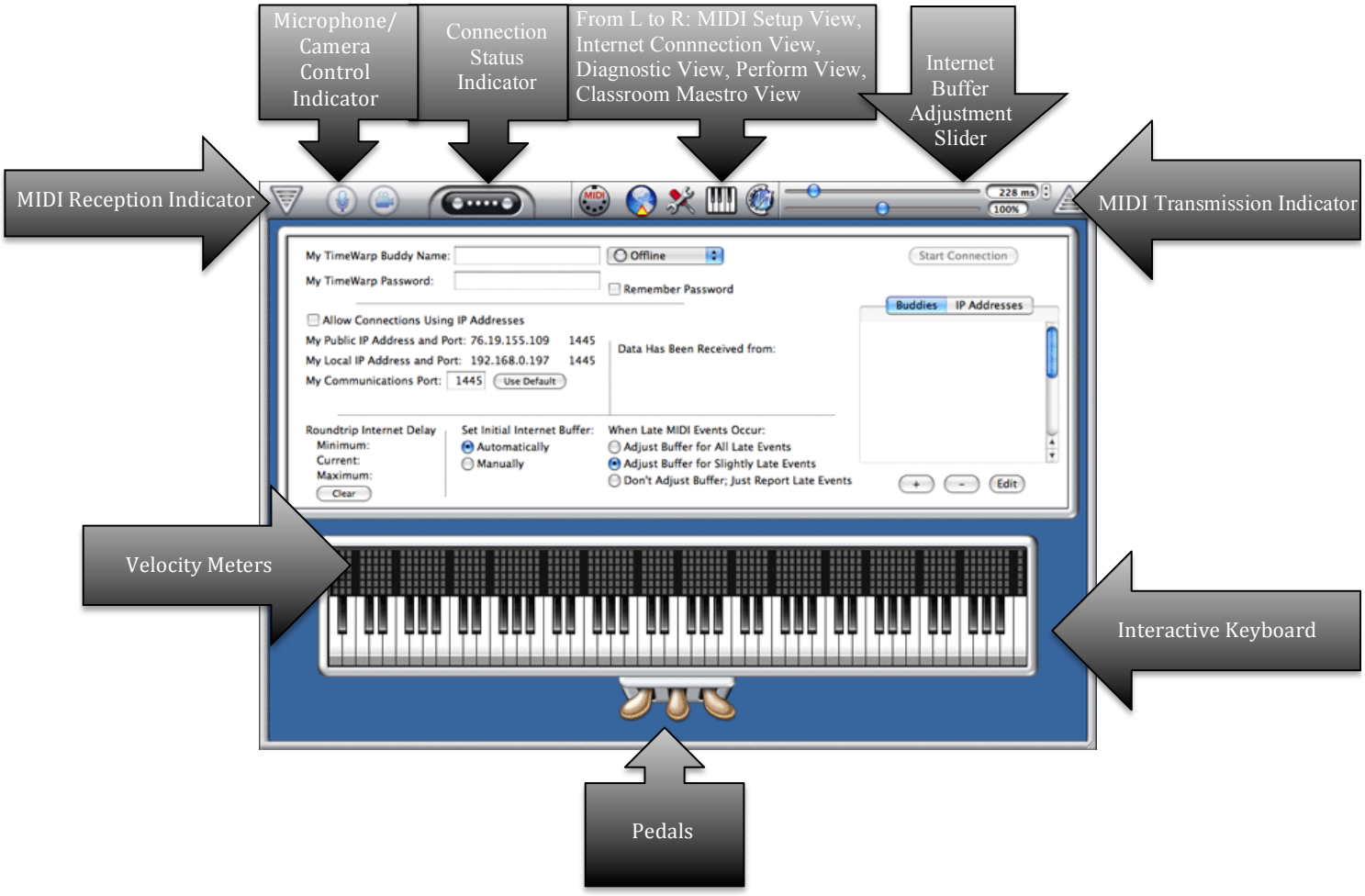


Figure 1. Screenshot of Internet MIDI Buttons, Controls, and Indicators

The distance lessons took place in a virtual environment. The teacher and student only met online during the study in order to maintain a purely distance relationship. Children who

were selected to receive face-to-face lessons (n = 9) received traditional instruction at the instructor's home studio and studied on a Yamaha C3 grand piano. These participants were required to have access to either an acoustic piano or a digital keyboard with similar features as listed previously in order to practice repertoire and other assignments. No other technology aids or enhancements were used in these traditional lessons.

Procedures

Mill's method of difference (Madsen and Madsen, 1997) is applied in this research design, with all variables controlled to be as similar as possible in the control and experimental group, including students, teacher, instruments, and curriculum. The one known contrasting variable between the two groups was lesson environment.

This exploratory study of musical achievement, lesson behaviors, and attitude resulting from traditional and distance piano lessons was conducted during a 7-month period of 2011. IRB forms were mailed to all students to sign and return before the first scheduled meeting. The beginner readiness assessment, initial interview, and online survey with all students took place one week prior to the start of lessons. For distance students, these sessions also included a technology component to practice connecting computers and keyboards and adjust any equipment as needed.

Weekly lesson appointments were 30 minutes, with 9 lessons given during an 11-week summer term and 14 lessons given during a 15-week semester in the fall term, totaling 23 lessons over the 7-month period. Scheduling considerations, such as the day and time of lessons, were discussed with parents to determine a convenient lesson schedule for the student and teacher. If lessons were missed due to a conflict with appointment time, illness, or technology complications, those lessons were not rescheduled and not made-up. Therefore, the maximum

number of lessons a student could receive was 23 lessons. However, students were permitted to miss lessons and continue with the remainder of the study.

The study curriculum, based on a popular piano method series *Piano Adventures* by Faber & Faber (1996), focused on concepts and skills such as note reading, piano performance, technique, sight-reading, ear training, and basic theory. This piano method was chosen because of the book's sequential, age-appropriate presentations of musical concepts and songs for a 6-9 year old beginning pianist. Though all initial lessons were similar in concept and approach, some students were expected to move ahead of others while progressing, as typical private piano lessons are flexible in this way. The 30-minute piano lesson focused on traditional concepts in every lesson such as music reading, technique, and piano performance. All lessons consisted of the following components: an initial greeting period, discussion of and documentation of the student's practice log, review and performance of the lesson assignment, check and discussion of written theory pages, discussion of new concepts, presentation of new pieces, review of the week's assignment, and a final discussion about what and how the student would practice for the week. The instructor informally assessed all skills weekly through student performance and verbal discussions in order to determine if the student mastered the skill and was ready to proceed to the next concept.

Every four weeks throughout the treatment period, students practiced on the post-assessment skills of playing from memory, sight-reading, and playing by ear, in addition to the traditional concepts focused on in every lesson. These practice excerpts were presented in a similar fashion to how the post-test measurements would be presented. During the first practice of these skills, the instructor briefly explained the skills sight-reading, visual memory, and aural memory, and described to the students how to perform these tasks. For sight-reading and visual

memory, the students were given approximately one minute to preview the excerpt and then perform the task. For the visual memory task, the excerpt was removed from sight for the student's performance. For the aural memory tasks, the instructor performed the short excerpt three times on the piano, followed by the student performance. The instructor directed the student on where to place his hand on the keyboard in order to know the starting note. For example, I would say, "Your left hand starts with thumb on C." The student was instructed to perform all excerpts at his or her best and to not stop and restart once the excerpt had begun. Appendix I shows the original compositions and copyrighted excerpts practiced every four weeks in preparation for the post-lesson performance assessments. Appendix J contains letters of permission to reprint the copyrighted music in Appendix I. Table 1 outlines a schedule for the total number of lessons and the concepts and skills covered each week.

Each traditional lesson was videoed with a digital recorder capturing the student and teacher live during the lesson. The distance lessons were recorded with the screen recording and video editing software *Camtasia* (www.http://www.techsmith.com/ camtasia/). Videos were archived for subsequent analysis and to document treatment.

During the treatment period, each child maintained a practice log for each practice week between lessons, keeping a record of days practiced and student goals. The log included how many days the student practiced, practice pages and assignment, and goals the student had for the week. Appendix K displays the form that students used to keep record of their weekly practicing, with completion of the log monitored weekly by parents and confirmed by the teacher at each week's lesson. The student marked the date of the lesson, the days of practice, the pages of song selections practiced, and any comments about what they worked on for that week. A parent signature confirmed this documentation.

Table 1
Outline of Weekly Lesson Content

Lesson Number	Skills	Concepts
1-3	Music reading, technique, performance	Steady beat, Pre-reading notation, Quarter and Half notes
4	*Sight-reading, visual memory task, aural task	
5-7	Music reading, technique, performance	C five-finger scale, Pre-reading notation, Whole notes, Dynamics
8	*Sight-reading, visual memory task, aural task	
9-11	Music reading, technique, performance	Middle C hand position, Dotted Half Note, Music Staff, Treble and Bass Clef, Landmark Notes, Stepping
12	*Sight-reading, visual memory task, aural task	
13-15	Music reading, technique, performance	Time Signatures 4/4 and 3/4, More than single notes played in one hand, Changing finger numbers
16	*Sight-reading, visual memory task, aural task	
17-19	Music reading, technique, performance	Bass C, C-five-finger scale on music staff, Skips, Playing hands together, Recital Repertoire Piece
20	*Sight-reading, visual memory task, aural task	
21-22	Music reading, technique, performance	Tie, Quarter Rest, Memory on Recital Piece
23	*Sight-reading, visual memory task, aural task	

Note. *Practice of the posttest achievement skills.

The final musical achievement assessment, interview, and posttest attitude surveys were completed one week after lessons concluded. All tests and discussions were digitally videoed and audio-recorded for analysis. A piano recital concluding the study period was held for all students and parents at Louisiana State University that blended the face-to-face students with the online students in a live, online steam.

Pilot Study for Online Lessons

Though the researcher was an experienced and nationally certified piano teacher, she conducted a pilot study with two online beginning piano students in order to test equipment and technology, delivery of content, and practicality of the entire study design. Before beginning the study and collecting of data, the researcher spent the four months prior to the treatment period working with an 8-year old beginning student and an adult beginning piano student, both in the same household in order to have an adult capable of troubleshooting when technology issues occurred. This family was located in Pennsylvania. The lessons were set for weekly 30-minute appointments, though these lessons were flexible to extend beyond that time frame if more time was needed to work through a technology issue or consider alternative options for working in this lesson environment.

It was determined that the equipment identified for use in the study was appropriate and satisfactory for the online beginning lesson environment. The best camera angle for maximum visual observation was a profile view, in order for the instructor to see the child's body position, hand and finger position, and also for monitoring the child's line of sight when reading music. It was also helpful for the student to have a pencil at the piano and sticky notes or tabs in order to mark page assignments.

I spent a great deal of time with pilot participants troubleshooting technology issues. These problems were a direct result of the Internet and could have been affected by the bandwidth speed, time of day the Internet was used, how many other people were using the Internet at the same time, and computer hardware issues. Some of the technology issues that were discussed were: camera angle, sound cancelation issues, establishing a reliable connection, picture quality, and audio quality for both software programs *Skype* and *Internet MIDI*.

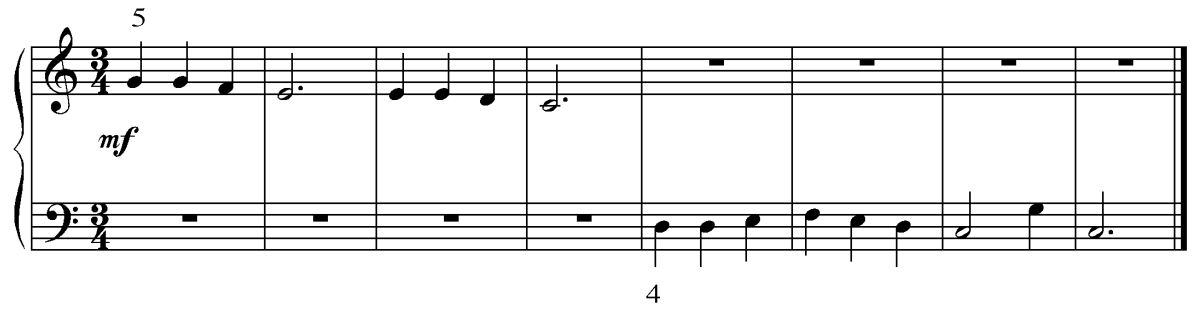
After teaching the 8-year old student from the *Piano Adventures* piano method book during the pilot study, I decided that students of this age in the online environment were capable of completing the same curriculum following the same pacing as the traditional students. I confirmed that traditional students and online students for the present study would use the *Piano Adventures* Primer Level curriculum, including the lesson book, performance book, and theory book. Through consistent practicing and lessons for the full 23 weeks, it was expected that all students would complete the primer level by the end of the study period in order to be fully prepared for the posttest assessments.

Musical Achievement Assessment

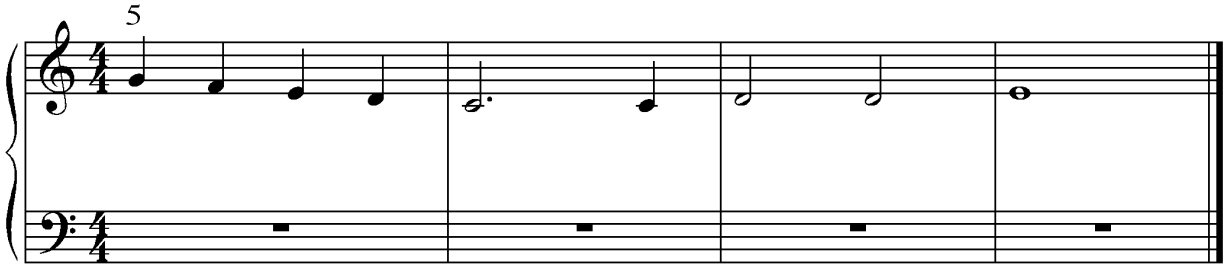
Assessment of musical achievement over the period of 23 piano lessons was conducted using an evaluation tool created by McPherson (1995) and adapted for the present study specifically for beginning pianists. This musical performance assessment had four components: a prepared or rehearsed selection, a sight-reading excerpt, a visual memory excerpt, and an aural excerpt. These components tested dimensions of the students' musical abilities, all adapted as appropriate tasks for beginning pianists to understand and demonstrate. Figure 2 displays one example each of the sight-reading, visual memory, and aural excerpts.

For the prepared performance component, each child was asked three weeks before the performance test to select a piece that he or she liked and could perform well (McPherson, 2005). According to Chronister (2005), three weeks is enough time to prepare a piece for a musical performance, but the basic notes and rhythms must be learned at least three weeks before the performance. The instructor guided the student's selection in order to choose a piece that was challenging enough but attainable for the student to perform confidently. After the student chose

Sight Reading #1



Playing from Memory #1



Playing by Ear #1

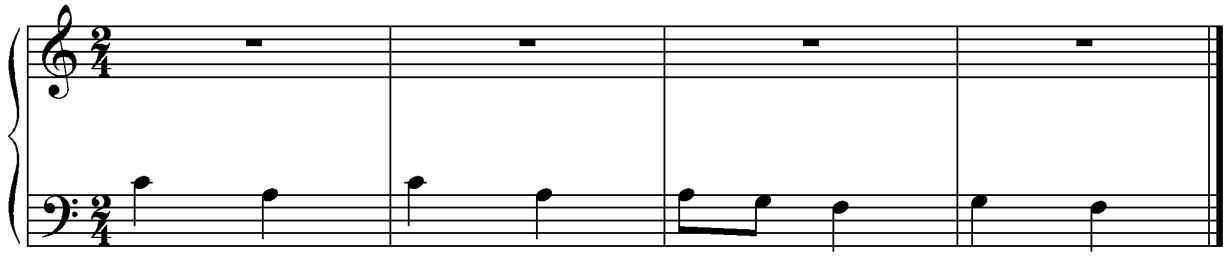


Figure 2. Musical Achievement Test Excerpts

his performance piece, it was rehearsed in the last lessons before the performance post-assessment, similar to end-of-the-semester recital preparation.

Sight-reading ability was measured by having students sight read two examples. The student previewed each piece for one minute, then performed each excerpt twice. Only the second performance was scored. The performance score was determined based on adapted scoring techniques from Baker (2008), whose sight-reading assessments were scored by measures adapted from the Watkins-Farnum exam (Watkins & Farnum, 1962). In this analysis, the beat served as the scoring unit, making it possible for participants to receive two points per beat, one for pitch accuracy and one for rhythm accuracy. Each beat could receive only one pitch error and one rhythm error. Descriptions of the errors are presented in Table 2. Complete scoring guidelines and assessment excerpts are included on the judge score sheet found in Appendix L.

Playing from memory consisted of two visual memory tasks, in which students were asked to visually study the written musical notation of an unknown melody and then perform the piece twice after the notation had been removed from sight. The second performance was scored for analysis. The student had two excerpts to play, one for left hand and one for right hand (the right hand excerpt is presented in Figure 2). Chronister (2005) defined memorization as "remembering what you understand" (p. 251), something easily taught and learned if it begins in the first lessons and grows with all other things the child is learning. Scoring was achieved similarly to the sight-reading scores (see Table 2), one point for accuracy of pitch and one of rhythm per beat.

Playing by ear consisted of playing the music that the student heard aurally only. In these tasks, the student heard a melody performed three times by the instructor on the piano in the

same register. Then, the student was told the starting note of the melody and also which hand to use. The student performed two aural examples, playing each example twice (refer back to Figure 2). This task examined the child's ability to transfer the aural image of the melody he had heard into the fingerings and intervals necessary to perform. Similar to the sight-reading and visual memory assessments, the scoring method for these test items included scoring per beat for accuracy of pitch and rhythm on each test (see Table 2). Though the student played each assessment piece twice, only the second performance attempt was scored for each task in order to allow the student his best attempt at these performance skills.

Table 2
Scoring Definitions for Assessment Measures

Error	Description of Error
Pitch Error	A note or notes added or omitted
	An incorrect note
Rhythm Error	Holding through a rest
	Holding rather than playing repeated notes
	Not holding a note for its full value
	Holding a note longer than its full value
	Any note value omitted or added
	Note not played at all

Pieces used for assessment, except one, were original compositions based on material students learned throughout the research project. One sight-reading excerpt from the beginning piano method *Alfred's Premier Piano Course* (Alexander, Kowalchyk, Lancaster, McArthur, & Mier, 2005) was used for testing. Traditional students read the excerpts from a printed score at

the lesson, and online students read the excerpts from a digital image on their computer screen. Pieces used for sight-reading, memory, and playing by ear were comparable to beginner piano methods for appropriate skill level, such as *Alfred's Premier Piano Course*, and supplemental books such as *Alfred's Basic Piano Library Sight Reading*, *Let's Sightplay*!, and *Piano Adventures Sight Reading Book, Primer Level.* The following were considerations for choosing the assessment pieces: technical difficulty, such as playing hands together or separately; rhythmic difficulty, including quarter notes and rests, half notes, dotted half notes, and whole notes; stationary, five-finger hand positions in either Middle C position or C position; no accidentals; and limited dynamics. The sight-reading excerpt was less technically challenging than students were expected to play in a prepared performance setting by the conclusion of 23 lessons. Considerations for the assessments of playing from memory and playing by ear were the length of the excerpt, playing with hands alone, and visual and aural patterns, such as stepping or skipping intervals.

Analysis of Musical Achievement

Two expert judges, both of whom held doctorates in music education and had extensive piano teaching experience at both pre-college and collegiate levels were asked to score the prepared performance pieces of each student. All performances were audio recorded and saved as digital .wav files. Judges were also given a digital copy of the music score to view while listening to the audio recording. The anonymous audio recordings were placed in a random order on a shared computer folder. Judges were asked to grade the overall performance quality of each student by grading on four 5-point scales: rhythmic accuracy; note or pitch accuracy; continuity; and musicianship, expressiveness, and character qualities. This was similar to judging an elementary piano festival event in that judges are asked to score each student by his own

performance and not in comparison to other students. There was no limit on the number of times judges could listen to each recording. Though no specific definitions were given to differentiate point differences, one point was deemed least accurate or the lowest score, and five points were considered the most accurate or highest score. The four 5-point scales were summed for an overall performance score on a scoring form (see Appendix M).

Because there were no specific definitions for grading students on each 5-point scale, the judges were left to their own opinion of what was deemed "least accurate" and "most accurate." The two observers achieved low inter-observer reliability scores of R = .63 for rhythmic accuracy, R = .68 for note accuracy, R = .37 for continuity, and R = .42 for expressiveness, musicianship, and character qualities. When the scores were recalculated by expanding agreeable scores to plus or minus one point, reliability increased to very acceptable scores of R = .947 for rhythmic accuracy, R = 1.0 for note accuracy, R = 1.0 for continuity, and R = 1.0 for expressiveness, musicianship, and character qualities. Reliability scores were obtained by dividing the total number of agreements by the sum of agreements plus disagreements.

Reliability on the sight-reading task, aural task, and visual memory task with an independent observer was calculated on 15% of the posttest achievement tests. The two observers achieved an interobserver reliability score of R = .89 for the sight-reading tests, R = .95 for the visual memory task, and R = .94 for the aural tests. Reliability scores were obtained by dividing the total number of agreements by the sum of agreements plus disagreements.

Lesson Content of Teacher and Student Behaviors

Though lesson environments of this study were inherently very different in nature, the student and teacher behaviors comprising these one-to-one piano lessons were expected to be similar and, therefore, comparisons were made in how time was spent during lessons. All face-

to-face lessons were recorded using a digital video camera on a tripod in order to capture teacher and student behavior of the face-to-face lessons. Distance piano lessons were recorded using the screen recording and video editing software *Camtasia,* in order to view the computer screen of the teacher and student. Systematic observation of three lessons throughout the teaching period was facilitated in order to compare the time spent in teacher and student behaviors throughout the treatment period. Two reliability experts and the researcher analyzed a beginning piano lesson, a piano lesson in the middle of the treatment, and penultimate piano lesson, all spaced equally apart to represent different stages of the treatment period.

Lesson behaviors as outlined and defined by Siebenaler (1997) and by Dye (2007) were adapted and modified for fifteen target lesson behaviors used in the present study. Each lesson was divided in timings of one activity or episode and then labeled by dominant behavior within one episode. Definitions for these fifteen target behaviors are outlined in Table 3. Refer to Appendix N for entire operational definitions. Though only one behavior was documented, there were many cases where more than one behavior was observed. The dominant behavior was marked with an asterisk and the secondary behavior was noted and deemed as a multi-tasking event in the lesson.

The first step in analyzing the digital recordings was to construct a time script containing episodes of the lesson that could be primarily described by one of fifteen target behaviors. Each episode had a start and stop time as determined by the researcher and reliability expert. How each episode functioned in the lesson was a factor in the start and stop timings. The researcher and reliability expert watched the recorded lessons as many times as necessary to agree 100%

Table 3
Fifteen Target Behaviors for Lesson Content Analysis

Behavior	Definition
Initial Lesson Preparation	Time between the beginning of the lesson and the first lesson activity or transition.
Preparation Instruction	Preparing the student for the next piece or activity. A series of related questions, implied questions, or statements in which there is a single, correct response that conveys something to be learned or recalled.
Preparation Explanation	Specific performance aspects or musical concepts are explained to the student that does not require any desired response.
Student Performance	Student playing the piano, or anything that serves as a function of practice, such as tapping fingers, humming, clapping, singing, and counting exercises. Included is the teacher count-off.
Teacher Performance	Teacher playing the piano, such as demonstrating or modeling, or any activity that serves as a function of practice, such as tapping fingers, humming, clapping, singing, and counting exercises.
Interactive Performance	Teacher and student are playing simultaneously, or are engaged in the same activity, such as playing a duet, tapping fingers, or other functions of practice.
Feedback Instruction	A series of related questions or statements that are related to the previous activity or performance.
Feedback Explanation	Specific details are given by the instructor about the previous activity or performance, but requires no response from the students.
Academic Instruction	Not related to any one specific piece, a series of related questions or statements in which there is a single, correct response that conveys something to be learned or recalled, functioning as a cue for the student to respond to the desired instruction.

Table 3 continued

Behavior	Definition
Academic Explanation	Instruction where specific performance, theory, or technique aspects are explained to the student that does not require any desired response.
Transition	Typically from one lesson activity to the next activity. No academic instruction is given, nor related to the previous or following activity academically.
Student Academic	A student-directed activity that is musically relevant and guides or leads an activity.
Off- Task	No academic instruction is given or discussed.
Technological Issue	Any issue related to any technology component, such as malfunction, adjustment, or physically manipulating the computer or camera.
Lesson Conclusion	Verbal comments or questions at the conclusion of the lessons, gathering books and other materials, recalling practicing assignments and goals, and leaving the piano for the end of the lesson.

that the timed episode served as one lesson activity and also to agree on start and stop times for each episode in the lesson script.

In order to record the target behaviors in videos, the independent reliability observer participated in a training session. The training session included a discussion of each target behavior definition and a viewing of a practice video with the researcher in order to observe examples of each behavior and complete a time script. The independent reliability observer was given a time script, which included the start and stop times of each episode in the lesson, and was asked to decide one behavior for each timed episode. From the time script, the independent reliability observer selected one of the behaviors for the timed episode (see Figure 3). Next, the reliability observer analyzed independently a video for practice data. The researcher checked the behaviors chosen by the independent reliability observer and behaviors were discussed together. Finally, the independent reliability observer was given all time scripts, list of operational definitions, and digital copies of the recorded lessons to be analyzed with all viewings being independent. Some clarifications on the definitions were made intermittently, though no specific or direct examples were used to bias the independent reliability observer's opinions of her answers.

The researcher and independent reliability observer achieved an inter-observer reliability score of R = .83 for all 12 videos. The beginning videos had the highest reliability score of R = .88, followed by R = .85 for the middle videos, and R = .77 for the ending videos. Reliability scores were obtained by dividing the total number of agreements by the sum of agreements plus disagreements. Statistical analysis of number of seconds of time spent in the lessons were compared for specific differences between face-to-face and distance lessons, for differences among the beginning, middle, and ending lessons, and for any interaction effect.

Lesson Activity	Time	IL Prep.	Preparation		Performance			Feedback		Academic		TRANS	ST. A	Off-Task	Tech. Issue	Lesson Concl.
			PI	PE	SP	TP	INT	FI	FE	AI	AE					
1	00:00-00:49															
	00:50-01:14															
	01:15-02:20															
	02:21-03:50															
	03:51-04:09															
	04:10-04:22															
	04:23-04:28															
	04:29-04:34															
	04:35-04:41															
	04:42-05:11															
2	05:12-05:31															

Figure 3. Time Script for Reliability Observer

Attitude Survey

In order to assess student attitude towards piano lessons, each student completed an attitude survey regarding his or her feelings about piano study, the lesson environment, skills learned in piano lessons, playing piano, and the child's relationship with the teacher. Children were asked what they thought they would learn from piano lessons, how they felt about learning to play piano, how they felt about taking lessons in their respective lesson environment, how piano lessons and playing music made them feel, how they felt about reading music in lessons, and the relationship they expect to have with the teacher. The Likert scale for the survey was 3-points with answer choices displayed as a set of faces. The questions and faces are presented in Table 4. The faces were age-appropriate and thought to be motivating for students. The faces found in Sims (1987) and Sims and Cassidy (1997) were found to be a reliable measurement tool for young children.

Participants were verbally told that the faces meant "I disagree," "I do not know," or "I agree." All students took the survey on a computer during the beginning readiness assessment before starting weekly lessons. Distance students took the survey on their computer while the instructor followed from her computer screen. Traditional students read the survey and answered on the computer at the instructor's home studio.

The attitude survey was based on a compositional attitude survey developed by Menard (2009), which was modeled after Wehr-Flowers (2006) and the Fennema and Sherman Mathematics Attitude Scales (1976). Two practice questions were given to students, in order to ensure that they understood the procedure. All questions were tailored for appropriateness to piano instruction and lesson environment. After participation in the 7-month lesson period, a post-lesson Likert attitude survey identical to the first survey was administered.

Table 4
Pretest and Posttest Questions for Attitude Survey

Question	Face Choices		
	1- I disagree.	2 – I don't know.	3.- I agree.
			
1. Practice question: The sky is blue.			
2. Practice question: Summer is my favorite time of year.			
3. I am excited to take piano lessons to learn to play songs on the piano.			
4. I think it is great when someone my age can play piano.			
5. I will be no good at playing piano.			
6. I think I can learn how to read music in order to play songs on the piano.			
7. The best part about taking piano lessons will be playing music.			
8. I am scared I will not do well learning to play piano.			
9. I think playing piano will make me feel good about myself.			
10. Learning to read music will not be a problem for me.			
11. I am sure that I can learn to play piano by taking lessons over my computer/at my teacher's home.			
12. I will be able to use all the equipment needed for piano lessons.			
13. Piano lessons make me feel uncomfortable and nervous.			
14. It is important for my teacher to understand how I feel and what I have to say.			
15. I will be able to have a friendship with my piano teacher			
16. Taking piano lessons on the Internet is just as good as taking piano lessons face-to-face.			

Analysis of Attitude Survey

Participants completed the survey once before beginning the lesson period and once at the end of the lesson period. Each question was given a total score by summing students' responses. The thumbs-down face was given one point for scoring, the face with arms shrugging was worth weighted two points, and the thumbs-up face was weighted three points. In the face-to-face group (n = 9), each question's score could possibly range from 9 to 27 points. In the experimental group (n = 10), each question's score could possibly range from 10 to 30 points. Scores were compared for changes between lesson groups and between pretest to posttest.

Interview questions were developed to address students' views of enrolling in piano lessons, the relationship between teacher and student, and students' perceived advantages and disadvantages of both lesson environments. The interviews were video recorded, and answers were transcribed and compiled.

Analysis Summary

Data collected from musical achievement analysis and video behavior analysis were used for statistical analyses. Pretest and posttest surveys and interviews were compared as descriptive data. All statistical tests were two-tailed and probability level was set to p = .05. Null hypotheses for tests were:

1. There will be no difference between a face-to-face lesson setting and distance lesson setting on the musical achievement of traditional-aged, beginning piano students.
2. There will be no differences in student and teacher behaviors between the face-to-face lesson setting and distance lesson setting and no difference across time.
3. There will be no difference between students' attitudes in the two lesson settings and no difference across time.

CHAPTER 3
RESULTS

The purposes of this study were to examine the effects of lesson environment on beginning piano students' musical achievement, lesson time spent in target behaviors, and student attitude toward piano lessons. Participants were traditional age beginning piano students (ages 6-9) with no prior private music instruction. All participants completed a pre-lesson survey that consisted of fourteen questions about the lesson environment, student and teacher relationship, and feelings about piano study. Participants were placed into one of the two lesson groups for the study based on student location and ability to reserve all necessary equipment. Each student in the traditional (n = 10) and online lesson groups (n = 10) had a weekly 30-minute private piano lesson. Participants in the online group interacted with the instructor solely in the online lesson environment from their homes without any physical contact during the entire treatment process. Participants in the traditional lesson group met for lessons at the instructor's home studio.

All students worked on piano skills and posttest skills that gradually increased in difficulty throughout the lesson period. At the conclusion of lessons, the posttest musical achievement tests were given to participants. The posttest included a prepared performance task, two sight-reading tasks, two visual memory tasks, and two aural memory tasks, as well as the attitudinal survey that was identical to the pretest survey. One student enrolled in traditional lessons was unable to complete the study and dropped out after the seventh lesson, resulting in only nine students in the traditional lesson group. Pretest and posttests were analyzed and compared between groups and across variables to determine differences among students that may have been affected by the lesson environment.

Musical Achievement

The four dependent variables measured for each student's performance achievement skills were a prepared performance task, two sight-reading tasks, two visual memory tasks, and two aural memory tasks. Two expert judges scored the prepared performance task on four 5-point scales including rhythmic accuracy, note accuracy, continuity, and expressiveness. These scales totaled to a score between 4-20 with 20 being the highest score possible. Sight-reading, visual memory, and aural memory tasks were scored based on pitch accuracy and rhythmic accuracy. The two sight-reading tasks totaled 56 beats, and each beat was worth one point for the correct pitch and one point for the correct rhythm. The highest possible score for both sight-reading pieces combined was 112 points. The two visual memory tasks totaled 40 beats, and each beat was worth one point for the correct pitch and one point for the correct rhythm. The highest possible score for both visual memory pieces combined was 80 points. The two aural memory tasks totaled 20 beats, and each beat was worth one point for the correct pitch and one point for the correct rhythm. The highest possible score for both aural memory pieces combined was 40 points. Because all scores were calculated on different scales, the scores were converted to percentages for analysis.

A multivariate ANOVA was used to determine if the four dependent measures were affected differentially by the two treatments. The overall MANOVA revealed no significant main effect for lesson environment, Wilks' $\lambda = .867$ [F (4, 14) = .53, $p = .71$]. Results are graphically displayed in Figure 4.

The four achievement scores of students in the traditional lesson environment were higher than students' scores in online lessons, but the difference was not enough to be considered

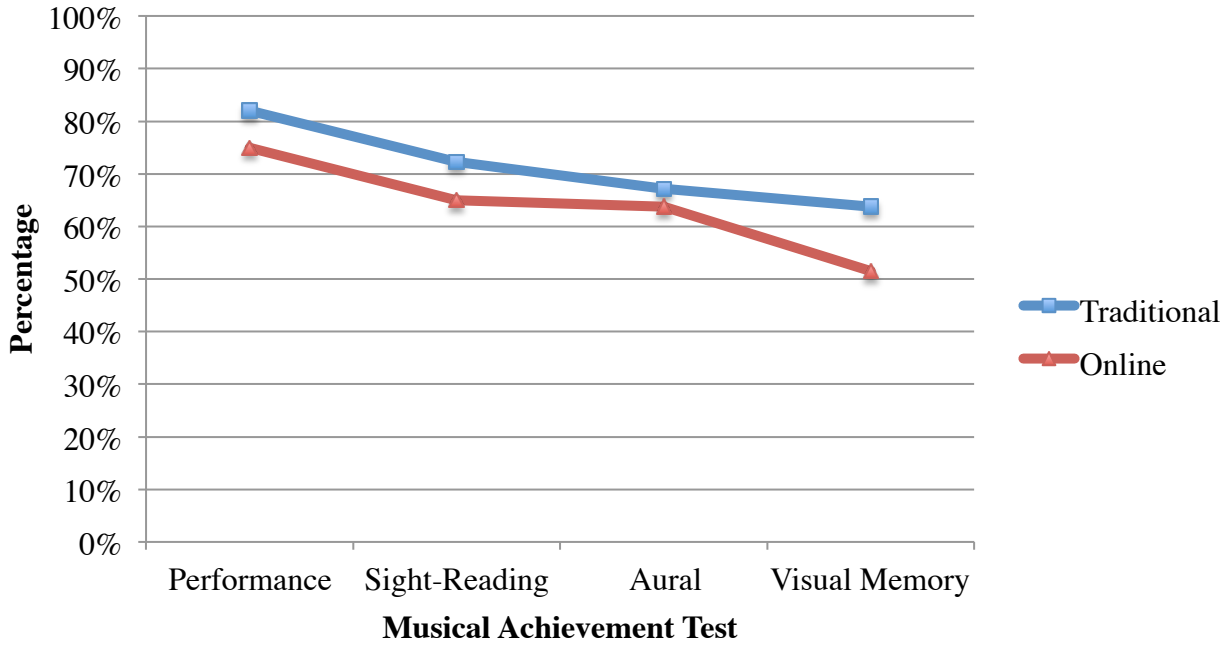


Figure 4. Posttest Musical Achievement Scores for Traditional and Online Lesson Groups

significant. The scores on the prepared performance assessment for both the traditional group (*M* = 81.67%, *SD* = 10.25) and online group (*M* = 75.20%, *SD* =8.72) were the highest of all four achievement tests. Following the prepared performance test, the next test in rank order was sight-reading for the traditional group (*M* = 72.32%, *SD* = 19.74) and the online group (*M* = 65%, *SD* = 14.24), followed by the aural tasks for both groups (*M* = 67.22%, *SD* = 14.33 and *M* = 63.75%, *SD* = 12.76, respectively). The lowest scores on the achievement tests were on the visual memory task by both the traditional group (*M* = 63. 75%, *SD* = 28.98) and the online group (*M* = 51.5%, *SD* = 22.03). The consistency of rank order of assessments between the two groups was striking. The standard deviations for the online lessons were smaller for every achievement score, meaning that this groups' performances were more similar than compared to the traditional students' scores, which showed greater variability among participants.

Given no overall significance, univariate tests were not considered. An examination of each score component is displayed in Figure 5 (Prepared Performance), Figure 6 (Sight-Reading), Figure 7 (Visual Memory), and Figure 8 (Aural Task). In every component for every achievement test, the traditional group average was slightly higher than the online group average. These scores reinforce that the traditional group consistently had higher overall performance scores on all components compared to the online lesson group, but were not significantly different in any way between groups and across the four achievement tests.

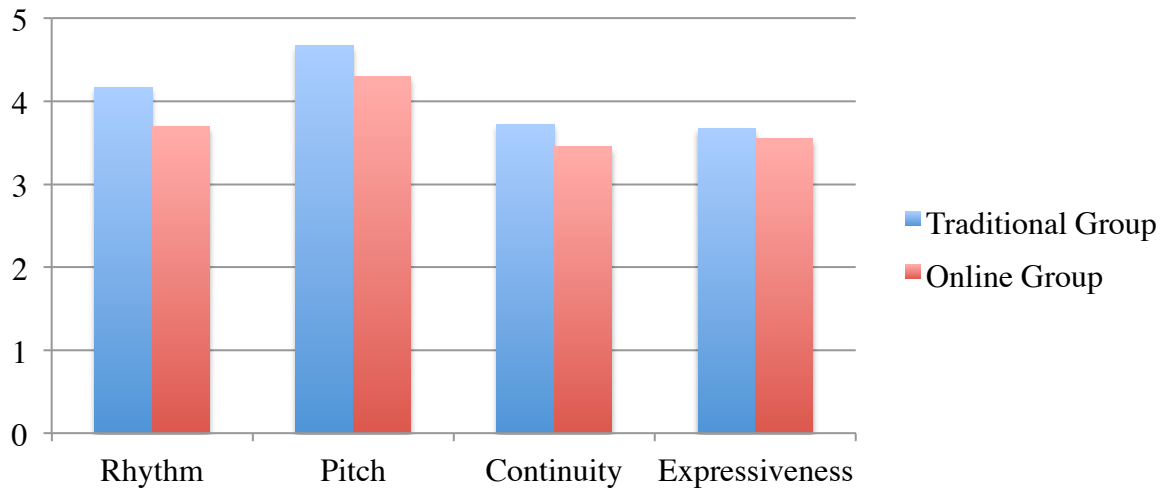


Figure 5. Four 5-point Scales Averaged for Performance Score

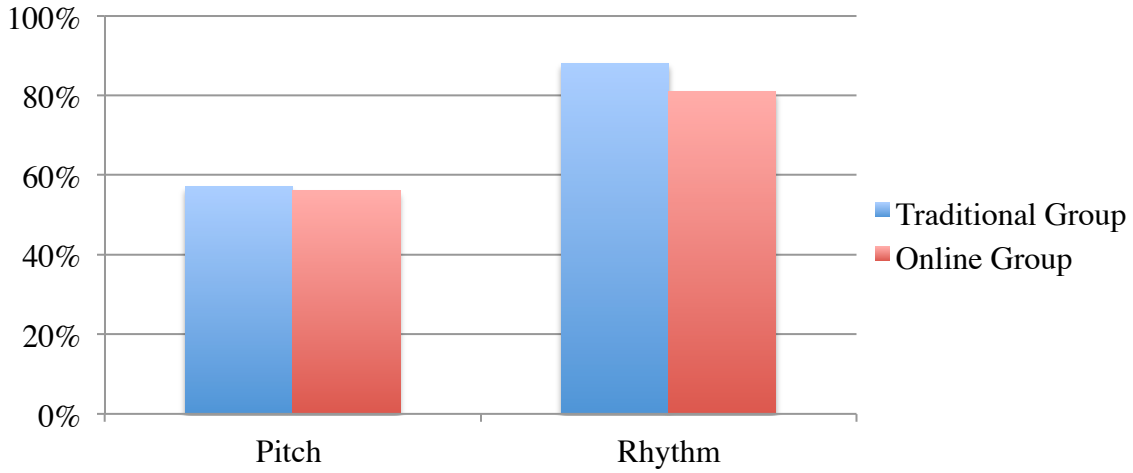


Figure 6. Average Pitch and Rhythm Percentages for Sight-Reading Tasks

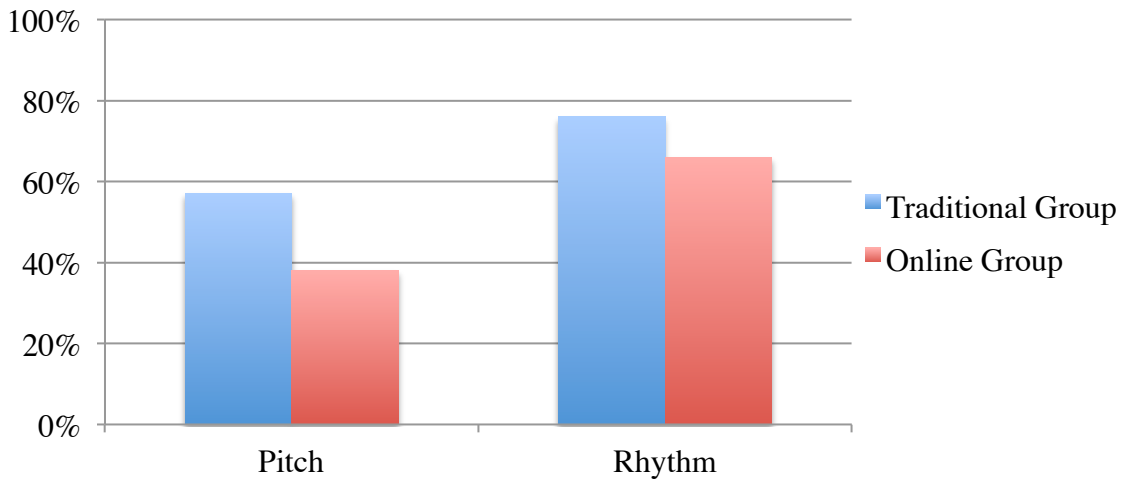


Figure 7. Average Pitch and Rhythm Percentages for Visual Memory Tasks

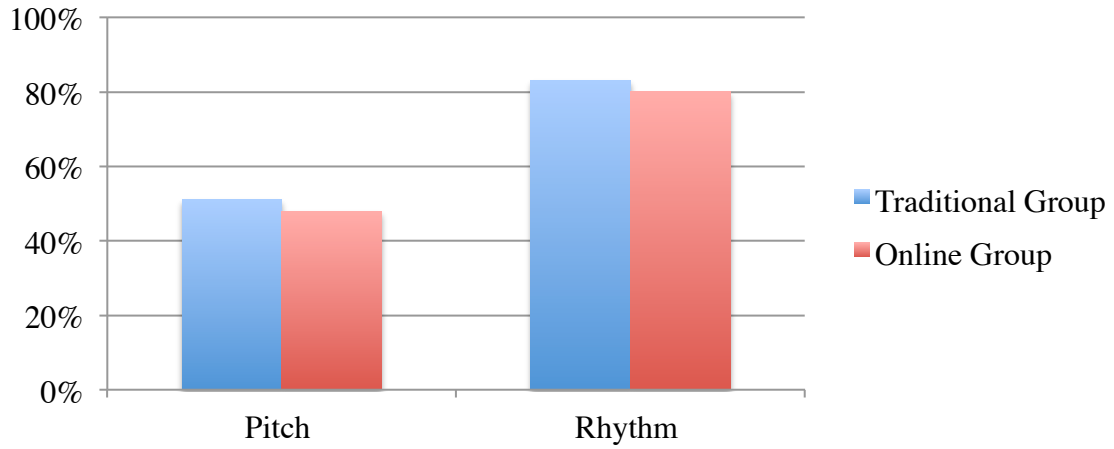


Figure 8. Average Pitch and Rhythm Percentages for Aural Tasks

Target Lesson Behaviors

The 19 subjects were assigned to one of two lesson groups, traditional and online. All lessons throughout the entire treatment were videotaped. Of the recorded lessons during the treatment period, the second lesson, the eleventh lesson, and the penultimate lesson were selected for comparison. I was interested in noting any differences between the two lesson environments in time spent in behaviors among the beginning, middle, and ending of the treatment period. This resulted in 57 (19 students X 3 lessons) video analyses for time spent in target behaviors.

The intention of the instructor/researcher was to provide 30-minute weekly lessons to all participants over the course of the seven months of the study. In reality, that was difficult to control. To observe the equivalency of overall time spent in lessons between groups and across time, a two-way ANOVA with repeated measures was calculated on total minutes (converted to seconds) spent in each lesson.

The results from the within subjects comparison show a significant difference for total time spent in the first, middle, and last lesson [$F(1,2) = 3.39$, $p < .05$]. The seconds spent in the first lesson averaged to 1,917.53 (SD = 279.40), or 31 minutes and 57.6 seconds. The middle lesson length slightly decreased to 1,877.47 seconds (SD = 174.75), or 31 minutes and 17.4 seconds. The final lesson was the shortest length, averaging to 1,735.26 seconds (SD = 301.35), or 28 minutes and 55.2 seconds. The least significant difference post-hoc test showed that there was no significant difference between the beginning to middle lesson (p = .59). The time difference between the beginning to the ending lesson was found to be significant (p = .046) and also significant from the middle lesson to ending lesson (p = .04).

There was also a significant difference in the between subjects comparison for the lesson groups [$F(1,1) = 6.02$, $p < .05$]. The mean seconds spent in online lessons was 1,929.77 (SD = 232.57), or 32 minutes and 9.6 seconds. The mean seconds spent in traditional lessons was less at 1,747.48 (SD = 270.13), or 29 minutes and 7.2 seconds. There was no Lesson Group x Lesson Time interaction effect [$F(1,2) = .15$, $p > .05$). These results are shown in Table 5. Because the online lessons were found to be significantly longer in length than the traditional lessons, and the lesson lengths decreased from beginning, middle, and ending lesson, time spent in each category were converted to percentages for further analysis.

Table 5
Repeated Measures Two-Way ANOVA Source Table

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Lesson Group	472185.79	1	472185.79	6.02	.03
Error (Lesson Group)	1333228.77	17	78425.22		
Lesson Time	352596.11	2	176298.06	3.39	.045
Lesson Group x Lesson Time	15161.94	2	7580.97	0.15	.87
Error (Lesson Time)	1768816.66	34	52024.02		

Fifteen target behavior categories were defined to document student and teacher behavior during the 30-minute lessons. In the analysis of each videotape, the time duration for each activity segment was scripted using the start and stop time to define each lesson episode, then labeled with one target behavior for each episode. It is important to remember that participants often executed more than one category simultaneously. However, only the dominant behavior was observed and recorded for time spent in an episode. Episode seconds were totaled by the 15 target behavior categories for each lesson and converted to percentages for subsequence analysis.

A Three-Way Repeated Measure ANOVA test was used to calculate differences between lesson group (traditional lessons and online lessons), fifteen target behaviors, and the lesson time (beginning, middle, and ending lesson). Results from this analysis are presented in Table 6. There was no significant different due to the main effects of Lesson Group, with identical means between the traditional group (M = 6.67%, SD = 8.97) and online group (M = 6.67%, SD = 8.85), [$F(1,1) = .05$, $p > .05$]. There also was no significant difference found among the within-subjects factor Lesson Time [$F(1,2) = .73$, $p > .05$], (beginning lesson M = 6.67%, SD = 8.25; middle lesson M = 6.67%, SD = 9.59; ending lesson M = 6.67%, SD = 8.84). There was no significant interaction effect of Lesson Time x Lesson Group [$F(1,2) = .40$, $p > .05$]. These

findings of no significant difference are not surprising, since both lesson groups spent 100% of time in the target behaviors during beginning, middle, and ending lessons.

Table 6
Three-Way Repeated Measures ANOVA Source Table

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Lesson Group	7.49E-7	1	7.49E-7	.05	.820
Error (Lesson Group)	.00	17	1.47E-5	1.47E-5	
Lesson Time	9.33E-6	2	4.66E-6	.73	.489
Lesson Time X Lesson Group	5.12E-6	2	2.56E-6	.40	.673
Error (Lesson Time)	.00	34	6.39E-6		
Behaviors	41993.80	14	2999.56	94.77	.000
Behaviors X Lesson Group	3983.64	14	284.55	8.99	.000
Error (Behaviors)	7533.06	238	31.65		
Lesson Time X Behaviors	4001.52	28	142.911	7.69	.000
Lesson Time X Behaviors X Lesson Group	1410.38	28	50.37	2.71	.000
Error (Lesson Time X Behavior)	8847.09	476	18.59		

There was a significant difference found among the 15 target behaviors [$F(1,14) = 94.77$, $p < .05$]. This finding was expected due to the inherent differences in the target behaviors themselves, for example between student performance time versus transition time. These means and standard deviations of the target behaviors can be found in Table 7.

Of most interest are the interactions. A significant two-way interaction effect of Behaviors x Lesson Group was found [$F(1,14) = 8.99$, $p < .05$]. Figure 9 displays this interaction in a graph. Clear differences occurred between groups in percent of time spent in student performance (traditional $M = 23.77\%$, SD = 9.82, online M = 20.92%, $SD = 7.13$), interactive performance (traditional $M = 8.20\%$, $SD = 1.19$, online $M = 0.20\%$, $SD = 0.81$), academic

Table 7
Means and Standard Deviations of Percent of Time Spent in Fifteen Target Behaviors

Target Behavior	Mean	SD
Initial Lesson Preparation	2.65	1.82
Preparation Instruction	22.58	10.36
Preparation Explanation	0.54	1.08
Student Performance	22.35	8.23
Teacher Performance	2.72	3.23
Interactive Performance	4.34	5.68
Feedback Instruction	10.73	5.53
Feedback Explanation	1.55	1.93
Academic Instruction	10.74	6.27
Academic Explanation	1.04	1.34
Transition	8.53	4.11
Student Academic	0.72	1.81
Off-task	2.40	2.66
Technology Issue	6.59	11.24
Lesson Conclusion	2.53	1.74
Total	*100.01	

Note. *Total is above 100% due to rounding.

instruction (traditional M = 12.69%, SD = 5.78, online M = 8.79%, SD = 6.00), transition (traditional M = 7.08%, SD = 3.72, online M = 9.98%, SD = 4.03), and technology issues (traditional M = .00%, SD = .00, online M = 13.17%, SD = 12.94). The remaining ten behaviors were similar between the two groups. A table of these means and standard deviations for the traditional group's and online group's total target behaviors can be found in Appendix P.

A significant interaction effect of Lesson Time x Behaviors was also found [$F(1,28) = 7.69$, $p < .05$]. Many target behaviors changed over time (see Figure 10), which was expected as the instructor and students changed and became more accustomed to the lesson pacing and lesson

environments. More time was spent in preparatory instruction in the middle lesson (M = 29.13%, SD = 10.82) than either the beginning lesson (M = 21.33%, SD = 6.80) or ending lesson (M = 17.28%, SD = 9.19). As might be expected right before a recital, more time was spent in student performance in the ending lesson (M = 28.32%, SD = 9.60) than the previous lessons (beginning M = 18.99%, SD = 4.79; middle M = 19.73%, SD = 5.77). This was off set by a corresponding decrease in the amount of academic instruction in the ending lesson (M = 6.05%, SD = 6.32), as compared to the beginning lesson (M = 13.14%, SD = 3.75) and middle lesson (M = 13.02%, SD = 5.42). There also was a clear difference and consistent decrease in the amount of time spent in technology issues from beginning (M = 9.47%, SD = 13.81), to middle (M = 6.93%, SD = 12.69), to ending lesson (M = 2.09%, SD = 1.54). There was also a consistent increase in the amount of time spent in transitions from beginning (M = XX%, SD =), to middle (M = XX%, SD =), to ending lesson (M = XX%, SD =). These means and standard deviations for target behaviors across beginning, middle, and ending lessons can be found in Appendix P.

Lastly, a significant three-way interaction effect of Lesson Time x Behaviors x Lesson Group was found [$F(1,28) = 2.71$, $p < .05$]. This interaction is graphed and displayed in Figure 11. It is clear that some behavior categories resulted in similar percentages of time regardless of lesson group or lesson behavior (initial lesson preparation, preparation explanation, feedback explanation, academic explanation, student academic, off-task, and lesson conclusion). Others were much more disparate among the lesson group/lesson time combinations (preparation instruction, student performance, teacher performance, interactive performance, feedback instruction, academic instruction, transition, and technology issue). To more clearly compare lesson behaviors, graphs comparing each behavior between traditional and online groups over

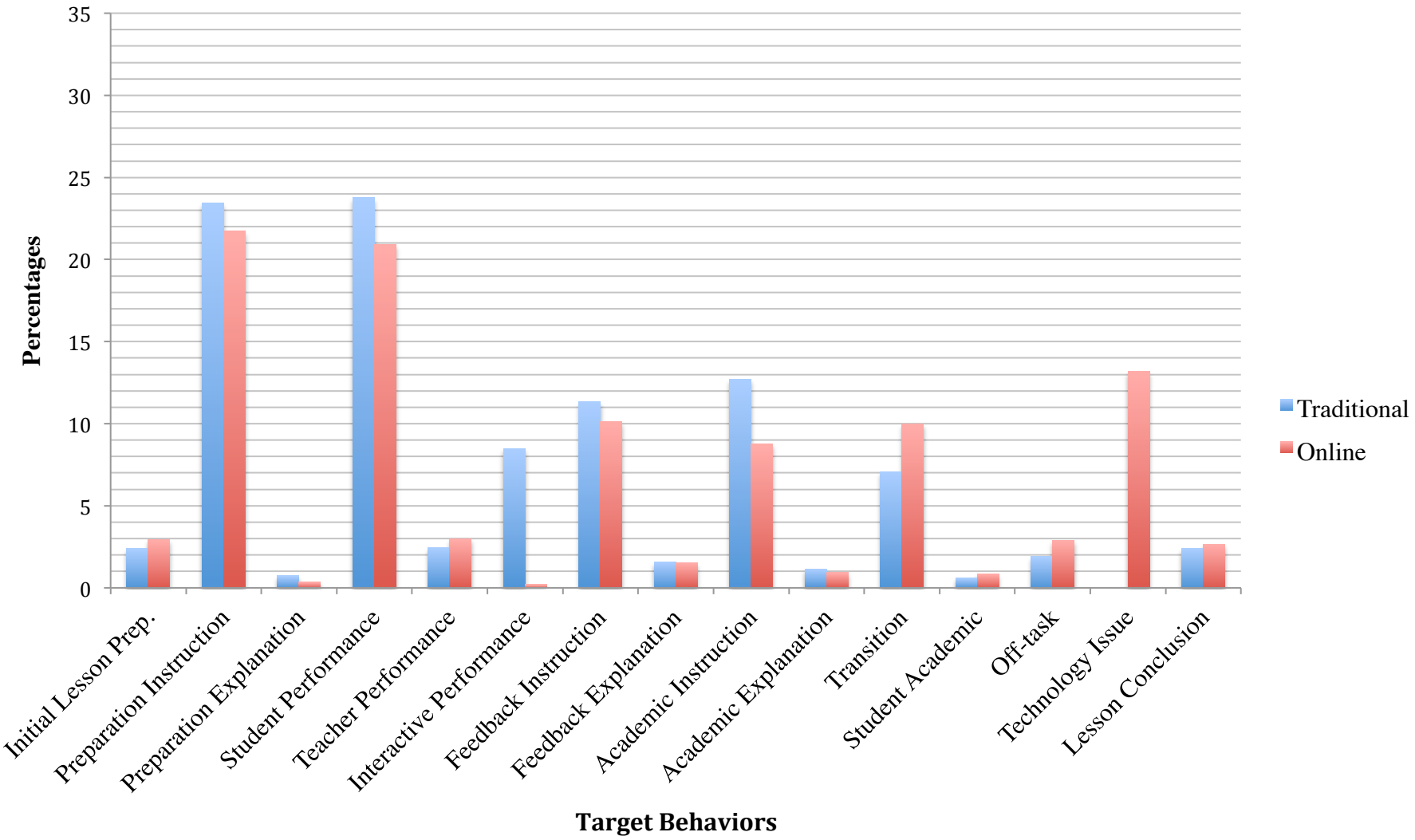


Figure 9. Target Behavior Means for Traditional Group and Online Group

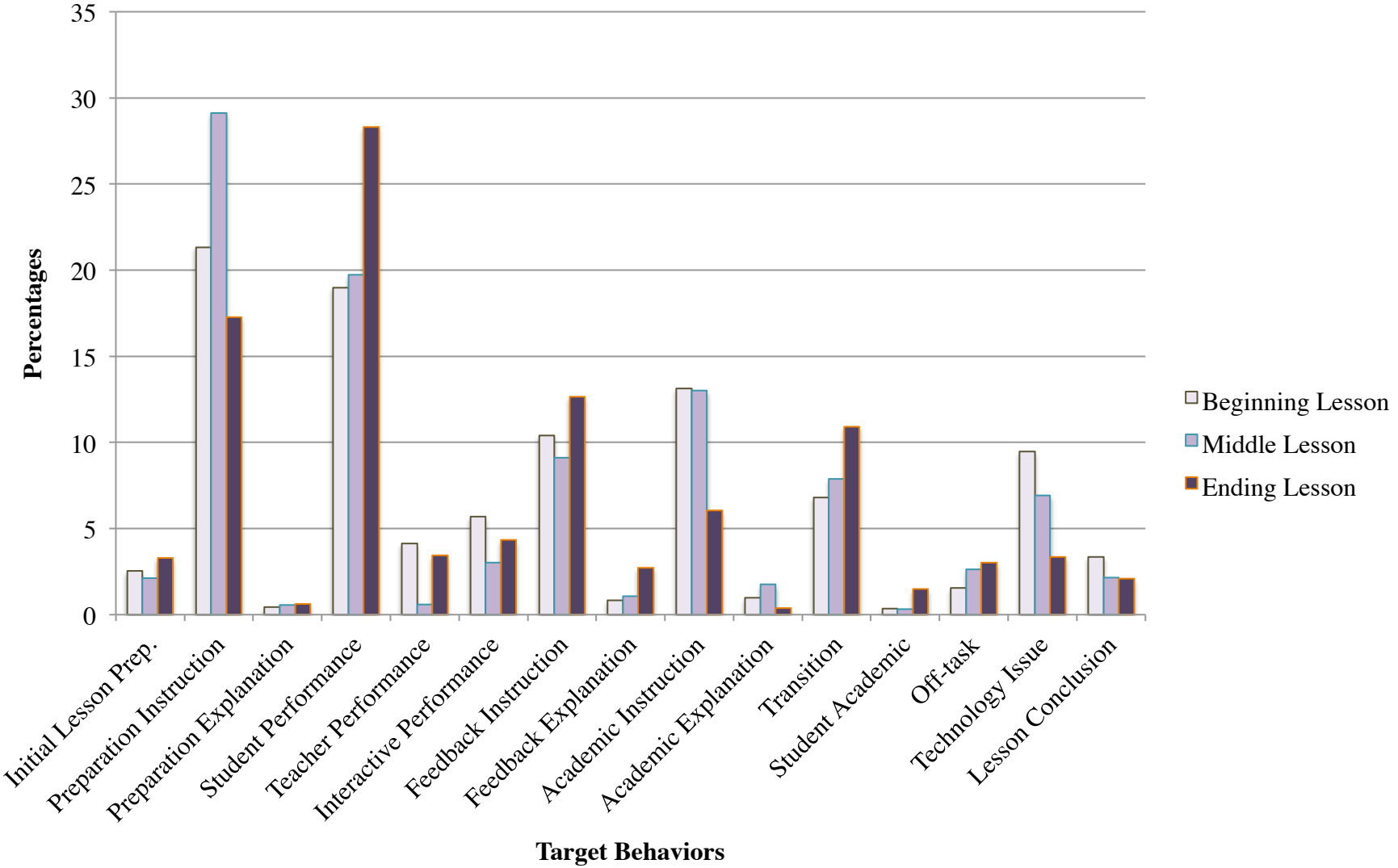


Figure 10. Target Behavior Means of Beginning Lesson, Middle Lesson, and Ending Lesson

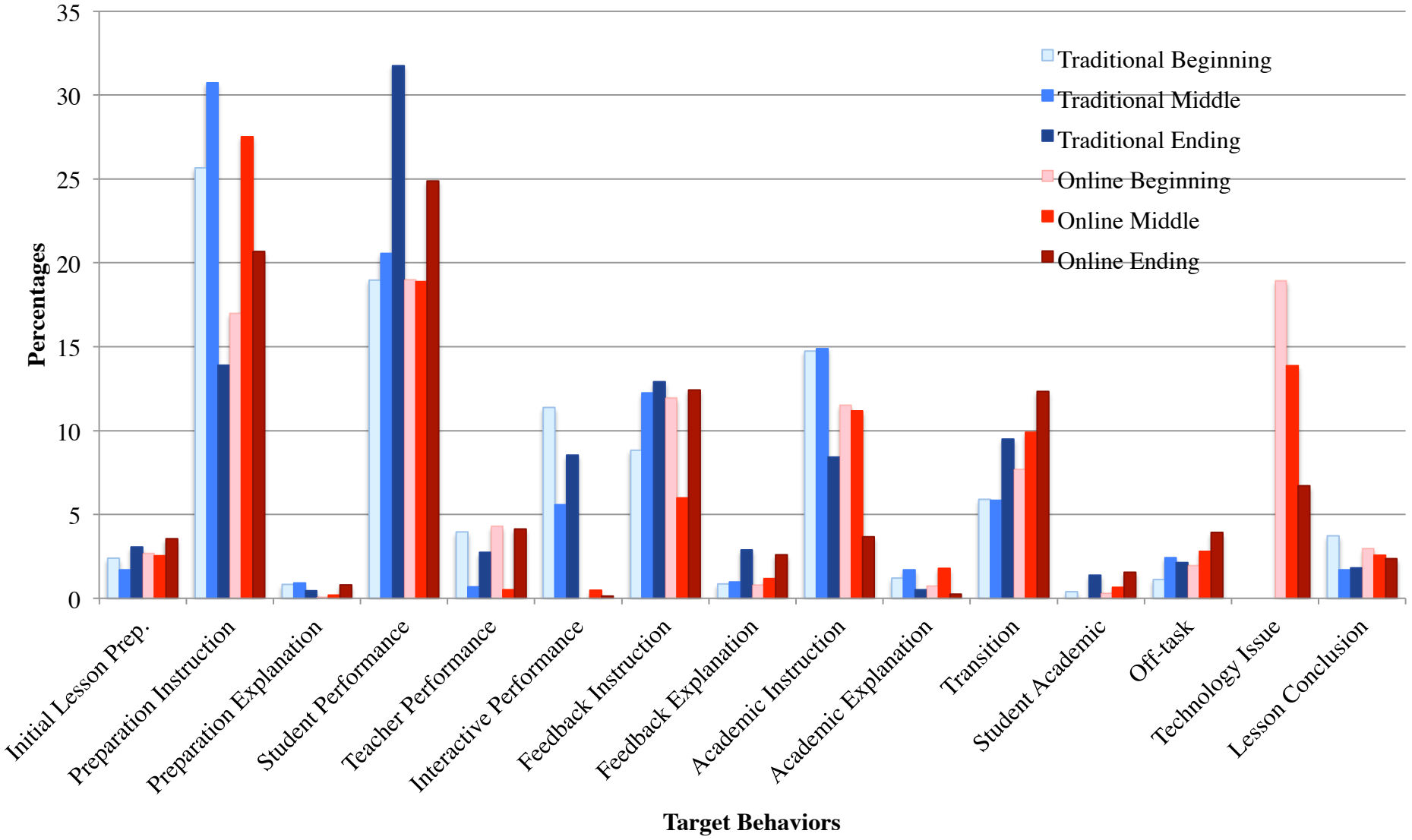


Figure 11. Target Behavior Means 3-way Interaction, Lesson Time x Behaviors x Lesson Group

the beginning (1), middle (2), and ending (3) lessons are diagramed in Figures 12-26. These behavior means and standard deviations can be found in Appendix P.

The following target behaviors (see Figures 12-18) represent a small percentage of total lesson time (5% or less): Initial Lesson Preparation, Preparation Explanation, Feedback Explanation, Academic Explanation, Student Academic, Off-task, and Lesson Conclusion. These behaviors were very similar between the lesson groups and also across the beginning, middle, and ending lessons.

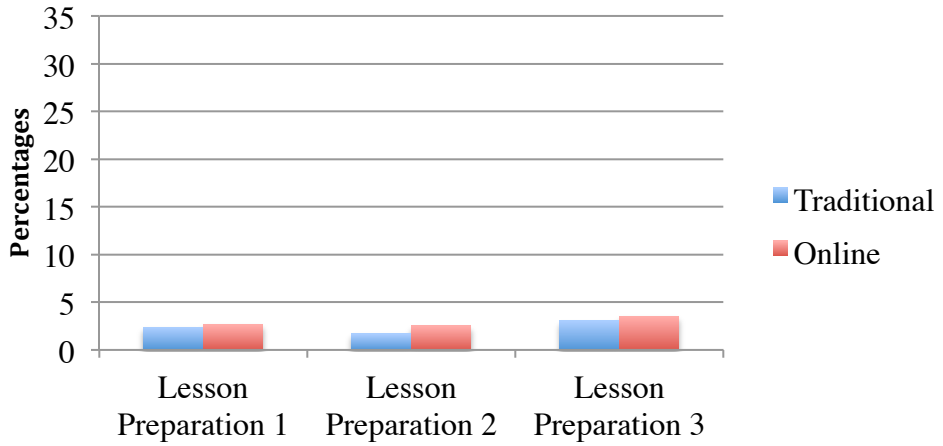


Figure 12. Initial Lesson Preparation Means for Traditional Group and Online Group

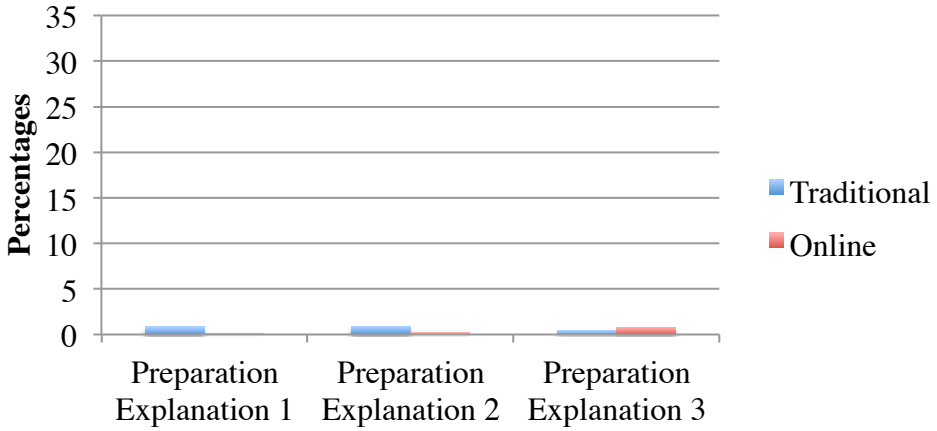


Figure 13. Preparation Explanation Means for Traditional Group and Online Group

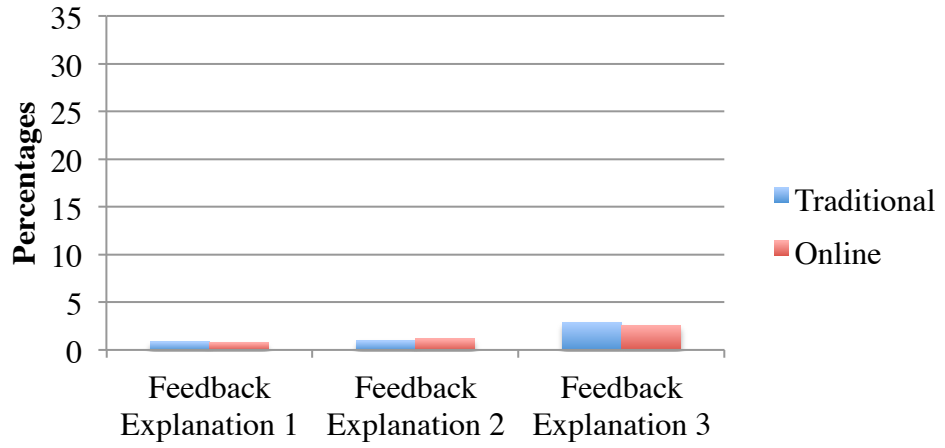


Figure 14. Feedback Explanation for Traditional Group and Online Group

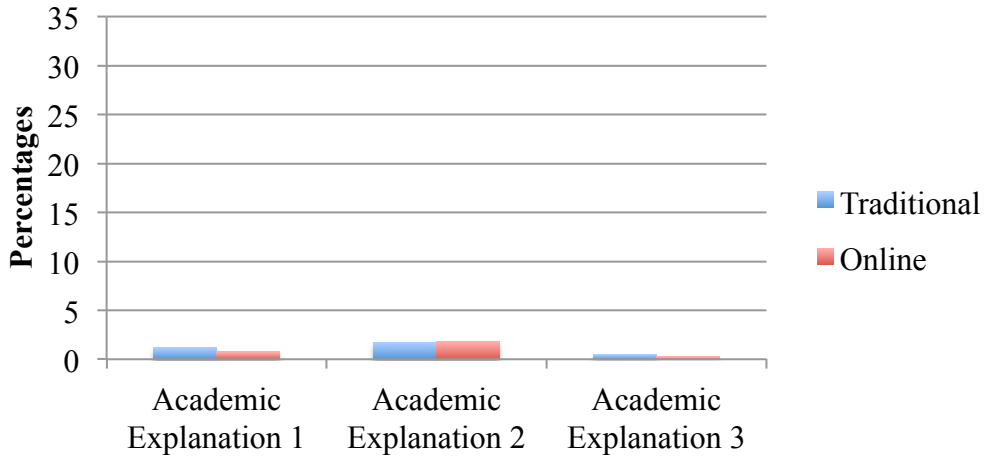


Figure 15. Academic Explanation for Traditional Group and Online Group

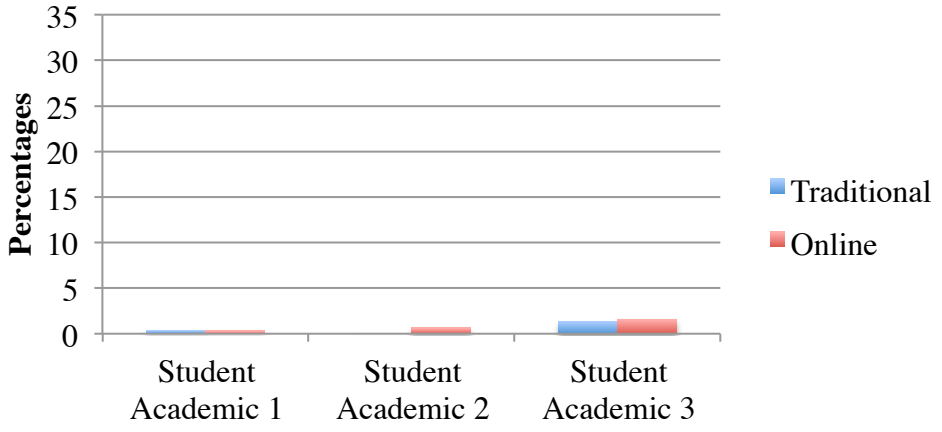


Figure 16. Student Academic Means for Traditional Group and Online Group

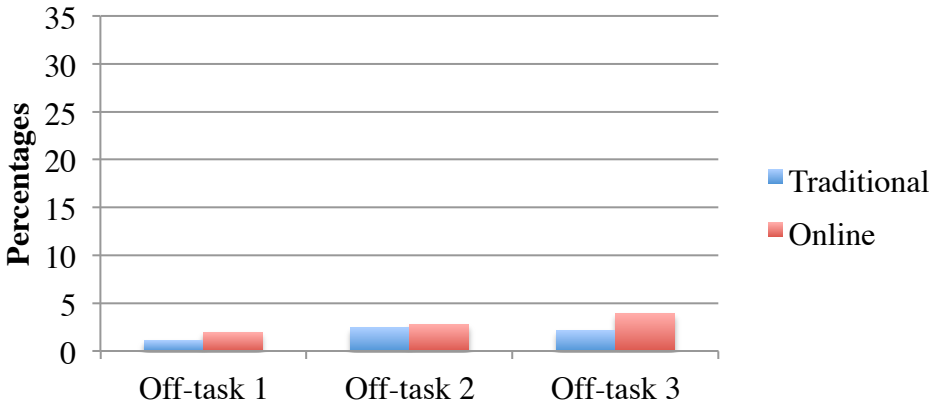


Figure 17. Off-task Means for Traditional Group and Online Group

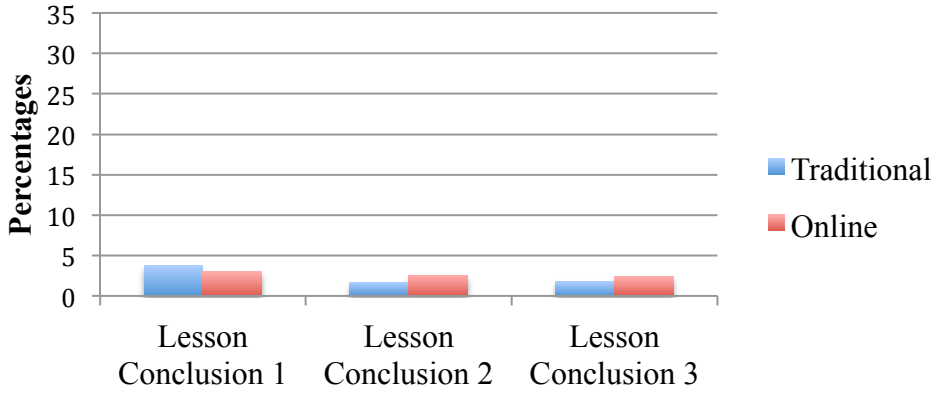


Figure 18. Lesson Conclusion Means for Traditional Group and Online Group

The remaining behaviors all represented the majority of how lesson time was spent in the target behaviors. The following behaviors reflect changes either between the lesson settings or across time. Percentage of time spent in preparation instruction (see Figure 19) was greatest in the middle lesson for both lesson groups. The distance group spent more time in this behavior during the ending lesson than the beginning lesson. The distance group also spent more time in preparation instruction in the ending lesson than did the traditional lesson group.

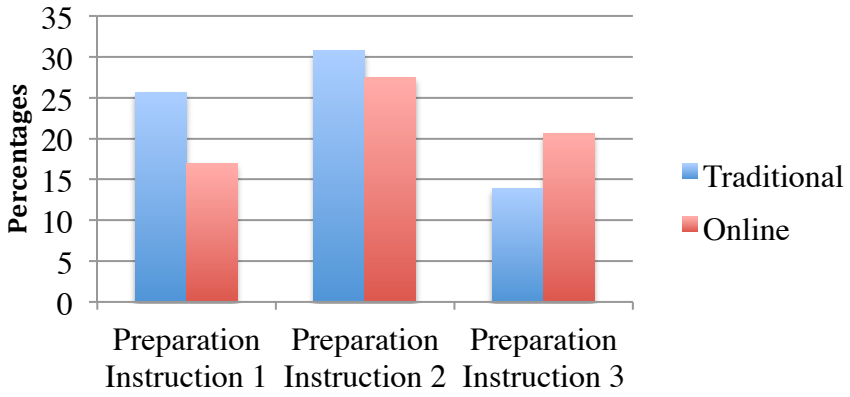


Figure 19. Preparation Instruction Means for Traditional Group and Online Group

The increased amount of time spent in the behaviors Student Performance (see Figure 20) and Feedback Instruction (see Figure 21) in the ending lessons is not surprising, since all students were preparing for the upcoming recital, and more playing and feedback would be expected at this point in piano lessons. Feedback Instruction remained fairly consistent for the traditional lesson group, but fluctuated more for the online group. The decreased Feedback Instruction time spent in the middle lesson for the distance group is likely due to the increased Preparation Instruction behavior (refer back to Figure 19). Though Teacher Performance behavior (see Figure 22) was less than 5% of lesson time, the decreased behavior time spent for the middle lesson was also likely offset by the increased Preparation Instruction behavior.

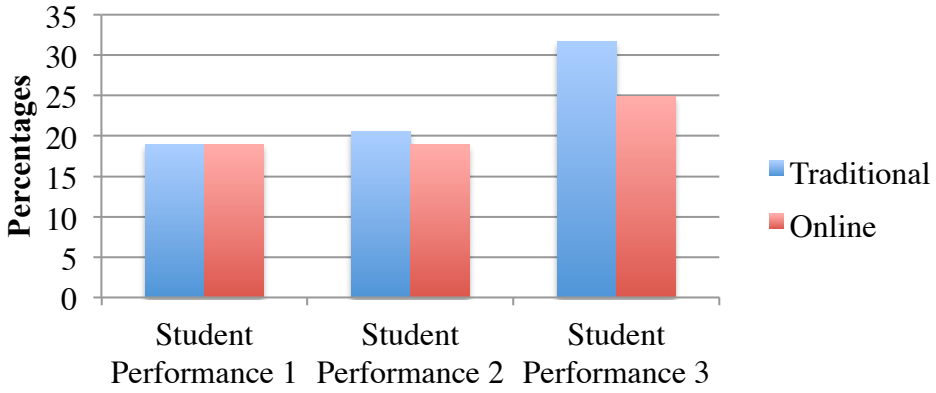


Figure 20. Student Performance Means for Traditional Group and Online Group

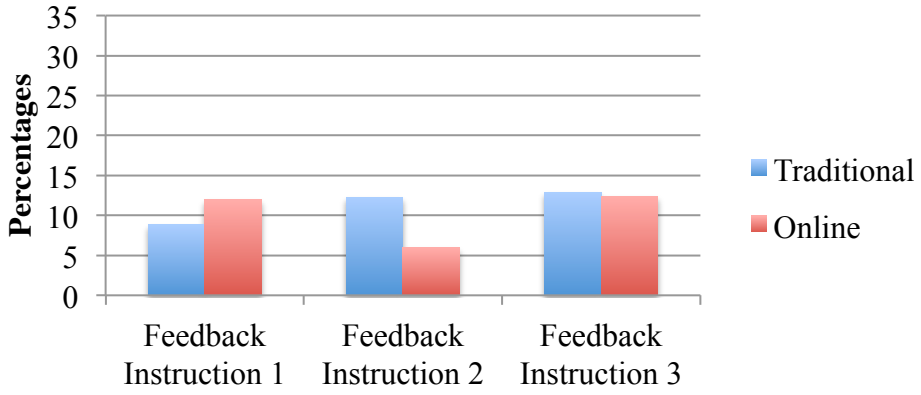


Figure 21. Feedback Instruction Means for Traditional Group and Online Group

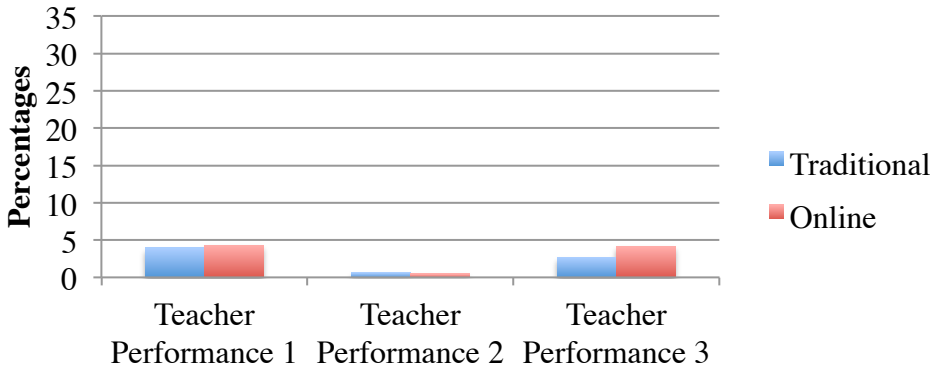


Figure 22. Teacher Performance Means for Traditional Group and Online Group

In the behavior Academic Instruction (see Figure 23), the traditional lesson group consistently spent more time in this behavior compared to the distance group. The lesson groups' percentages of time spent between the first and middle lessons are almost identical. The decreased behavior time in the ending lesson is similar to the decreased Preparation Instruction behavior in the ending lesson (refer back to Figure 19), likely offset by increased time spent in student performance preparing for the recital. Transitions (see Figure 24) increased slightly for the ending lesson in both groups, likely due to more transitions because of the larger number of lesson activities culminating at the end of the study.

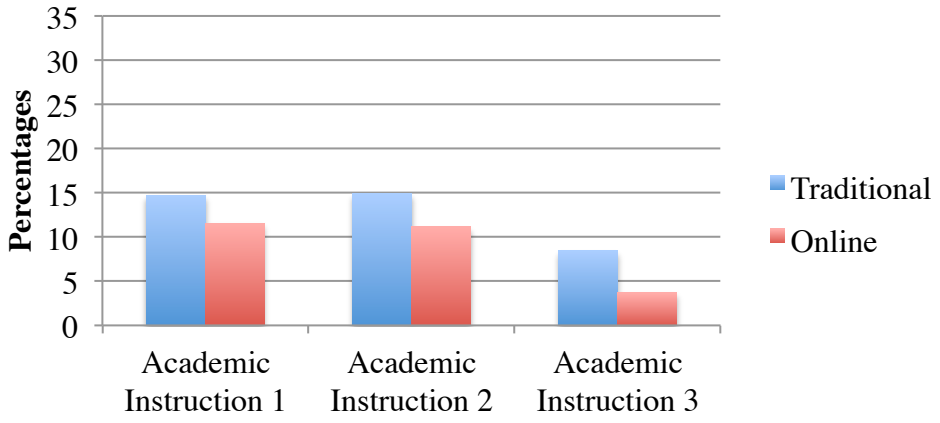


Figure 23. Academic Instruction for Traditional Group and Online Group

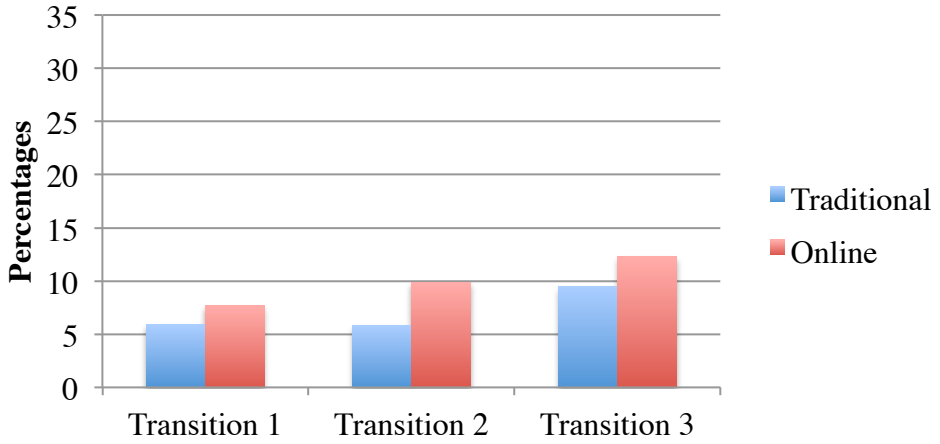


Figure 24. Transition Means for Traditional Group and Online Group

Because Interactive Performance (see Figure 25) required that the teacher and student engage in the exact same activity in lessons at the same time, such as playing a duet, tapping fingers, clapping a rhythm, etc., the difference of time spent in Interactive Performance between groups was not surprising. This behavior was not entirely possible in distance lessons, though there was one occasion of an Interactive Performance activity occurring in the middle distance lessons. The activity was perceived by the student to be interactive and occurred in his real-time; however, due to the time delay of the Internet, it was not synchronous with the teacher's time. Technology behavior (see Figure 26) was another behavior expected to only be seen in one lesson setting. The result was a positive finding to see that time spent in technology issues

decreased across lessons, from almost 20% in the beginning lesson, to about 6% in the ending lesson.

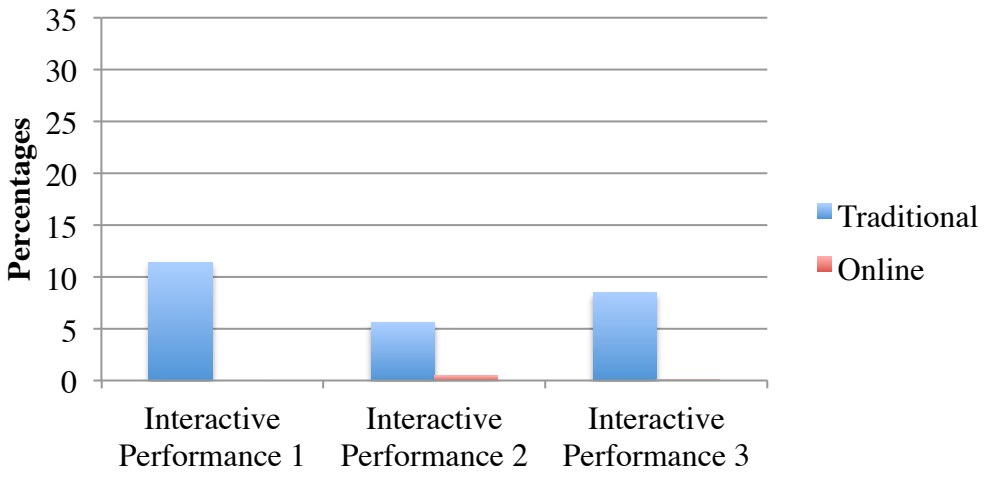


Figure 25. Interactive Performance Means for Traditional Group and Online Group

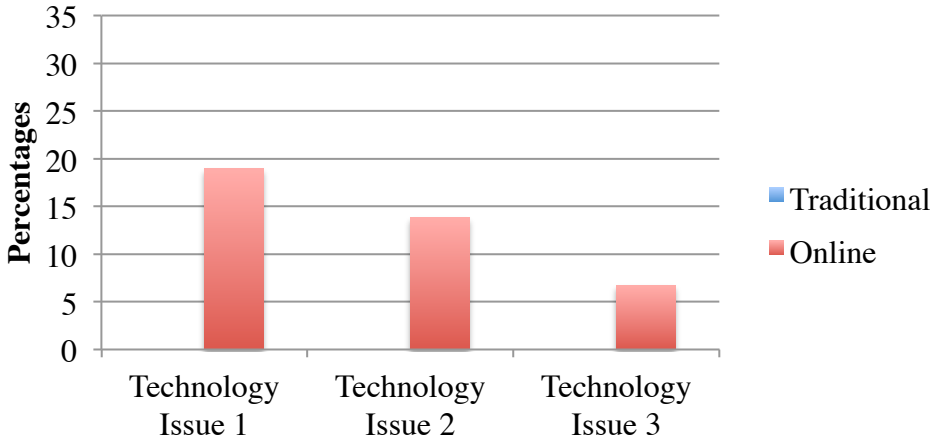


Figure 26. Technology Issue Means for Traditional Group and Online Group

The episodes that were denoted as multi-tasking behaviors were counted for frequency and averaged for lesson group. In all three lessons, there were more episodes of multi-tasking

recorded for the traditional group (beginning $M = 22.22$, $SD = 8.23$, middle $M = 15.78$, $SD = 6.96$, and ending $M = 17.78$, $SD = 5.12$) than for the online group (beginning $M = 9.6$, $SD = 5.64$, middle $M = 9.5$, $SD = 4.06$, and ending $M = 9.3$, $SD = 4.74$).

Attitude

Survey

Participants completed a 14-item attitudinal questionnaire online during the pre-lesson and post-lesson assessments. Participants responded to each question by selecting one of three cartoon faces by each item representing either "I agree," "I don't know," or "I disagree." All students completed the same questionnaire in the initial lesson interview and following the completion of lessons. Table 8 displays the number of responses for the corresponding answer choice on the pretest and posttest for the traditional lesson group. Table 9 displays the number responses for the corresponding answer choice on the pretest and posttest for the online lesson group.

Each student's answer was weighted either three points for an "I agree" answer, two points for an "I don't know" answer, and one point for an "I disagree" answer. All student responses were summed to give each question a total score. Each questionnaire item score for the traditional group ($n = 9$) could range from 9 to 27. Each questionnaire item score for the distance group ($n = 10$) could range from 10 to 30. Questions were examined for changes within responses and changes in the total score to determine if any differences in attitude toward piano lessons occurred from pretest to posttest. This was done for participants in each treatment group. Students answered two practice questions on the survey that were not examined for analysis.

In the traditional group, there was minimal change from pretest to posttest questions. Questions 5, 6, 11, 12, 14, and 15 all remained the same between respondents from pretest to

posttest. There was a slight decreased total score on the posttest for traditional students for question items 3, 8, and 9. Total questionnaire scores slightly increased for question items 4, 7, 10, 13, and 16.

Questions 7 and 13 showed the most change of survey questions in the traditional lesson group. Though Question 13, "Piano lessons make me feel uncomfortable and nervous," only increased by one point for the total score, there were several changes within student responses that showed more students reported feeling comfortable in piano lessons after the lesson experience. Question 7, "The best part about taking piano lessons will be playing music,"

increased by three points from the pretest to posttest total score, indicating that students were largely satisfied with playing music in piano lessons. Other questions with slightly increased total scores indicated that students thought it was great when someone of similar age to the student could play the piano; the best part for students about lessons was playing piano; students were confident in their abilities of learning to read music; students believed that taking lessons over the Internet was just the same as piano lessons face-to-face; and students should feel comfortable and relaxed in piano lessons.

In the online lessons, there was more overall change in responses from pretest to posttest. Only Question 11 and Question 12 remained consistent from pretest to posttest, which stated "I am sure I can learn to play piano by taking lessons over my computer," and "I will be able to use all the equipment needed for piano lessons." These questions were also consistent from pretest to posttest for the traditional group.

There were positive score increases for question items 3, 5, 6, 8, 9, 10, 13, 14, and 15. These questions indicated that after completion of the treatment, these students felt more excited to learn to play music in piano lessons; felt more confident that they could learn to read music;

Table 8
Attitudinal Survey of Number of Likert Scale Responses for Traditional Group Pre and Posttest Questionnaire

Questionnaire Item (Likert scale responses scored 1-3)	Pre-test Responses 1 **D	2 DK	3 A	**Total Score**	Post-test Responses 1 D	2 DK	3 A	**Total Score**
3. I am excited to take piano lessons to learn to play songs on the piano.	0	0	9	**27**	1	0	8	**25**
4. I think it is great when someone my age can play piano.	0	2	7	**25**	0	1	8	**26**
5. *I will be no good at playing piano.	0	1	8	**26**	0	1	8	**26**
6. I think I can learn how to read music in order to play songs to play songs on the piano.	0	1	8	**25**	0	1	8	**25**
7. The best part about taking piano lessons will be playing music.	2	0	7	**23**	0	1	8	**26**
8. *I am scared I will not do well learning to play piano.	0	1	8	**26**	1	0	8	**25**
9. I think playing piano will make me feel good about myself.	0	0	9	**27**	0	1	8	**26**
10. Learning to read music will not be a problem for me.	1	2	6	**23**	1	0	8	**25**
11. I am sure that I can learn to play piano by taking lesson at my teacher's home/over the Internet.	0	0	9	**27**	0	0	9	**27**
12. I will be able to use all the equipment needed for piano lessons.	0	0	9	**27**	0	0	9	**27**
13. *Piano lessons make me feel uncomfortable and nervous.	0	3	6	**24**	1	0	8	**25**
14. It is important for my teacher to understand how I feel and what I have to say.	0	0	9	**27**	0	0	9	**27**
15. I will be able to have a friendship with my piano teacher.	0	0	9	**27**	0	0	9	**27**
16. Taking piano lessons on the Internet is just as good as taking piano lessons face-to-face.	2	0	7	**23**	1	0	8	**25**

Note: *Reverse-Scored Questions.

**D=Disagree; DK=I don't know; A=Agree

Table 9
Attitudinal Survey of Likert Scale Response Scores for Online Group Pre and Posttest Questionnaire

Questionnaire Item (all Likert scale responses are 1-3)	Pre-test Responses 1 **D	2 DK	3 A	**Total Score**	Post-test Responses 1 D	2 DK	3 A	**Total Score**
3. I am excited to take piano lessons to learn to play songs on the piano.	0	1	9	**29**	0	0	10	**30**
4. I think it is great when someone my age can play piano.	0	3	7	**27**	0	5	5	**25**
5. *I will be no good at playing piano.	0	2	8	**28**	0	1	9	**29**
6. I think I can learn how to read music in order to play songs on the piano.	1	2	7	**26**	0	3	7	**27**
7. The best part about taking piano lessons will be playing music.	0	1	9	**29**	1	2	7	**26**
8. *I am scared I will not do well learning to play piano.	2	2	6	**24**	0	2	8	**28**
9. I think playing piano will make me feel good about myself.	1	1	8	**27**	0	1	9	**29**
10. Learning to read music will not be a problem for me.	3	5	2	**19**	0	3	7	**27**
11. I am sure that I can learn to play piano by taking lessons at my teacher's home/over my computer.	0	1	9	**29**	0	1	9	**29**
12. I will be able to use all the equipment needed for piano lessons.	0	3	7	**27**	0	3	7	**27**
13. *Piano lessons make me feel uncomfortable and nervous.	1	1	8	**27**	2	0	8	**26**
14. It is important for my teacher to understand how I feel and what I have to say.	0	2	8	**28**	0	1	9	**29**
15. I will be able to have a friendship with my piano teacher.	0	3	7	**27**	0	1	9	**29**
16. Taking piano lessons on the Internet is just as good as taking piano lessons face-to-face.	0	1	9	**29**	1	1	8	**27**

Note: *Reversed-Scored Questions.

**D=Disagree; DK=I don't know; A=Agree

felt good about themselves after playing piano; felt that it was important for the teacher to understand their feelings; and believed that they could develop a friendship with the teacher. Slightly lowered scores on the posttest for distance students included question items 4, 7, 13, and 16. These question items indicated that students did not think it was great for someone their age to play piano; the best parts of taking piano lessons may have included other parts besides playing music; piano lessons on the computer may have made students feel nervous or uncomfortable; and lessons on the Internet may not be as good as taking piano lessons face-to-face.

Question 10, "Learning to read music will not be a problem for me," showed the most change from the online group pretest to posttest total score, increasing from 19 points on the pretest to 27 points on the posttest. This increase indicated that several students were aware of their musical progress through the lesson process. A reverse-scored item, Question 8 reads, "I am scared I will not do well learning to play piano." This question increased by four total points, indicated that students gained confidence in learning to play piano over the lesson period. Question 7, "The best part about taking piano lessons will be playing music," had a three-point decreased score from pretest to posttest in the online group, suggesting that some participants enjoyed other aspects of lessons as much or more than playing piano.

Interviews

Answers from the pre-lesson and post-lesson interview questions were counted and grouped into general responses. Refer to Appendix G for a list of the interview questions. Transcripts of all interview responses can be found in Appendix O. The pre-lesson interview Questions 1, 2, and 7 about each student's age, grade, and knowing other friends who took piano

lessons were only a question to strengthen rapport with each child and were not analyzed for participants' answers.

In the pre-lesson interview of the traditional groups, all students responded that their favorite part of piano lessons would be "playing piano," "playing songs," or "playing music." Other answers some responded with more than one behavior included "spending time with my teacher," "learning how to read the music," and "making the sounds and the music." When asked what their least favorite part of piano lessons might be, three students responded "I don't know," one student responded "nothing," one student answered "the hardness of it," one other participant said "sitting," one replied "taking the test," and two students responded "when I don't know the song," or "sometimes you might mess up and press one of the wrong keys and it might interrupt you."

Seven students had a positive feeling about piano initially when asked about their feelings towards piano lessons, stating either "excited," "happy," or "good," feelings. Two students said they did not have any feelings about taking piano lessons. Children either did not know specifically what they wanted to learn in piano lessons, or they reported that they wanted to learn how to play piano when asked about what they wanted to learn in piano lessons. When asked about the student's feelings of taking lessons at the instructor's home, seven students replied positively. Almost all children had some experience using a computer when asked about their technology experience. Six children used the computer to "play games," one child used the computer to watch or "pull up videos," and one child would "talk to grandma on it." Two children reported not using a computer. Students were asked what they anticipated any differences might be in traditional and online lessons. The traditional students anticipated some expected differences in their counterpart online lessons, which included answers such as "not

understanding what the teacher means," "that you are somewhere else for piano lessons," and "you are using the computer when you're looking on the Internet." Students realized that in online lessons, the teacher and student would be physically separated, as one student responded that a challenge may be "because you [the teacher] couldn't show them" and "on the computer you don't get to be face-to-face."

In the post-lesson interviews, traditional students responded with a variety of answers about their favorite part about piano lessons, including four students who said "the recital piece," and three students who said "learning the notes" and "learning the songs." All students reported that there was nothing that they were dissatisfied or disappointed with in lessons. All nine children reported feeling comfortable taking lessons at the instructor's home studio. Five students reported that the beginning songs in the method book were what made learning piano easy. Lastly, when asked if taking lessons face-to-face was as good as taking piano lessons on the Internet, eight children stated that lessons in both environments were the same. One child thought that face-to-face lessons were not the same as online lessons, which corroborates with the posttest attitude survey results. When asked why one type of lessons might be better, the student replied "because it's better seeing [the teacher] in person than just the computer screen."

In the online group pre-lesson interview, all students expressed interest in "playing songs" or wanting to "learn how to play piano." All ten students stated they were either "excited," "happy," or wanted to "have fun" taking piano lessons. Only two students expressed that they believed their least favorite part about lessons would be "getting tested" and "having to read all the notes." When asked what did students want to learn in piano lessons, the answers by nine children were "to play piano" or "to learn the notes." All ten of the students online expressed that they had used the computer to either play games or used the computer in school or

for homework. Students stated that piano lessons on the Internet would be "fun" and two students answered "weird," which was interpreted as unknown or unsure. One student replied with a detailed prediction of online piano lessons as "more fun than piano lessons face-to-face because I just get to learn how to use technology and piano at the same time." Finally, when asked about what the student thought the lesson differences may be between face-to-face and online instruction, two students replied with perceptive comments about the visual limitations of a computer screen: "You can't see their whole body, you can only see half of it," and "I don't see you in person, I just see you on the Internet."

Similar to the traditional groups' responses in the post-lesson interview questions, the students in online lessons thoroughly enjoyed "learning the songs and learning all the keys," "playing piano," and "playing the songs." Five students commented on his or her favorite piece studied during lessons. Other students' favorite parts of lessons included "my teacher and practicing music," "the thumbs up and thumbs down [online survey]," "learning my recital piece," and "playing music with you."

Answers about what made learning easy were varied, for example one student answered "the theory helped and taking time and practicing," and another student who responded, "when it [notes] has letters inside of them." Four students commented that those first notes made learning accessible. One student recalled the progression of concepts and skills accurately: "at the beginning, it started out easy and got harder. So that makes it pretty good, I mean, easy." Some aspects that students noted that made learning hard included "learning the notes, it was really tricky at first" and another who said "the memory flashcards." Four students also mentioned moving hands out of a stationary position was challenging. When asked about any communication problems that occurred during lessons, the students were aware of technical

challenges during lessons and responded with detailed descriptions, including problems with *Skype*, *Internet MIDI*, the computer and/or keyboard sounds, the computer screen or pictures, and the Internet.

In summary, both lesson groups were very positive on the outset of taking piano lessons, and also at the conclusion of piano lessons, with the most common statements being "happy" and "excited." Though students did not have a general idea of what specifically they wanted to learn, students reported wanting to be able to play music. At the end of lessons, students in both groups reported that they really enjoyed their recital piece, as well as other favorite lesson activities, such as the attitude survey, theory, or other favorite songs. Students were able to recount what made the learning process easy, which included a variety of different things for each student. The majority of students had used computers prior to the study, and both lesson groups made accurate predications about the setting differences. Though the face-to-face group did not experience distance lessons in this study, and despite the technology issues that the distance group reported, these factors did not negatively persuade opinions of the quality of distance lessons.

Lesson Completion

All students volunteered for participation in this research study by purchasing necessary equipment for and attending weekly 30-minute piano lessons throughout the seven-month treatment period. The commitment to lessons was an agreement by parents, students, and the researcher. If the student completed the entire study, he or she received 23 lessons, an initial assessment session, a concluding assessment session, and was given the opportunity to perform in the final recital. However, several students completed fewer lessons due to either a conflict with the weekly appointment or because of sickness. No make-up lessons were given despite illnesses or other conflicts, such as technology difficulties that arose during a scheduled

appointment. In the online group, seven students completed all 23 lessons; one student completed 22 lessons; one student completed 2l lessons; and one student completed 20 lessons. In the traditional group, six students completed all 23 lessons; one student completed 22 lessons; one student completed 21 lessons; one student completed 16 lessons, and one student completed seven lessons and did not complete the study.

Journals

Practice journals were kept throughout the semester and collected at the conclusion of the study. A stamped folder was mailed to each family in an attempt to collect practice journals at the study conclusion. Despite repeated efforts of mail, email, and phone calls, only three journals of online students were completed and returned, and five journals of traditional students were returned. Therefore, no analysis was done with these journals. However, an analysis was examined of student's verbal report of weekly practice. The traditional lesson group had a self-reported average practice week of 3.78 days (SD = 2.13) and the online group had a self-reported average practice week of 2.8 days (SD = 1.84).

CHAPTER 4
DISCUSSION

The present study was undertaken to provide empirically-derived perspective and insight on the plausibility of distance piano lessons as an effective substitute for or alternative to traditional, face-to-face methods. Distance education is accessible and used extensively across many academic disciplines for all ages of students (Allen et al, 2004; Bernard et al., 2004; Lou et al., 2006), but implementation of distance education in applied music instruction has made a slower, more cautious appearance. Researchers in the music discipline who have examined distance education have made conflicted suggestions as to how this educational environment should be implemented in future music instruction (Dammers, 2009; Dye, 2007; Pike, 2012; Pike & Shoemaker, in press). Piano pedagogues are leading the music discipline in using this lesson environment, as we are seeing a growing number of teachers engaging in distance piano lessons (Ajero, 2010; Litterst, 2003; Litterst, 2007; Pike & Shoemaker, in press; Romney, 2013; Saint Louis, 2012; Sick, 2011; Snow, 2011). Given that both research-driven and clinical-driven practices are young in applied music instruction, distance music education should continue to be explored as to its effectiveness as an instructional environment. Because previous distance education (DE) has a long standing history of conflicting results of effectiveness (Bernard et al., 2009) and the unique one-to-one situation of private music lessons, one should not assume that online pedagogies are the same or comparable to traditional face-to-face pedagogies. In the present study, comparing the synchronous distance private piano lesson to the face-to-face private piano lesson was explored in order to determine the viability of this emerging lesson environment.

The participants in this study were beginning piano students ($N = 19$) between ages 6-9 with no prior private music instruction. This age student was chosen for the present study

because these are common ages that students begin piano lessons (Duke et al., 1997) and because previous research has shown that students of this age in a synchronous learning environment can attain high levels of engagement (Hastie, Chen, & Kuo, 2007). The two lesson groups in the present study were divided as similarly as possible regarding age and gender. The traditional group included three 6-year old students and six 7-year old students, though by the conclusion of the study, several children had a birthday during the 7-month study period. The traditional group was made up of five boys and four girls. The distance group included two 6-year olds, six 7-year-olds, and two 8-year olds. Similar to the traditional group, many students in the distance group had birthdays during the 7-month study period, including both 8-year old students. The distance group had five boys and five girls. Based on the known variables controlled for research purposes, and also the initial beginner readiness assessment, students were set up for the best possible piano lesson experience with the instructor. All students were engaged fully in the process throughout the study and, including the student who did not complete the study because of lack of interest, were able to do all tasks required for successful progress. The results of the present study provide evidence that distance applied piano lessons was an effective mode of teaching and learning for beginning piano students when proper instructional techniques and technologies were employed.

Musical Achievement

The four musical achievement skills chosen for measurement were a prepared performance piece, sight-reading tasks, visual memory tasks, and aural memory tasks. These performance excerpts, designed for subjects in the present study, were skills chosen based on the research of McPherson (1995) and because of their value recognized in well-rounded musicians. These skills are also emphasized in pre-college comprehensive music curriculums, such as the

Louisiana Music Teachers Association Piano Rally curriculum (2013). Both the traditional group and the distance group had highest scores on the prepared performance task. The sight-reading scores, then aural task scores, followed the prepared performance scores. The lowest scores of both lesson groups were the visual memory task.

One possible reason for this consistent ranking of scores could be due to the amount of attention given to the prepared performance piece during lessons. The final piano recital was a performance goal, which motivated many of the children to practice their recital piece in order to perform it well in the post-lesson analysis. The other assessment skills (sight-reading, aural memory, and visual memory) were practiced every fourth week of the study, compared to the prepared performance piece that was practiced weekly in a more focused way during the final three or four lessons. Also, the practice of reading new excerpts was how students learned the skills of sight-reading, aural memory, and visual memory, with no specific practice strategies or techniques presented to teach the components of these skills. Unlike the performance piece, it is doubtful that the students practiced these other skills outside of the few lessons where they were presented. In this study, these three tasks were not developed as thoroughly as other skills necessary for performance (i.e. reading notes, keyboard fluency, posture and hand position, etc.). Sight-reading, aural memory, and visual memory are important skills, however it might be that waiting until after the initial months of piano lessons is a better curricular decision.

With these achievement scores in a consistent rank order for both lesson groups, there is an indication that children in this age group (6-9 years) might have difficulty understanding and memorizing an unseen short excerpt to perform. In fact, one student from each lesson group commented during the post-lesson interview that practicing these memory excerpts was the most difficult part of lessons. Though there were several practice tests throughout the study for

students to anticipate the posttests, more specific teaching strategies on the component skills of memory should be incorporated in beginning piano lessons. Recognition of patterns, the overall shape of an excerpt, and step/skip intervals are examples of behaviors that could be taught rather than simply practiced (as they were in this study) for quicker skill development.

The prepared performances were evaluated on rhythmic accuracy, note accuracy, continuity, and expressiveness. The traditional students scored higher on each scale than did the distance students, though traditional students' and distance students' scores for each scale were extremely close when compared. It is not surprising that the scale with the largest difference between the two groups was rhythmic accuracy. Rhythm proved the most challenging concept to teach in online lessons. The nature of rhythm in music instruction involves teaching time regulation and is often experienced simultaneously between teacher and student; however, rhythm could not be experienced exactly in real time for teacher and students in the distance group. In videoconferencing, there is a time delay between the teacher and student as an inherent result of the Internet connection. The time delay, though brief as milliseconds, is due to data being transmitted, such as the picture and sound of the videoconference, from one location to the other. Exactly how much of a time delay depends on the download and upload speeds of the Internet connection at both teacher and student homes.

The physical separation between teacher and students in online lessons resulted in the teaching approaches of rhythm to be adapted or modified. For example, instead of performing rhythms synchronously, students were asked to clap, play, or chant rhythms after the teacher model. Despite the best modeling approaches, not having the ability to perform in exact time with a student is limiting. This inability possibly could have affected the rhythmic accuracy in the prepared performance scores of distance students. Of interest to note, however, is that

rhythmic accuracy was higher than note accuracy for both traditional and distance students on the remaining three achievement measures (sight-reading, visual memory task, and aural memory).

In a sight-reading study by Pike and Shoemaker (in press), the challenge of not being able to perform in real time for distance lessons was overcome by having students practice excerpts with a performance CD. The digital accompaniments served as a time-shifted supplement in order to provide motivation for students, to reinforce rhythm and pulse, and to reach a final tempo during a performance. A time-shifted, or asynchronous distance enhancement was not utilized in the present study; however, the time-shifted duet accompaniments warrant consideration as a possibility for overcoming the physical and time separation in distance lessons.

Another alternative for establishing rhythmic stability and pulse with distance students is the software program *Home Concert Extreme* (www.zenph.com). *Home Concert Extreme* is a computer program that interacts with MIDI-equipped pianos or keyboards in a similar way as *Internet MIDI*. This accompaniment program can be used as a MIDI file player in one of the three modes: Jam Mode, Learn Mode, and Perform Mode. In the Jam Mode, *Home Concert Extreme* plays the accompaniment track at an adjustable speed, similar to a recorded CD accompaniment. In the Learn Mode, the program responds to the student's incoming MIDI data from the piano and pauses until each note of the solo track is played correctly. In the Perform Mode, *Home Concert Extreme* responds to the incoming MIDI data from the student's piano in order to match the student's tempo, dynamic expression, and other musical qualities. *Home Concert Extreme* is compatible with any MIDI file that is commercially published or self-made, free or purchased. This software would be an excellent substitute for the live teacher duets in the

case that the teacher is unable to play accompaniments in real time with a student, such as in distance piano lessons.

Another possible reason for slight differences in achievement scores between lesson groups was the delivery method from which students read and performed the excerpts. Students in the face-to-face environment read the sight-reading and visual memory excerpts from paper, and distance students viewed these same excerpts from their computer screen. The distance students' computers were either placed facing the student on his or her keyboard, or the computer was slightly angled at a side profile view. These computer placements allowed students to comfortably view the sight-reading and visual memory excerpts and also to comfortably play the sight-reading example (The visual memory excerpt was played only from memory.) The researcher held the excerpts up to her iSight camera, and online students read these excerpts from their computer screen. The decision was made to have students read these excerpts from the computer to ensure that no child could practice the excerpts or receive help from parents prior to the lesson. Though picture clarity and size of the *Skype* screen were not reported as problems by students per se, these were more than likely different for each distance student, as were many other variables throughout the study (brand and quality of keyboards, bandwidth strength, laptop quality, practice dedication, etc.) Furthermore, the difference in the lesson group's delivery mode for sight-reading and visual memory would not have caused any differences between the lesson groups' scores for the aural memory skill and prepared performance skill. Alternatives to reading from the computer screen would be to scan and email files to each participant prior to the lesson appointment, or scan and place a portable document format (PDF) in a file sharing application, such as *Dropbox*, with each student prior to the lesson. These alternatives were not considered in

this study because I wanted to control exposure to these materials rather than take a chance that some students might look at them ahead of time.

Lesson Behaviors

The 15 target lesson behaviors chosen for the present study were based on previous research of teacher and student behaviors documented in piano lessons (Kostka, 1984; Siebenaler, 1997; Speer, 1994) and modified specifically from the studies of Siebenaler (1997) and Dye (2007). These target behaviors were used to describe the timed episodes of lesson activities in a beginning, middle, and ending lesson for each student. It was found that the lengths of the lesson appointments were significantly different between lesson groups and across beginning, middle, and ending lessons. Some of the reasons for lesson length differences were due to starting and ending lessons promptly based on children arriving on time for the lessons, technology issues, and the lesson content that needed to be presented and covered in each lesson. From a functional standpoint the differences were small – just a few minutes between the longest and shortest lesson times. There did not appear to be a systematic difference in lesson length due to any of the variables in this study.

Examination of the target behaviors showed that time spent in these behaviors did change for both lesson groups from the beginning and middle to ending lesson. In the beginning of the study for the traditional group, the majority of lesson time was spent in preparation instruction, student performance, and academic instruction. This amount of time in preparation and academic instruction was expected in a normal course of piano study, since piano skills were still new for all students. As music reading and performance skills became more familiar to students, student performance, feedback instruction, and preparation instruction comprised the majority of ending lessons. This reversal of behaviors from beginning to end was also expected in the study, since

students were more equipped with music reading and performance skills by this point of instruction, and the ending lessons mostly involved preparation for the upcoming recital. The overall time spent in student performance (which includes student performance and interactive performance in the present study) was 32.27% in traditional lessons, slightly less than previous research indicates for lesson time in student performance (Kostka, 1984; Speer, 1994). There were other episodes, however, in which the student played as a response to the teacher's prompt, and the episode was coded as a behavior other than student performance. Some semblance of student performance was a common occurrence in preparation instruction, academic instruction, and feedback instruction. The definitions, however, placed the episode in a different category. Therefore, student performance time was underestimated during this process.

In the beginning lessons for the distance group, the majority of lesson time was spent in technology issues, student performance, and preparation instruction. Both instructor and students were still getting acquainted with the technology, software, and uses of all equipment; therefore, technology issues occurring this frequently in lessons was not surprising. By the middle lesson, behaviors largely were preparation instruction, student performance, and technology issues, in that order. This was a positive finding, indicating that both instructor and students had a better understanding of the technology and how to problem solve issues that arose unexpectedly, so as to not disrupt the pacing of the lesson. By the ending lesson for the distance group, the majority of lesson time behaviors were very similar to the traditional lesson group: student performance, preparation instruction, and feedback instruction. The lesson time spent in other target behaviors for the distance group supported findings from other research investigating behavioral occurrences in distance private music lessons, including low teacher performance times (Dye,

2007; Orman & Whitaker, 2010) and dominant verbal instruction behaviors by the teacher (Dye, 2007).

The time spent in transitions in the distance group ending lessons (12.33%) was extremely close to time spent in feedback instruction (12.42%). This was a bit surprising, given that students in the distance lessons had to be more independent in changing out materials between activities, whereas in traditional lessons I took the lead in doing these tasks. Students in the distance group acclimated well to managing this aspect of the lesson, and it is a good reminder that children are more capable of independence than we sometimes allow. Students in traditional lessons would benefit for taking responsibility for more of these tasks during lesson time. There was an unexpected, incremental increase of transition time across the lessons, in both lesson settings. This increase in transition time is likely attributed to the number of transitions increasing in the ending lessons because of more lesson activities.

One difference to note between the two environments was the ability to multitask in face-to-face lessons that is simply not possible in distance lessons. In categorizing the timed lesson episodes, one dominant behavior was recorded for each lesson episode, and an asterisk was marked to reflect an episode with a strong secondary behavior occurring simultaneously. There were many instances of episodes including more than one behavior. This multitasking nature was predominantly in the traditional lessons and became very apparent after watching the recorded lessons. For instance, the teacher might open a book, ask a question for the student to recall information, and instruct the student to check his posture at the piano. All three of these behaviors could be done nearly simultaneously, or in a series of a few seconds, in a face-to-face lesson and were coded as one episode in the lesson. These same behaviors in an online lesson,

however, might function as separate activities, divided into three distinct episodes, and labeled as a transition and preparation instruction or explanation for each separate behavior.

Some distance students did not progress as much or as quickly as the traditional students. Of the traditional students, six students either completed the entire curriculum or were within pages of completing the piano primer method book by the end of the study. Three traditional students did not complete the primer books. Of the distance students, four students either completed the entire curriculum or were within pages of completing the primer method book by the end of the study. Six distance students did not complete the primer books. This difference may have been partly due to the lack of multitasking abilities during the distance lessons, and also due to lesson time spent dealing with technology issues. When a technology issue occurred during a distance lesson, the loss of time resulted in a shift in remaining lesson activities or skills because lessons could not exceed much beyond 30 minutes.

Alluded to previously, video observations revealed that the teacher was more in control of the pacing in face-to-face lessons and the student was more in control of the pacing in online lessons. In the face-to-face lessons, the teacher was able to do things that maximized the lesson time, such as organization of books and materials, writing down assignments or other lesson notes, turning pages, pointing to music notes, or positioning a student's hands. The pacing of traditional lessons depends largely on these transitions happening quickly, in order to spend the majority of lesson time on academic activities. The distance student in his or her respective environment, however, controls these same events. A great amount of responsibility and independence is assumed by the student, resulting in management by the student of these lesson components in the distance environment (Pike & Shoemaker, in press). The teacher in a distance lesson acts more as an instructional guide, helping the student navigate his way through lesson

material and content. Though distance lessons may be slower-paced and more student-led than their counterpart face-to-face lessons, these same qualities could ensure deep student learning and comprehension. In fact, even with the differences in how the lesson time was spent in the present study (i.e., a fair amount of time spent in technology issues), distance students were still engaged at a high enough level to perform statistically similar to the face-to-face students. These findings corroborate data from the videoconferencing study by Hastie, Chen, and Kuo (2007) that indicate elementary-aged students involved in the synchronous online classroom were engaged in high levels of learning and were engaged visually, aurally, and kinesthetically because of the technology components.

The fact that at least some lesson episodes in either lesson group had more than one target behavior occurring simultaneously was a possible reason for lower reliability scores in behavioral analysis. Operational definitions were established for research clarity and only the dominant behavior of an event was reported, but different interpretations still resulted. Despite some difficult reliability decisions, I feel this particular method of behavioral analysis presents a true reflection of meaningful data in the lessons by capturing the essence of face-to-face and distance instruction.

The lower reliability scores might also be partly attributed to the reliability observer physically moving to another state during the analysis period. Taking time away from the analysis, then attempting to revisit and code behaviors meant that the definitional clarity in the process could have been less accurate, despite having the definitions to refer to throughout the analysis.

Discrepancies were largely found between Instructional and Explanation categories and between Preparation and Feedback categories. In the Preparation category for all twelve videos,

the reliability score was equal to .77. However, 13 disagreements in this category were within the same category of Preparation, only coded differently in the "explanation" or "instruction" category. If only the broader Preparation category was analyzed, the reliability score increased to equal .87. The reliability score for the Feedback category was equal to .70, with half of the 32 disagreements coded differently as either Feedback Instruction or Feedback Explanation. When analyzing only the behavior of Feedback without "instruction" or "explanation," the reliability score increased to .85. Lastly, the Academic category was the weakest category with R = .62. Five of the disagreements were coded differently for "instruction" or "explanation." The reliability score was increased to equal .72 when removing this code from analysis. In the interpretation of these data with implications for teaching pedagogy, the difference between "instruction" and "explanation" is probably a subtle one that does not provide any clarity on the effectiveness of instruction. It was anticipated that in the distance lessons I was going to have to provide a lot more explanation than in the traditional lessons. That did not turn out to be the case, so future use of this system of describing lesson behaviors would be more reliable if behaviors were just labeled as "Preparation," Feedback," or "Academic" and very little useful information would be lost.

The last discrepancy between reliability observers was deciding if a target behavior functioned as preparation or feedback. These two categories, Preparation and Feedback, had 64 disagreements combined, and 19 of those were coded as the other category. The organic nature of a private lesson must be reactive to a student's performance. Teacher behaviors are difficult to delineate, commonly functioning in lessons as either preparation for the upcoming activity, or as feedback in response to the performance. Perhaps the behavior actually functions as some type of

combination of both of these things, and therefore, should be a independent category for future analysis.

Even with minor discrepancies in reliability coding, this did not result in any differentiations in how time was spent for either lesson group. There was no indication from the analysis that the two lesson settings functioned differently as a teaching and learning environment. The target behaviors were outlined and defined prior to video analysis in attempts to quantify possible differences between lesson settings. Perhaps other methods of analysis would have resulted in differences between lesson settings, such as examining sequential patterns of instructions, (Yarbrough & Price, 1989), frequency counts of behavioral occurrences, or even transcribing lessons to code for emergent themes. An important result from the lesson analysis that does not appear in the statistics is that all students of both lesson settings were able to absorb lesson content, despite any differences in lesson behaviors. All students were equipped with basic piano skills to perform in a piano recital and complete the post-lesson musical achievement measures. There are many variables that affect a student's ability to perform better or worse on musical achievement assessments, such as practice time and commitment; however, the slight differences in how time was spent in the two lesson settings for the present study did not seem to influence what the students learned nor how the students performed.

Attitude Survey

For the present study, the participants reported having mostly positive feelings about piano lessons, learning to read music and play piano, and also about the student-teacher relationship. Overall, students reported being "happy" and "excited" to take piano lessons and learning to play piano. Students taking online lessons responded that they liked the computers and technology in piano lessons. This study supports the findings in previous literature that

students enroll in piano lessons because they are excited and want to learn to play (Duke, Flowers, & Wolfe, 1997), and students continue taking lessons due to enjoyment and satisfaction in playing (Rife, Shneke, Lauby, & Lapidus, 2001).

The traditional group's responses overall remained much more consistent than the distance group's responses from pre-lesson to post-lesson scores. This consistency could be because of face-to-face students having a preconceived idea about traditional piano lessons from family or friends, and students responded with more straightforward answers because they knew what to expect in lessons. In all probability, students in the on-line group did not know anyone who had taken piano lessons via a computer. This may have translated into some hesitancy in responses on the pretest, which, after lessons in the distance environment, became more positive. The only survey items that remained consistent for the online group are the statements "I am sure that I can learn to play piano by taking lessons at my teacher's home/over my computer," and "I will be able to use all the equipment needed for piano lessons." Those question items were also two questions that remained the same from pre-lesson to post-lesson in the face-to-face group.

As the study progressed, all students became more comfortable with the instructor and began sharing more information and details with the instructor about his or her daily life and happenings. For the distance students, this sharing time became an important part of the lesson that helped to establish a relationship between student and teacher and develop a connection with families. For example, the first and last few minutes were often spent talking informally with the student about activities planned for the week or upcoming weekend. Students often wanted to show the instructor a special award he or she received in school, for an athletic event or classroom award, or something that he or she made. The teacher was introduced to other family members, siblings, and friends of the child. This interaction of seeing the child's home, family,

and personal space became an unexpected advantage to online lessons that face-to-face students would not normally have. This time spent in the distance lessons supports the decreased score for the question item, "The best part about taking piano lessons will be playing music," implying that students did enjoy these parts of the piano lessons in addition to, and perhaps more than, playing the music.

Also of interest is that several online students reported in the interviews that they enjoyed taking the online survey, or the "smiley face questions," when asked about favorite parts of piano lessons. Students can offer valuable information about their satisfaction with lessons in efforts to improve instruction and level of engagement throughout piano study. Surveys with students on a regular basis could be a helpful tool to inform teachers of student's goals, attitude, struggles, and perceived abilities in order to refine the curriculum and keep motivation high.

Student Participants

The student participants in the present study represented a wide population of children, ranging in ages, family backgrounds, educational backgrounds, ethnicities, and geographic locations. The researcher made every attempt to control known variables in order to have a homogenous group of students; however, these unknown variables were certainly factors in the study that may or may not have affected the outcomes of the study. Other variables were more certainly a contribution to the study outcomes, such as parental or family involvement with practice routines between lessons.

The ages of 6-9 years for participants was chosen for the present study in order to expand the scope of available subjects in each group, due to both the distance group and face-to-face group having to make financial and non-financial investments for participation. Despite ages 6-9 being outwardly close in terms of number of years, it is quite likely that some students

were not as mature, either developmentally and/or musically, as compared to other students in the study. This is not to say that the younger participants were not as developmentally or musically mature as the older participants. In fact, one of the students who advanced the furthest in the present study and was strongest musically was a six-year-old participant. On average, however, a six-year student thinks and reasons differently than an eight-year or nine-year old. Selection of a curriculum and additional materials should be done individually based on developmental and musical readiness rather than on a "one fits all" basis. For control purposes, that was not possible in this study.

One of the requirements for study participation was that students could not have taken any prior private music instruction, but many children informally reported having music class at their schools or church. Knowing a family member or friends who have taken piano lessons or who currently played was also reported. Both of these prior musical exposures were possible influences on students and are a reflection of parental attitude towards seeking out music education opportunities for their child.

With respect to parental influence, parental involvement was a variable that was not monitored or controlled in the present study. Since it was expected that the parents would not attend and participate in the face-to-face lessons, it was decided that parents should not directly participate in any instruction or modeling in the online lessons. Parents were asked to help with any technology issues that arose before, during, or after distance lessons, but parents did not have to be present and engaged in the distance lessons. There were occasions when parents did step in during lessons to physically show their child a hand motion or to give directives or feedback in place of the teacher. This was only after the child struggled for a large portion of the lesson time trying to imitate what the teacher modeled. After observing a child struggle with the teacher

model on the screen but then understanding a skill from the in-person parent, it was decided that the child was not able to understand due to some barrier of the computer screen. It is difficult to hypothesize if the child would have had similar struggles in face-to-face lessons, but it is probable to say that a child struggling to understand something on the computer screen would probably have the same challenges in face-to-face lessons.

In face-to-face lessons, a teacher might help a student resolve a problem with hand-over-hand intervention, i.e., placing the teacher's hand over the student's hand and manipulating it. This method would also be advantageous for a kinesthetic learner, who would respond positively to feeling a movement or physical motion adjusted in his hand by the teacher. In online instruction, this teaching method is not an option and is possibly detrimental for kinesthetic learners. How specific pedagogies and strategies can help the student transfer and execute a skill is of interest for furthering online teacher effectiveness. Parental intervention may be warranted to assist students who have difficulties in technique or movements. Also, using descriptions, large, exaggerated movements, aural modeling, and very sequential step-by-step directions are important in all effective teaching environments, and crucial in online instruction.

Reflections on the Method

As I watched these 57 videos that represented a beginning, middle, and ending point of the 7-month lesson period, I reflected as both the teacher in the lessons and the researcher. There are differences in teaching piano privately and teaching piano in a research environment. The many variables that must be controlled in a research setting might not warrant the same considerations in a clinical lesson setting. Some of those variables that were controlled for the present research study included: choice of method books, make-up policy, pacing of curriculum, and limited supplemental resources. For the present study, one primer-level, piano method series

was chosen for all students from which to study. In a private lesson environment, the teacher will often choose the most appropriate piano method for each student, based on the student's age, ability level, or learning styles (Clark, 1992). After assessing the student's strengths and weaknesses from an initial interview or lessons, then the teacher can match the student with the best possible piano method series. For example, the youngest child and oldest child in the present study would have likely studied from different levels or even a different piano method in a private lesson setting, simply due to their age differences. The similarity of lesson materials, a constraint due to the research process, may have had an impact on the progress made by students – in particular the older ones.

The make-up policy of the research study, i.e., no make-up lessons were given for missed lessons, is one that is typically adhered to by most professional piano teachers. The lesson appointment is a recurring weekly commitment, and many teachers do not give make-up lessons when students have a conflict due to other activities or sickness in order to preserve a consistent work schedule. Though students taking piano lessons are typically allowed to miss a lesson and return the following week for instruction, the curriculum would usually pick up where the student and teacher left off from the previous meeting. This flexibility allows for some variation in the length of time it may take a student to complete a piano method level. In the present study, students had the 7-month study period to complete the primer level. This was quite possible to do so comfortably provided the student practiced and attended lessons regularly, and this was affirmed by the pilot study after working with a distance, traditional-aged beginning student.

Also in private lessons, there are many cases in which helpful, technological resources and teaching aids would be used to supplement lessons, in both traditional and distance lesson settings. Some of these tools include computer software programs (such as *Music Ace*), online

theory games (such as www.musiclearningcommunity.com or www.emusictheory.com), apps (such as *Music Flash Class*), or digital audio/video recordings. These supplements could not be used in the present study for students in traditional or distance lessons, despite benefits of these tools, in order to preserve the no-technology lesson environment for the traditional students and an equivalent curriculum for the distance students.

This study has resulted in many pedagogical recommendations for teachers using synchronous videoconferencing in applied music lessons. Two of the biggest challenges in online instruction are the most obvious differences in lesson environments: time separation and physical separation. Not having the ability to physically manipulate or guide the lesson is a huge challenge. This separation also means that any part of the lesson done in real time, such as rhythmic work, chanting or singing, or playing duets, is not possible. This does not mean, however, that the distance environment is less effective; it is only different because of the separation. The time delay means that teacher and student activities will not be exactly in time. Activities can be synchronous one-way, meaning that the teacher starts an activity and the student joins the activity with the teacher. From the student's perspective, the activity is happening in exact time simultaneously with the teacher; however, the delay of information coming to the teacher does not allow for responsive interaction, such as musical or dynamic expressiveness in music. As technology improves and bandwidth speed is increased, it is hoped that technology will allow for exact, synchronous activities between distance teachers and students.

Verbal instructions functioned as the dominant teacher presentation in the distance lessons. Instructional clarity was important to maximize distance instruction. For example, saying one direction at a time was important in effective directions. Using concise descriptions

or instruction and sequencing patterns or steps are practices that online instructors should incorporate in teaching. Also, training children to respond to physical cues or musical cues can be used as a tool in place of the verbal instructions. For the present study, I used a physical cue of thumbs-up for "yes" and thumbs-down for "no" in the lessons. These short answers of "yes" and "no" could also be represented by a short musical selection played on the instrument, for example, a high trill and low trill, a chord progression, or even short melody.

Establishing a consistent routine was very important in making the most of a 30-minute distance lesson. I experimented with ways to help students focus attention by keeping a checklist during the lesson. I would show this to students throughout the lesson to help students know how many activities to anticipate during a lesson, what the goals were for the lesson, and also to monitor that not too much time is spent on each activity. Also to maintain routine, following a specific order of piano books was established. The distance lessons always progressed from the lesson book, to performance book, and theory book. In fact, this consistency ensured that the student had all three piano books at the beginning of each lesson, in order to prevent stopping during the lesson to go searching for a misplaced book. In attempts such as these to limit transition time, however, the time spent in transitions surprisingly still increased from the beginning, middle, to ending lesson for both lesson groups. This could be due to simply more transitions in a lesson because of more activities and lesson episodes in the 30-minute time frame.

Another issue for consideration in teaching distance applied lessons with children is practicing. Distance students in the present study were solely responsible for practice assignments by marking pages, either placing a sticky note on the page directly or writing a date on the page. However, very few completed, practice journals were collected at the study

conclusion. This was also the case with students in the traditional group. This indicates that students either had a practice routine, informally monitored by the parents, or there was no practice routine established and parents were not willing to invest time to record their child's practicing. With children this age who tend to be less independent in keeping track of paper work, this may say as much about the parents as it does about the students. A lack of commitment could have been affected by the piano lessons being a free service because they were enrolled in the study. Not paying tuition for piano lessons may have resulted in the parents' diminished commitment level to practicing. Knowing the student's and also parent's goals prior to enrollment in piano lessons will help the teacher make the best decisions about the music program for the child.

A similar topic with regards to the distance students' practicing is the written theory assignments. Checking written theory assignments was a challenge in the distance lessons. The students would attempt to hold the written page up to their camera for the teacher to view. When guiding the student to locate and correct any mistakes, it was difficult and time consuming to help guide the student to find the exact mistake and also how to correct it. An alternative to looking at theory assignments during the lesson appointment is to check this outside the lesson time. The parent can take a picture of the theory page with his or her iPhone and email or text-message the picture of the theory work to the instructor. At that point, the student and teacher can work through the theory pages either together or separately, while reading from the same document. Also, online theory games would be effective and motivating for teaching students introductory theory concepts. Online game databases such as www.musiclearningcommunity.com or www.emusictheory.com would allow both traditional or distance students to complete games and teachers to track student scores for their records.

A final consideration of applied distance music instruction is to where these students belong in terms of a private music studio. Should distance students be incorporated into a teacher's "traditional" piano studio? One issue that teachers must decide is where distance students will perform. The type of blended piano recital used in this present study is a possibility for piano performances. For this recital, the face-to-face students all attended the live recital at Louisiana State University and played on an acoustic grand piano. The distance students were individually connected via Skype into the LSU recital location and connected via *Internet MIDI* to perform on the local digital keyboard. The video from *Skype* was projected onto the wall at the LSU recital location. Since the distance students were performing from their respective home locations, one external camera at the recital location was used to capture the audience in order for the distance students to see the audience on their end of the videoconferencing connection. Another external camera was used to capture the entire recital and stream it live on *Ustream* (www.ustream.com). This stream made it possible for anyone with Internet access and the website channel to view and listen to all students perform in the piano recital. Distance and traditional students were intermingled in the order of performance, and all students had the opportunity to watch and listen to each student perform.

Anticipated technology will allow for multi-user MIDI connections, similar to group videoconferencing calls, but currently, only group videoconferencing is possible for online performance opportunities. Also a consideration for teachers and students is where distance students are able to participate in piano festivals and competitions. Most professional music organizations that sponsor local piano events require that the piano teacher be an active member of the state or district. If the teacher and student live in different states, which is quite likely with distance instruction, will these distance students be provided with similar competitive

opportunities as those students living in-state with the teacher? Lastly, teachers should consider marketing strategies to attract online students. Teachers will have to decide if online students in their studios will follow the same studio policies outlined for traditional students, such as make-up policies, tuition pricing, and commitment expectations.

Within the context of this present study, distance applied piano instruction was a viable lesson option for beginning-aged piano students. All students reported that they were satisfied with instruction and students were able to demonstrate basic piano achievement skills in the post-lesson assessment and piano recital. In fact, there were possible student benefits to distance piano lessons, including student ownership and independence of lesson content and student-guided activities. The teaching and learning interactions of the distance lessons informed my own teaching behaviors in all lessons, as a result of teaching in the distance environment. A new focus to my lesson planning and instructional and verbal clarity were some of the results that resulted from teaching in the distance lesson environment. Overall, the private distance piano lesson environment using videoconferencing and MIDI-connectivity software was a positive experience for both students and the teacher.

Summary and Implications for Future Research

The distance education field has decades of research examining the effects of technology on education. The discipline of music is in its infancy using distance education and in researching this area. Perhaps researchers within music discipline should follow in the footsteps of those who work in other areas who promote examining the best way to incorporate DE in the classroom (Bernard et al., 2009; Hannum, 2009; Lou et al., 2006; Meyer, 2002). Instead of asking which environment works best, distance or face-to-face, more specific, focused research

questions are warranted for investigations and developments of best practices and effective pedagogies.

The present study investigated synchronous music instruction only. An examination of blended or combined face-to-face and distance instruction, as well as asynchronous with synchronous instruction, should be examined. Moving past methods of only comparing online to face-to-face instruction will answer questions such as how best to incorporate effective distance education instruction.

Parental attitudes and satisfaction of distance applied music lessons are important considerations for students of this age. Parental satisfaction and concerns with online instructional barriers should be examined. The training of parents to use and understand the software is essential in this lesson environment. Though face-to-face lessons require commitment from parents, such as driving their child to and from lesson, there are parent commitments required for online lessons as well, but they are of different quality. There is a level of parental involvement possible in online lessons not possible or needed in face-to-face lessons. Guidelines for teacher and parental roles during lessons should be established in order for students to develop teacher trust.

Training parents is needed to operate software during lessons, but training future teachers is urgently needed as technology advances and spreads into practice. Teachers need sufficient support to understand how software works and to offer effective teaching strategies (Jopling, 2012). Training teachers in online pedagogical design and strategies, hardware and software equipment protocols, and technological problem-solving skills are necessary for future online music educators. How teacher training and practicums can be incorporated into education programs must be further explored (Pike, 2013).

The learning styles of each student may play roles in their ability to absorb or transfer information in online lessons. It was difficult to determine if some of the struggles that students endured in online instruction were due to the online environment, or if students would respond similarly in face-to-face instruction. Some students may respond to face-to-face interactions because they are extroverts and/or kinesthetic learners. It is possible that introverted students and/or visual and aural learners might prefer and actually thrive in online instruction. Examining the learning styles and personality traits of distance students who had a positive experience and those of students did not have a positive experience could help in course design and pedagogy elements in an effective music DE program. Perhaps a learning style or personality test could help in making recommendations for students who are more likely to respond better to online instruction or face-to-face instruction. Also of interest for future research to examine is identifying the role online instruction plays in self-efficacy, particularly beginning piano students.

Future researchers should broaden the scope of subjects examined in a distance music environment. The teacher and student behaviors of distance lessons should be observed in different lesson settings with a variety of subjects: for example, older students and adults with more or less musical abilities; private lessons compared to group or classroom settings; a larger teacher pool whom have more and less teaching experience; and different MIDI-equipped instruments including Disklaviers and Clavinovas. Distance lessons create the means to connect students and teachers from cultures anywhere in the world. The opportunities to connect students and experts from different musical cultures will be more accessible than ever before. However, decisions must be made in order to create an authentic learning experience for teachers and students of different musical cultures. Some possible questions to consider are, should music

notation be taught to students of a predominantly aural musical culture, and should a keyboard instrument tuned in equal-temperament, not indigenous to a musical culture, be the primacy of study in private music lessons?

The relationship between teacher, student, and parent, blended synchronous and asynchronous lesson environments, learning styles, self-efficacy, teacher training, and social and cultural implications are all variables that warrant further study in applied distance instruction. Looking closely at the complete educational experience of the student is necessary to create the best and most effective learning environment, regardless of the technology used. Distance education opportunities will continue to be influenced as technology changes and becomes more sophisticated. The distance music experience should mirror this same growth. The point at which the distance applied music lesson is most effective for teachers and students should be considered and examined in future research.

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APPENDIX A
INFORMATION DISTRIBUTED TO RECRUIT PARTICIPANTS FOR STUDY

You are invited to participate in a research study on distance piano lessons given in an online environment. If you have a child that is 6-9 years of age and wish to enroll him in piano instruction, beginning in June 2011, please consider participating in this study. Lessons will be free of charge for committing to 7 months of piano lessons, beginning June 2011. Your commitment to this study includes your child attending weekly lessons, for 30-minutes for 9-week summer term and a 14-week fall term, as well as the parental responsibility of actively encouraging home practice of all piano assignments. Your child will get to study with a National Certified Teacher of Music with over 9 years of teaching experience, as well as be a part of a research study that may be beneficial to the field of distance music education.

If you are interested in traditional piano lessons, the following are required:

- An acoustic or digital keyboard for at-home practice.
- Provide transportation for your child to lessons.
- Purchase of lesson books, approximately $30.
- Provide encouragement for practicing.

If you are interested in the convenience of distance piano lessons from you home environment, the following are required:

- A full-size digital keyboard with MIDI connection and weighted keys of high sound quality.
- Internet access.
- A laptop, capable of downloading and useing *Skype* (www.skype.com).
- Purchase of computer software for lesson use for $69, *Internet MIDI* (www.timewarptech.com).
- Purchase of a M-Audio Uno USB MIDI Interface cable, approximately $40.
- Purchase of lesson books, approximately $30.
- Provide encouragement for practicing.

Please contact Rebecca Bellelo for more information on participating in these piano lessons.
662-417-4362
rcarte8@lsu.edu

APPENDIX B
IRB APPLICATION FOR EXEMPTION

Application for Exemption from Institutional Oversight

Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu
lsu.edu/irb

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

-- Applicant,Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at http://www.lsu.edu/screeningmembers.shtml

-- A Complete Application Includes All of the Following:
(A) Two copies of this completed form and two copies of part B thru E.
(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)
(C) Copies of all instruments to be used.
*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
(D) The consent form that you will use in the study (see part 3 for more information.)
(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (http://phrp.nihtaining.com/users/login.php.)
(F) IRB Security of Data Agreement: (http://www.lsu.edu/irb/IRB%20Security%20of%20Data.pdf)

1) Principal Investigator: Rebecca Carter Bellelo **Rank:**

Dept: Music Education **Ph:** 662-417-4362 **E-mail:** rcarte8@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each

Supervising Professor: Jane Cassidy
Vice Provost for Academic Affairs
Phone: 225-578-3270 Email: jcassid@lsu.edu
146 Thomas Boyd Hall

IRB# E5535 LSU Proposal #
⊗ Complete Application
⊗ Human Subjects Training

3) Project Title: MUSICAL ACHIEVEMENT AND ATTITUDE OF BEGINNING PIANO STUDENTS IN A SYNCHRONOUS VIDEOCONFERENCING LESSON ENVIRONMENT

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 I www.lsu.edu/irb
Exemption Expires: 5-15-2014

4) Proposal? (yes or no) no **If Yes, LSU Proposal Number**

Also, if YES, either ○ **This application completely matches the scope of work in the grant**
OR ○ **More IRB Applications will be filed later**

5) Subject pool (e.g. Psychology students) beginning piano students
*Circle any **"vulnerable populations" to be used:** (children <18, the mentally impaired, pregnant women, the ages, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature Rebecca C. Bellelo **Date** 5/10/11 (no per signatures)

**** I certify my responses are accurate and complete.** If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted X Not Exempted ____ Category/Paragraph ____

Reviewer S. Kim MacGregor **Signature** S. Kim MacGregor **Date** 5/16/11
AM

APPENDIX C
CONSENT FORMS

CONSENT FORMS

Parent Consent Form

Study Title: Musical Achievement and Attitude of Beginning Piano Students in a Synchronous Videoconferencing Lesson Environment

Performance Site: Investigator's home piano studio, 1311 Westchester Drive, Baton Rouge, 70810, and the participants' homes for distance lessons

Investigators:	Principle Investigator	Faculty Supervisor
	Rebecca Bellelo	Jane W. Cassidy
	662-417-4362	225-578-8863
	rcarte8@lsu.edu	jcassid@lsu.edu

Purpose of the Study: The purpose of this research project is to examine the advantages and disadvantages of distance piano lessons for beginning students as a viable method for musical achievement. The study will also examine comparable teacher and student behaviors of those in distance piano lessons to those observed in traditional lesson environments, and attitude of students learning piano in a traditional environment compared to those in a distance learning environment.

Subject Inclusion: Recruited students who are interested in beginning piano lessons and who are willing to comply with the researcher's request for videotaping of lessons and interviews with students.

Study Procedures: This study of musical achievement gained from traditional and distance piano lessons will be conducted during a 7 month period of the 2011 school year, anticipated to begin in June. All lessons will be given weekly lasting for 30 minutes, with a 9-week summer term and 14-week semester in the fall term, totaling 23 lessons over a 7 month period. The curriculum will focus on note reading, piano performance, technique, sight-reading, ear training, and basic theory. The beginner readiness assessment, pre-instruction attitude survey, and initial interview with all students will take place prior to lessons beginning. Each lesson will be videotaped with a high definition digital recorder. During the summer and fall semester, each child will maintain a practice log, keeping a record of days practiced, and student goals as decided between student and instructor. The final musical achievement assessment, and post-instruction attitude surveys, and post-instruction interviews with all students will take place after lessons have concluded. All students will remain anonymous in this study and may only be identified by a pseudonym if referenced in the conclusive paper. Your child may choose not to participate in lessons, interviews, or surveys at any time.

Benefits and Risks: The study may yield valuable information regarding distance education for music study and accessibility and viability as a means for studying piano. There are no risks to participate in this study.

Privacy: Results of the study may be published, but no real names or identifying information will be included in the publication.

Financial Information: All students must provide a purchased copy of their piano books in order to receive instruction. There will be no fee for lessons given, nor any financial compensation. All students are expected to have access to a piano or equivalent keyboard as described in the information distributed for parental information. For those students selected to participate in the distance piano lessons, they must have access to a computer or laptop with Internet access and a webcam, a weighted-action, 88-key, MIDI keyboard, software programs *Internet MIDI* and *Skype*, and a M-audio USB Midisport Uno MIDI Interface cable. Students participating in the face-to-face lessons are expected to have transportation provided to and from the studio site.

Additional Requirements: Parents and students agree to comply with the researcher's request for interviews and assessments, including surveys and performance measures, videotaping of all lessons, and practice expectations to be met by the student and completion of the weekly practice log, with parental supervision and assistance when needed.

Signatures:
The student has been discussed with me and my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Matthews, Institutional Review Board, (225) 578-8892, irb@lsu.edu, www.lsu.edu/irb. I acknowledge the investigator's obligation to provide me with a signed copy of this consent form upon request.

Yes, I give my permission for my child to participate.

Parent Signature_____

Parent Name (print) _____

Child's Name _____

Date _____

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 I www.lsu.edu/irb
Exemption Expires: 5-15-2014

Student Assent Form

I, _____, agree to participate in a study that will look at musical achievement and attitude of piano students who take lessons over the Internet and in face-to-face lessons. I will participate in piano lessons and practice all assignments asked by my teacher, as well as keep a practice log. I agree to be interviewed about my feelings about the lessons and teacher. I will fill out the attitude surveys when they are given to me. I may choose not to participate in the lessons, interviews, or attitude surveys at any time.

Student signature: _____

Student name (print): _____

Age _____

Date _____

Witness: _____

Date _____

(Witness was present for the assent process)

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Exemption Expires: 5-15-2014

APPENDIX D

LETTER TO PARENTS OF STUDENTS ENROLLED IN LESSONS

April 30th, 2011

Dear Parents,

Thank you for agreeing to be a part of my dissertation study, one of the very first research studies on distance piano lessons. Please make sure that you have the **following equipment** ready for use by our first meeting.

1. Computer with Internet connection and webcam
2. Keyboard with MIDI capability
3. M-Audio UNO Cable—connecting the keyboard to the computer
4. Computer software—Internet MIDI:
   http://timewarptech.com/Pages/Products/InternetMIDI/InternetMIDI.html
5. Computer software—Skype:
   www.skype.com

If you have a desktop computer (not a laptop), please set your keyboard up as close the computer as possible, as it will help greatly when we are using the screen to see each other's hand positions while playing. If you are using a laptop, you can set your keyboard wherever you like and simply place your laptop to the side or on top of the keyboard.

Also, please make sure that you have the **piano books** that we will be using for lessons:
Faber & Faber Piano Adventures, Primer Level, ***1st Edition
Lesson Book, Performance Book, and Theory Book.
These books may be purchased at:
http://www.jwpepper.com/6314082.item
or a local music store will probably carry these books.

These other items are very helpful to have close by for lessons:
- ✓ Pencil or crayons
- ✓ Sticky notes
- ✓ Stickers

As part of this study, you and your child agree to the following:
- Free piano lessons, weekly 30-minutes, and purchase of equipment needed, for 9 lessons in the summer term beginning in June, and 14 lessons in the fall semester, beginning in August and ending in December.
- Your child will be videotaped for every piano lesson.
- Data will be collected on your child, including interviews, surveys, and performance measures at the conclusion of lessons.
- Your child will maintain regular piano practice and keep a log of weekly practicing.

I will be sending you a consent form to sign and return, which explains in detail your agreement to the study. **Please send me your local mailing address** so I can mail this to you to sign and return.

Lastly, please **send me your preference for lesson day (Monday-Friday) and time**.

- Our first meeting will be a technology session in order to practice setting up and using equipment, as well as a meeting with your child. This will begin the week of *May 30th*.
- The 9 lessons will be weekly, beginning the next week of *June 6th* through the week of *August 15th*.
- Let me know of any scheduled vacations or other weeks that there may be conflicts with our lesson, as we will skip those weeks needed. If you do not have any conflicts for the summer, we will only have 9 lessons during this 11-week period.
- We will reschedule days and times as needed for the fall semester, to accommodate everyone's after-school activities. The fall semester begins the week of *August 22nd*.
- No make-up lessons will be given for any reason, but I do ask for notice if an emergency happens and you should need to cancel a lesson.

Thank you, again, for your participation in this exciting study. Please feel free to call or email with any questions. I am looking forward to meeting and working with your child.

Sincerely,
Rebecca Bellelo
rebeccabellelo@yahoo.com
662-417-4362

April 30, 2011

Dear Parents,

Thank you for agreeing to be a part of my dissertation study, one of the very first research studies on traditional lessons and distance piano lessons. Please make sure that you have a **piano** or a full size, weighted-action **keyboard** at home for practice. This is needed by our first meeting, which is outlined below.

Also, please make sure that you have the **piano books** that we will be using for lessons:
Faber & Faber Piano Adventures, Primer Level, ***1st Edition
Lesson Book, Performance Book, and Theory Book.
These books may be purchased at:
http://www.jwpepper.com/6314082.item
or a local music store will probably carry these books.

These other items are very helpful to bring for lessons:
- ✓ Pencil or crayons
- ✓ Sticky notes
- ✓ Stickers

As part of this study, you and your child agree to the following:
- Free piano lessons, weekly 30-minutes, and purchase of books needed, for 9 lessons in the summer term beginning in June, and 14 lessons in the fall semester, beginning in August and ending in December.
- You are expected to provide transportation for your child, arriving on time and picking up your child promptly after the 30-minute lesson.
- Your child will be videotaped for every piano lesson.
- Data will be collected on your child, including interviews, surveys, and performance measures at the conclusion of lessons.
- Your child will maintain regular piano practice and keep a log of weekly practicing.

I will ask you and your child to sign a consent form, which explains in detail your agreement to the study, at our first meeting.

Lastly, please **send me your preference for lesson day (Monday-Friday) and time**.
- Our first meeting will be an informal assessment, as well as a meeting with your child. This will begin the week of *May 30th*.
- The 9 lessons will be weekly, beginning the next week of *June 6th* through the week of *August 15th*.
- Let me know of any scheduled vacations or other weeks that there may be conflicts with our lesson, as we will skip those weeks needed. If you do not

have any conflicts for the summer, we will only have 9 lessons during this 11-week period.

- We will reschedule days and times as needed for the fall semester, to accommodate everyone's after-school activities. The fall semester begins the week of *August 22nd*.
- No make-up lessons will be given for any reason, but I do ask for notice if an emergency happens and you should need to cancel a lesson.

My home address is *1311 Westchester Drive, Baton Rouge, LA 70810*. It is located behind the BREC park, on the corner of Highland and Siegen.

Directions coming from Highland Road, east (away from LSU campus):

1. Cross over Siegen Lane.
2. Turn LEFT onto AMISS RD. This will be less than 1 mile past Siegen, just past Highland Trace Drive. Look for the BREC park sign and a small church on the left.
3. Turn RIGHT onto N AMISS RD. This is at the first stop sign.
4. Turn LEFT on WESTCHESTER DRIVE, the 2nd street on the left.
5. My home, 1311, is several houses down on the left side. If you reach Neil Ave., you've gone too far.

If you are coming south on Siegen, turn LEFT onto HIGHLAND RD., and continue with direction #2 listed above.

If you are coming north on Burbank, turn RIGHT onto HIGHLAND RD., and continue with direction #2 listed above.

When bringing your child to piano lessons, please park in the driveway or along the edge of the road and my front yard. Come to the front door, where my studio is located.

Thank you, again, for your participation in this exciting study. Please feel free to call or email with any questions. I am looking forward to meeting and working with your child.

Sincerely,
Rebecca Bellelo
rebeccabellelo@yahoo.com
662-417-4362

APPENDIX E
BEGINNER READINESS ASSESSMENT

Student name: _____ Age:_____
Grade in school: _____

School: _____

Conversation starters/questions (to student).

Does anyone else in your family play an instrument?

What is your favorite music to listen to?

What do you think you want to learn from piano lessons?

Comments:

Readiness Evaluation: (follow each assessment with comments)

- Aural discrimination (note if student gives correct answer and number of tries)
    - Higher or Lower
    - Direction of up and down
    - Tracing the direction of upward and down passages as you play them
    - Louder or softer
    - Longer or shorter
    - Same or different intervals
    - Singing back short phrases
- Rhythm
    - Moving to music- steady beat,
    - Clapping back short rhythm patterns, then play back rhythms on the piano

- Piano technique
    - Black key groups and white keys
    - Have student demonstrate how to sit in a good position at the piano
    - Have student demonstrate what a good piano hand looks like;

Additional Comments:

APPENDIX F
PRETEST AND POSTTEST QUESTIONS FOR ATTITUDE SURVEY

1. Practice question: The sky is blue.
2. Practice question: Summer is my favorite time of year.
3. I am excited to take piano lessons to learn to play songs on the piano.
4. I think it is great when someone my age can play piano.
5. I will be no good at playing piano.
6. I think I can learn how to read music in order to play songs on the piano.
7. The best part about taking piano lessons will be playing music.
8. I am scared I will not do well learning to play piano.
9. I think playing piano will make me feel good about myself.
10. Learning to read music will not be a problem for me.
11. I am sure that I can learn to play piano by taking lessons over my computer/at my teacher's home.
12. I will be able to use all the equipment needed for piano lessons.
13. Piano lessons make me feel uncomfortable and nervous.
14. It is important for my teacher to understand how I feel and what I have to say.
15. I will be able to have a friendship with my piano teacher
16. Taking piano lessons on the Internet is just as good as taking piano lessons face-to-face.

APPENDIX G
INTERVIEW QUESTIONS

Initial Student Interview Questions

1. What is your age?
2. What grade are you in?
3. What do you think your favorite part of taking piano lessons will be?
4. What do you think the least favorite part of taking piano lessons will be?
5. Is it important for you to get along with your teacher and build a friendship?
6. What are your feelings about playing piano?
7. Do you have any friends or anyone you know that takes piano lessons?
8. Do you have anything that you really want to learn in piano lessons?
9. What do you think taking piano lessons [over the Internet/at my home] will be like?
10. What experience do you have using a computer or other technology?
11. What do you think the differences may be between piano lessons face-to-face and piano lessons over the Internet?
12. Do you have any other concerns or anything else you would like to share?

Final Student Interview Questions

1. What do you think the best parts of your music lessons were?
2. Is there anything specific that happened that you really liked? If so, explain.
3. Was there anything that happened in your lessons that you didn't like?
4. Overall, did you feel comfortable working with me in this environment?
5. How would you describe your musical progress from these lessons? Did you learn everything that you wanted to learn?
6. Was there anything that you were disappointed with in the lesson experience?
7. What were the parts about the lessons that made learning easy? Hard?
8. Describe the relationship you have with your teacher. How do you think [the computer/coming to my home] affected the relationship that we have?
9. Do you think there were musical communication problems? Do you think any other parts of the lesson were effected by the computer/by coming to my home?
10. Do you think this method was as good as taking piano lessons face-to-face/taking lessons from my home?
11. Is there anything else you would like to share?

APPENDIX H
INSTRUCTIONS FOR ONLINE LESSON SETUP OF EQUIPMENT

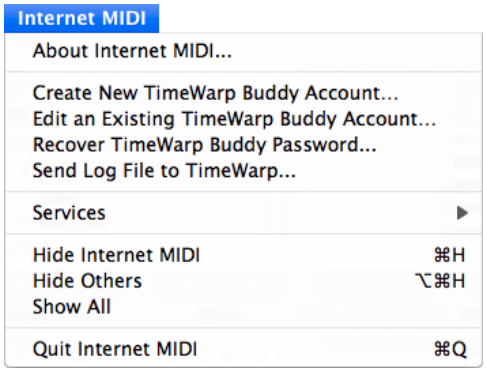
May 27, 2011

Dear Parents,

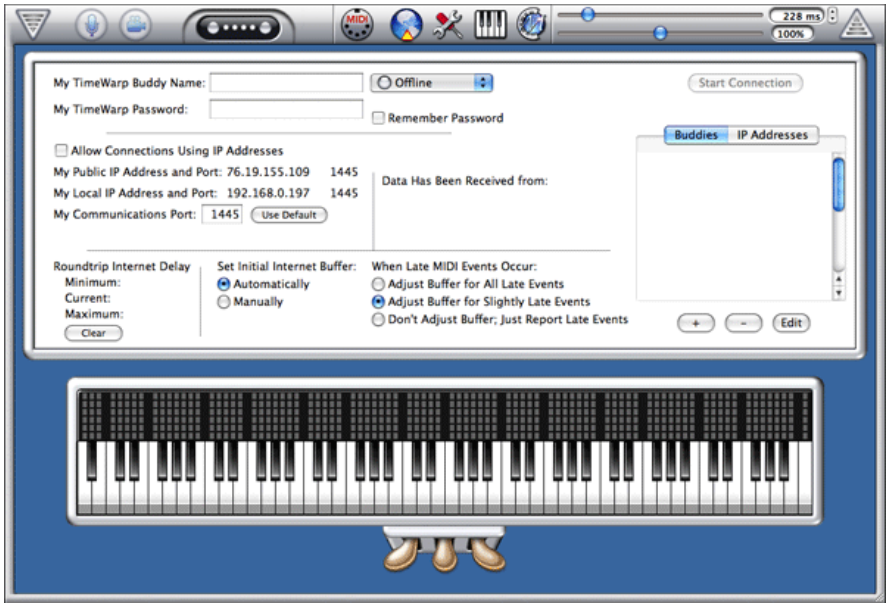
The time is here for us to begin our distance piano lessons! Here's a few notes and reminders for the upcoming week.

I. I am sending **permission forms** in the mail to you. Please have you and your child sign these and return then as soon as possible. Thank you!
II. I am attaching a **piano practice log sheet** to the email. Please print out 23 copies (number of lessons we should have) and put this in a folder. *This is important information to help with your child's **weekly** practice, and also something I will collect at the end of the study! Your encouragement for practicing will ensure your child's success at playing piano.*
III. I am also attaching the weekly lesson schedule to this email. Please make sure it is accurate!
IV. I will be sending out an email soon with a link to a survey that your child will take at our first lesson next week. **Please keep this email with the survey link and be ready to open the link when we are together in our first lesson, no earlier than this.**
V. Lastly, I need everyone's Skype and Internet MIDI buddy names, in order to add you to my contact list. The following are directions on how to do this:

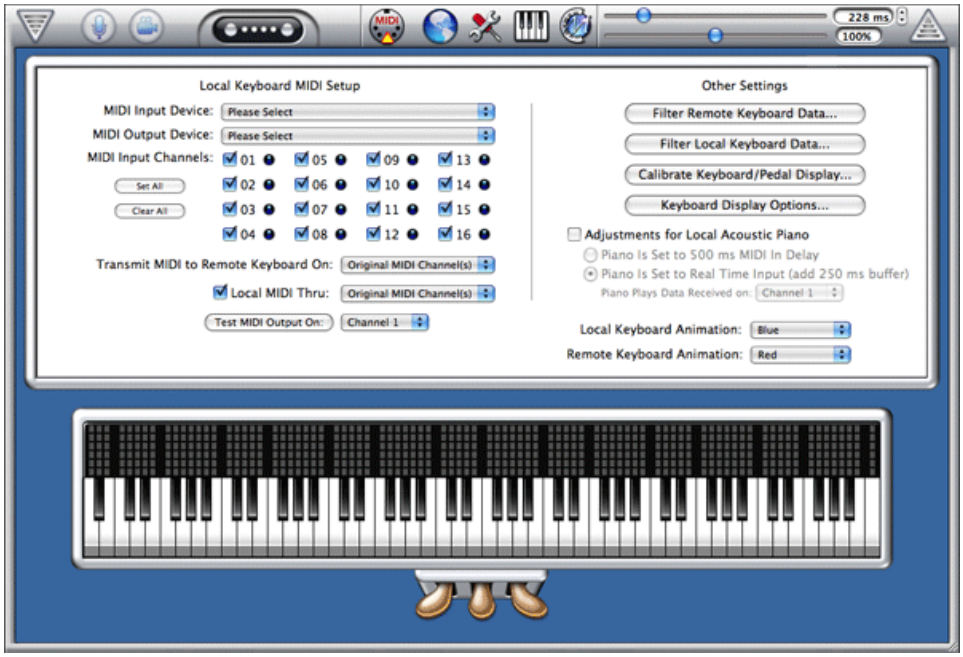
1. Open Internet MIDI and click "Create New TimeWarp Buddy Account" under the first tab "Internet MIDI." Fill out the necessary information. Click Save.



2. Click on the "Globe" icon in the middle of the screen. This screen is the Internet Connection View and the first screen you should look at when we connect. Type in your buddy name and password. You can check the box "remember password."



3. When you and I are ready to connect for lessons, you must change the box in the middle column from "offline" to "online".
4. Add me in your "Buddies" contact list on the right, by clicking the "+" box in the bottom right corner of the screen. **My buddy name is "rebeccabellelo."**
5. On the bottom center of this screen, select "manually" for set the initial internet buffer, and the option "Don't adjust buffer, just report late events" under the category "When late MIDI events occur."
6. You can hook up your cable from your keyboard to your computer. The two round ends "MIDI IN" and "MIDI OUT" OR the square end of the USB cable will be to your keyboard and the USB flat side will go into the computer. Once this is connected and the keyboard is turned on, select the "MIDI Setup View" by clicking the icon in the top-middle of the screen labeled MIDI.



7. Click the arrows for the items "MIDI Input Device" and "MIDI Output Device" and select the M-Audio Cable.
8. You can perform a test to see if your keyboard and computer are connected.
   A. When you play your keyboard, the keyboard on the screen should light up.
   B. When you click the keyboard on the computer screen, you should hear the notes played through your keyboard speakers.

Directions for creating Skype name:

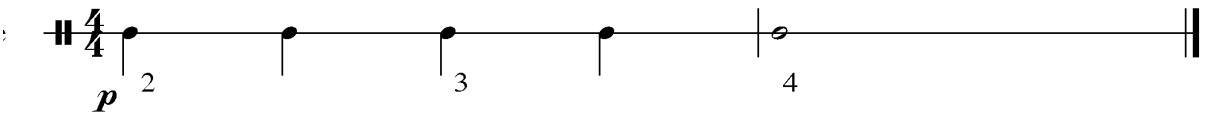
1. Download Skype from www.skype.
2. ***Important- If you are using a Mac computer, please download the older version of Skype Version 2.8 found here: http://mac.oldapps.com/skype.php?old_skype=37
3. Create a user name and password, found on the first screen "Don't have a Skype Name?"
4. *If any box opens that asks about other programs being allowed to use Skype- You should allow **Internet MIDI to use Skype**. Select the option "Allow this application to use Skype."*
   If something does not pop up in a box asking you this, it can be found under the tab "Account" and by selecting "Manage API Clients." If you have Internet MIDI downloaded, you should see that in the box, as you select this and select the option "Allow this application to use Skype."
5. **Please add me to your buddy list. My Skype name is "rebeccabellelo."**

Our first lesson next week will include an interview, the email survey, a general technology session for you to get comfortable with the equipment, and keyboard introductory material. Thank you again for your participation in this exploratory research study on distance piano lessons!

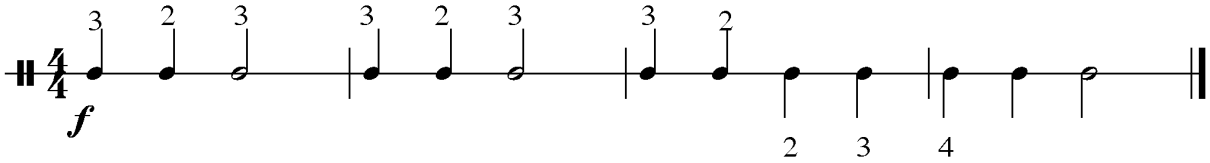
Sincerely,
Rebecca Bellelo

APPENDIX I
PREPARATORY ASSESSMENT SKILL PRACTICE EXERCISES

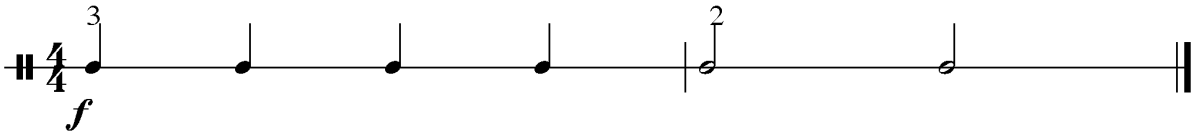
Assessment Skills Practice 1
Sight Reading 1



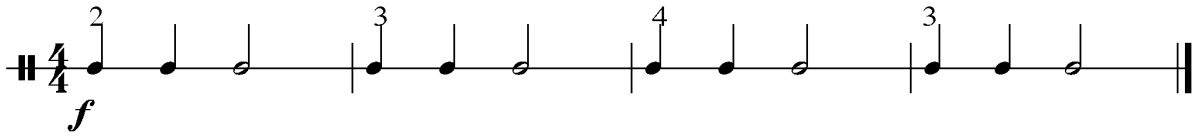
Assessment Skills Practice 1
Sight Reading 2



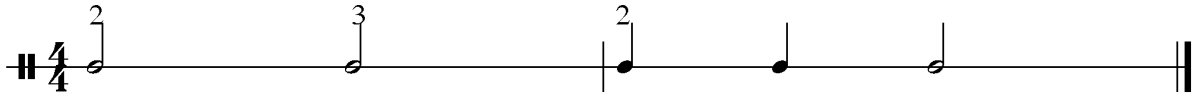
Assessment Skills Practice 1
Visual Memory 1



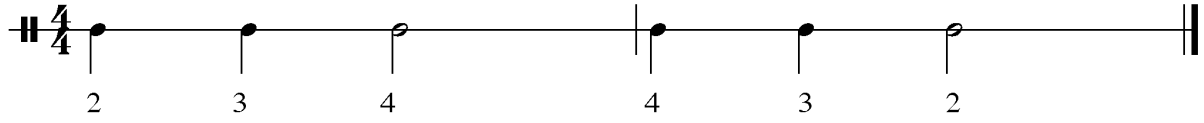
Assessment Skills Practice 1
Visual Memory 2



Assessment Skills Practice 1
Playing by Ear 1

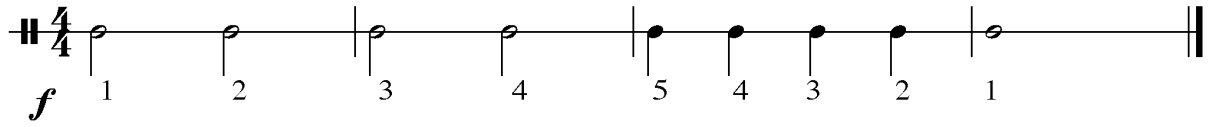


Assessment Skills Practice 1
Playing by Ear 2



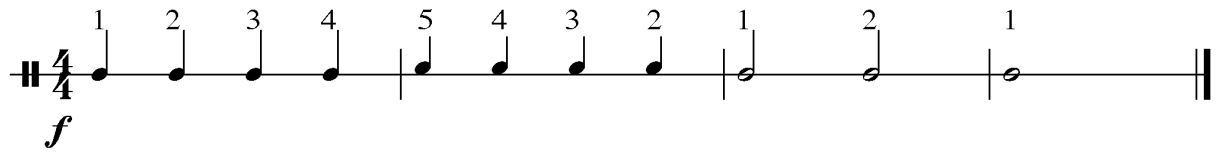
Assessment Skills Practice 2
Sight Reading 2

C five-finger scale



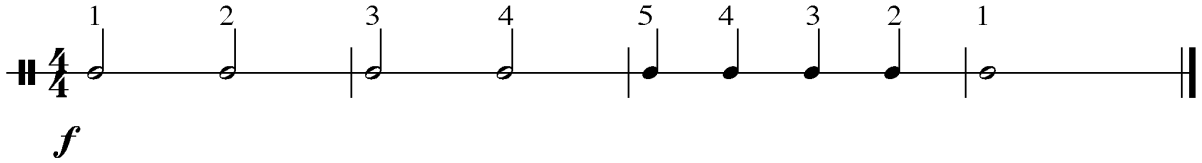
Assessment Skills Practice 2
Sight Reading 1

C five-finger scale



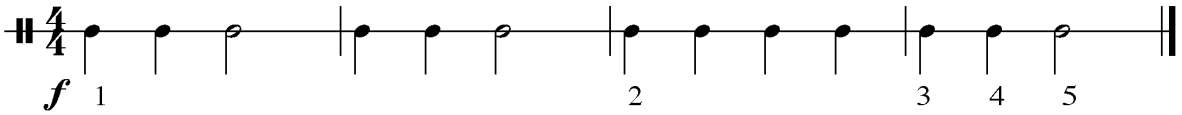
Assessment Skills Practice 2
Visual Memory 1

C five-finger scale



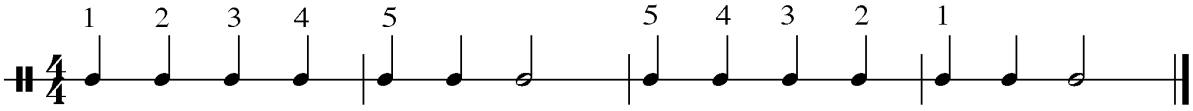
Assessment Skills Practice 2
Visual Memory 2

C five-finger scale



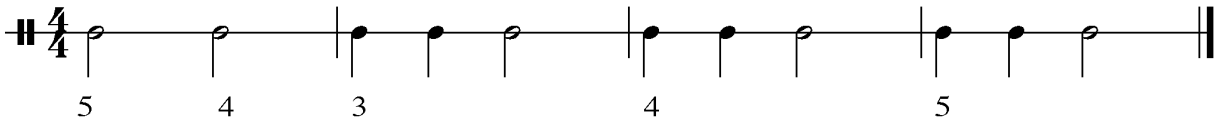
Assessment Skills Practice 2
Playing by Ear 1

C five-finger scale

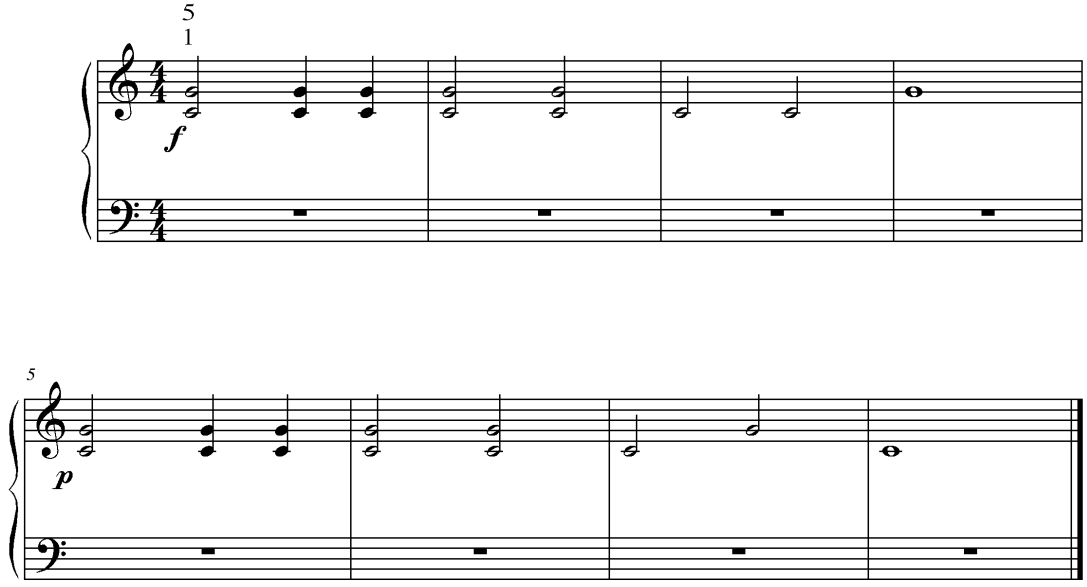


Assessment Skills Practice 2
Playing by Ear 2

C five-finger scale



Assessment Skills Practice 3
Sight Reading 1



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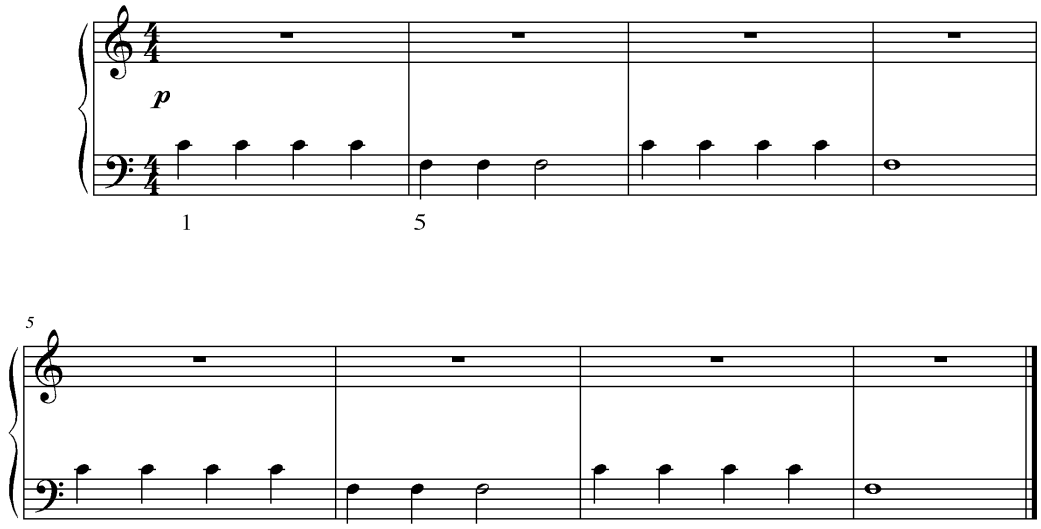
Assessment Skills Practice 3
Sight Reading 2



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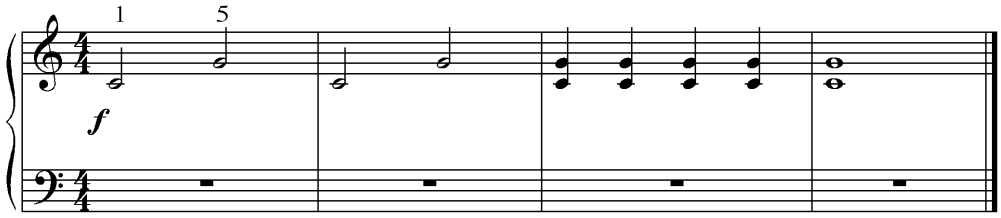
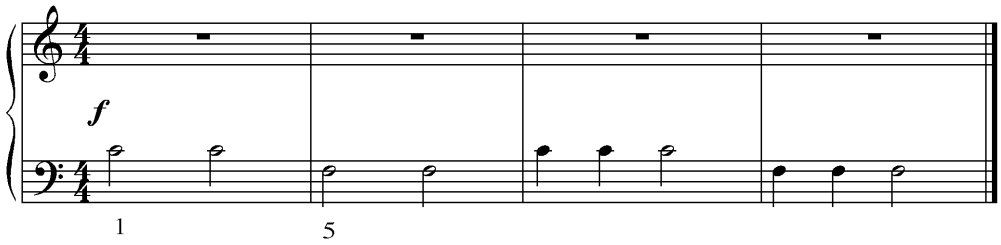
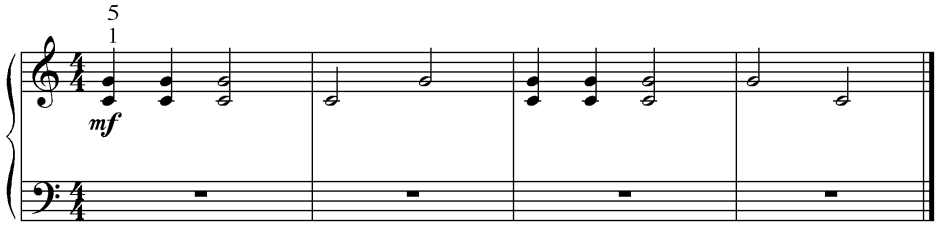
Assessment Skills Practice 3
Visual Memory 1



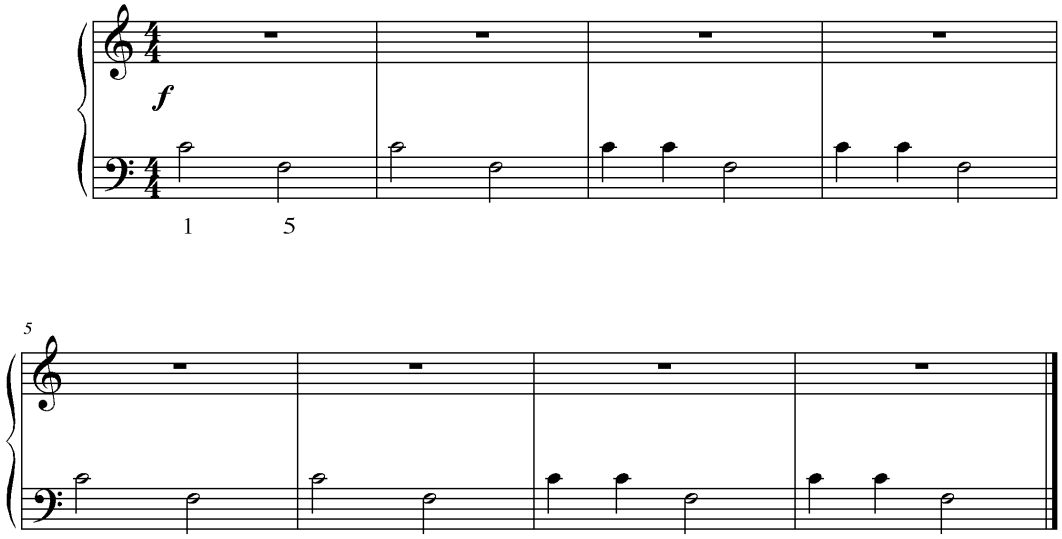
Assessment Skills Practice 3
Visual Memory 2



Assessment Skills Practice 3
Playing by Ear 1



Assessment Skills Practice 3
Playing by Ear 2



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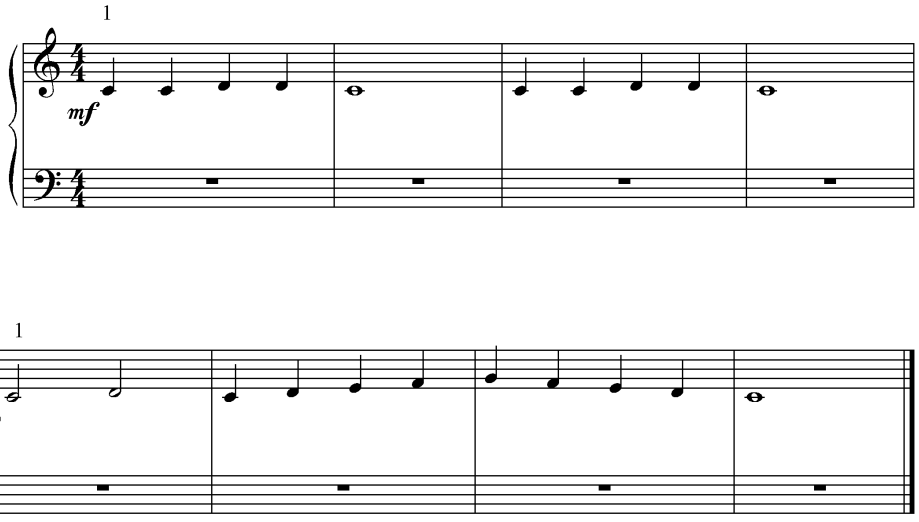
Assessment Skills Practice 4
Sight Reading 1



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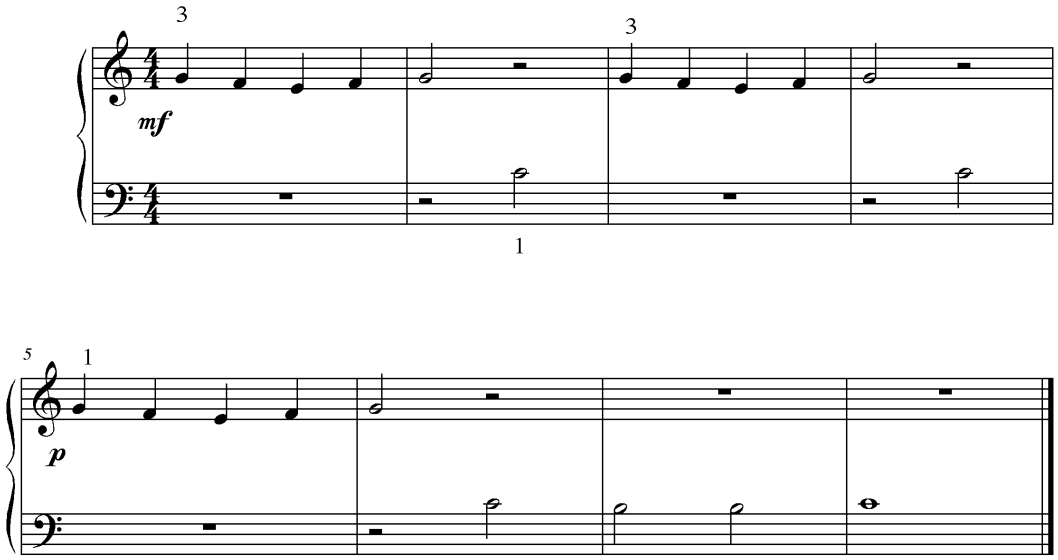
Assessment Skills Practice 4
Sight Reading 2



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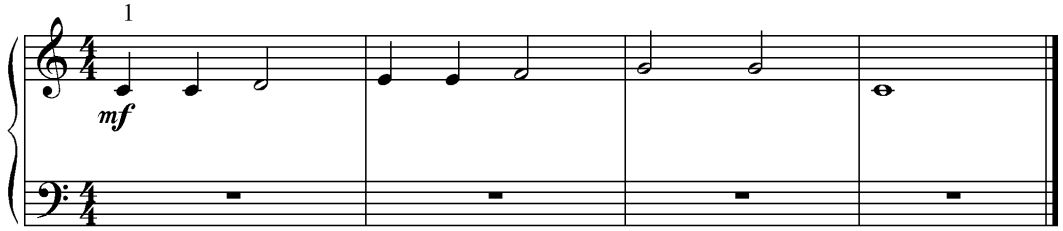
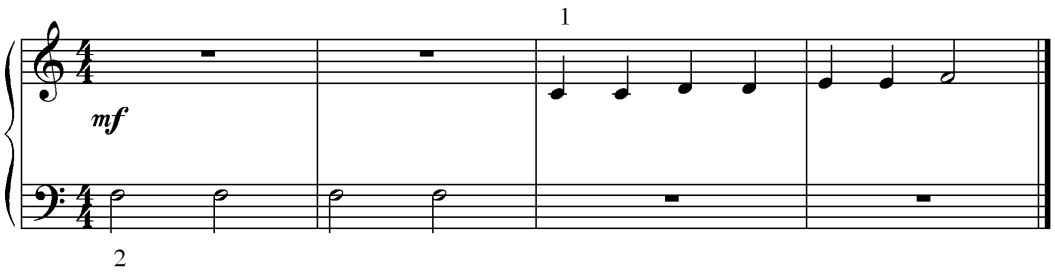
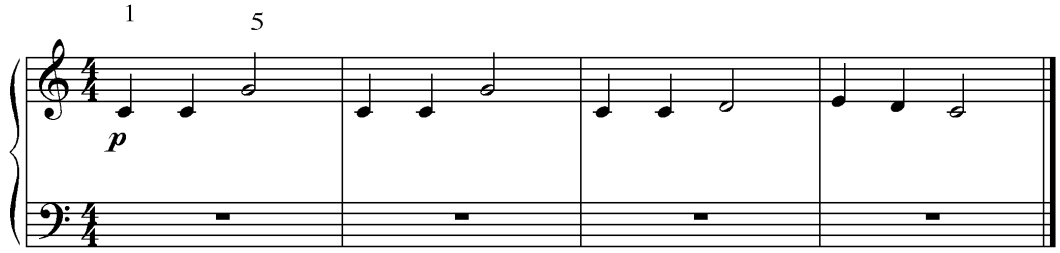
Assessment Skills Practice 4
Visual Memory 1



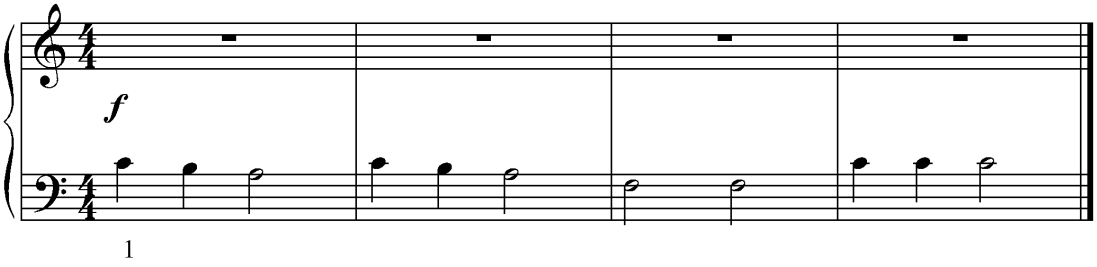
Assessment Skills Practice 4
Visual Memory 2



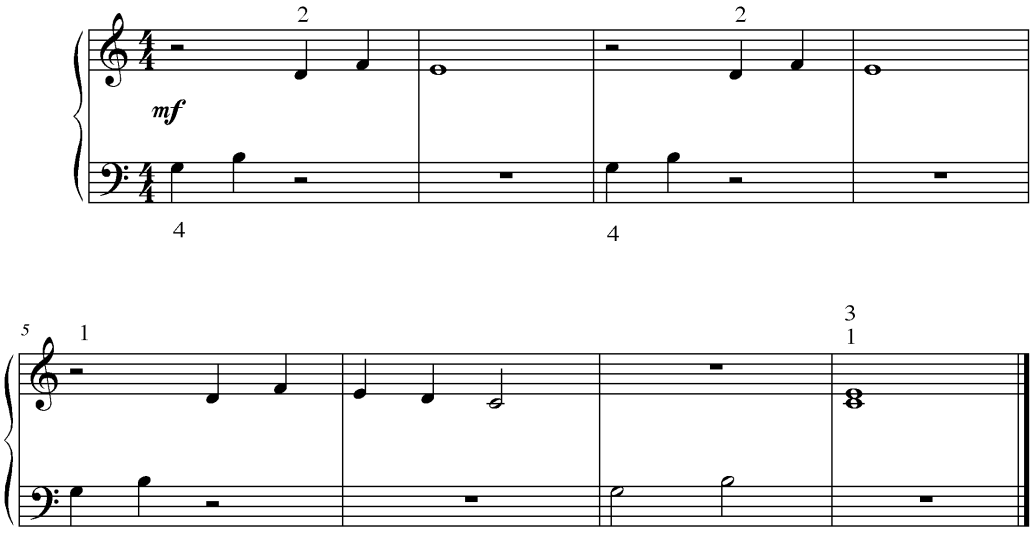
Assessment Skills Practice 4
Playing by Ear 1



Assessment Skills Practice 4
Playing by Ear 2



Assessment Skills Practice 5
Sight Reading 1



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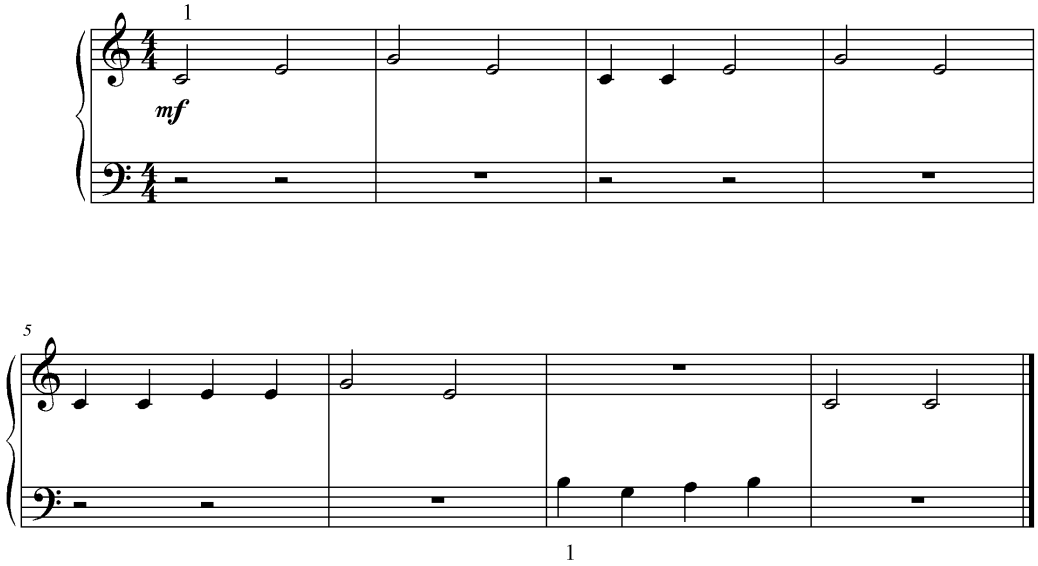
Assessment Skills Practice 5
Sight Reading 2



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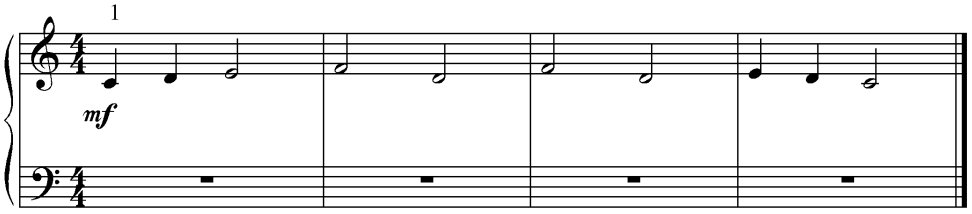
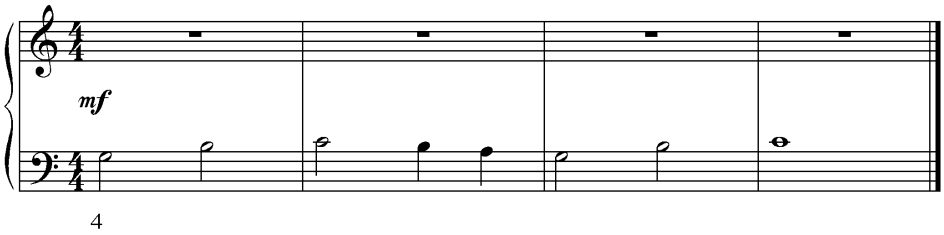
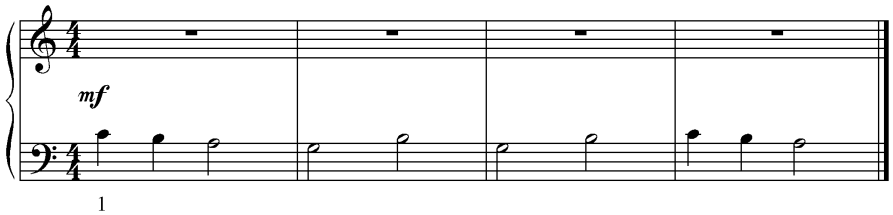
Assessment Skills Practice 5
Visual Memory 1



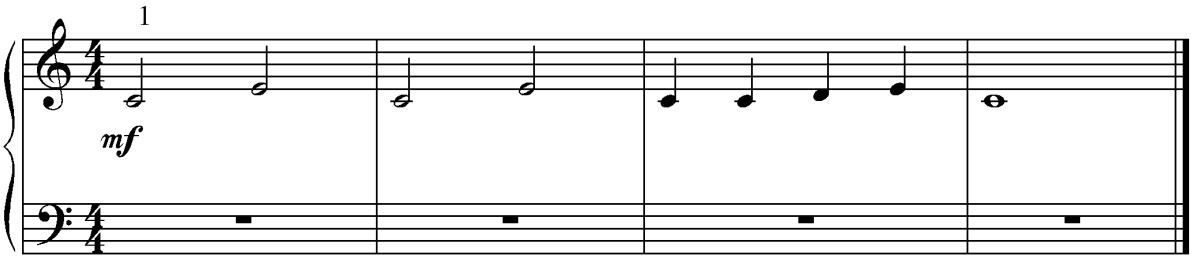
Assessment Skills Practice 5
Visual Memory 2



Assessment Skills Practice 5
Playing by Ear 1



Assessment Skills Practice 5
Playing by Ear 2



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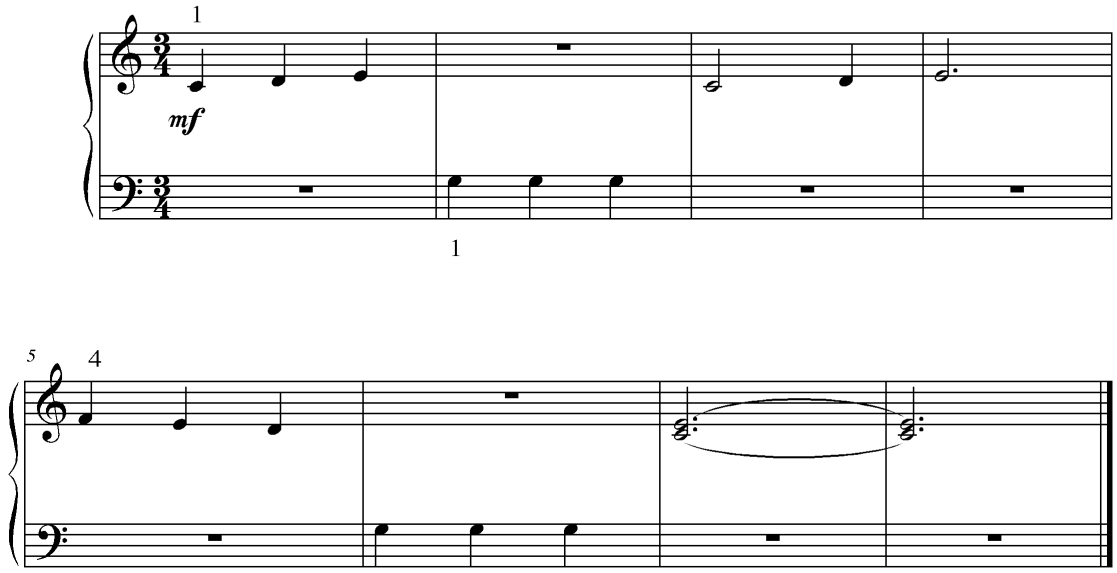
Assessment Skills Practice 6
Sight Reading 1



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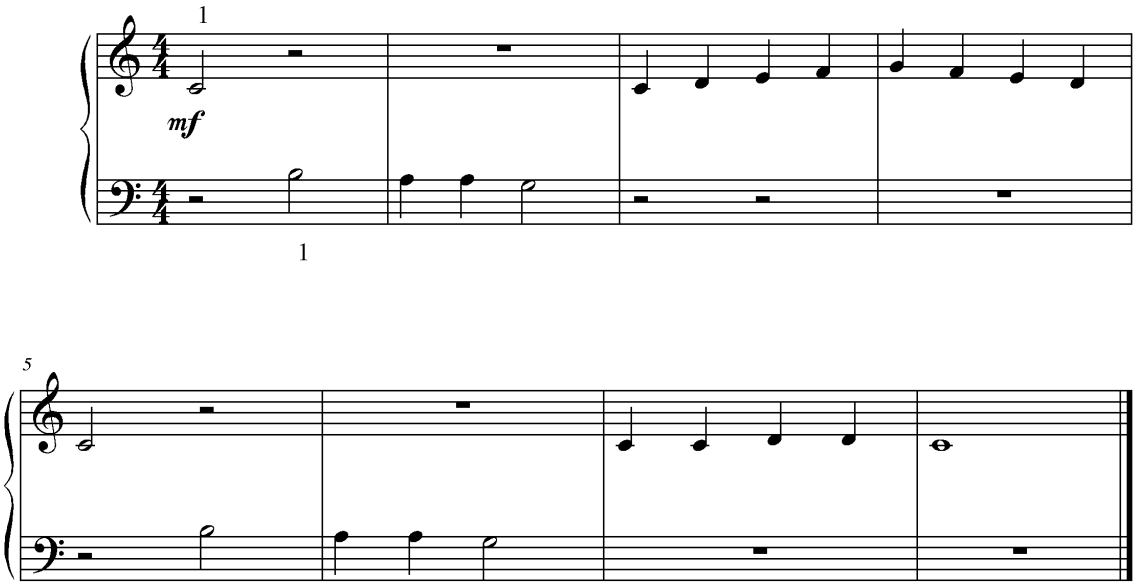
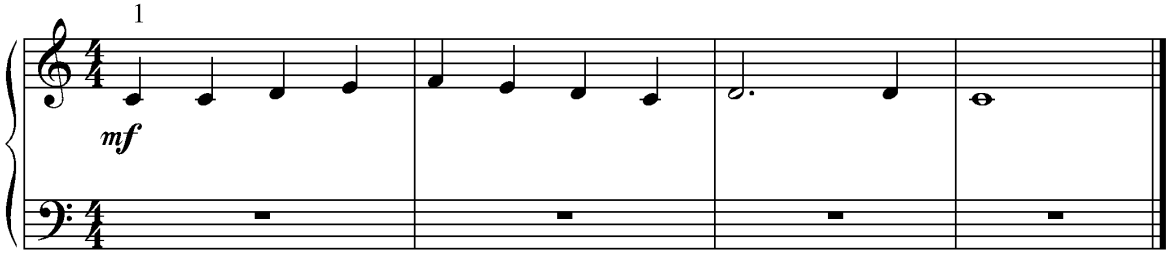
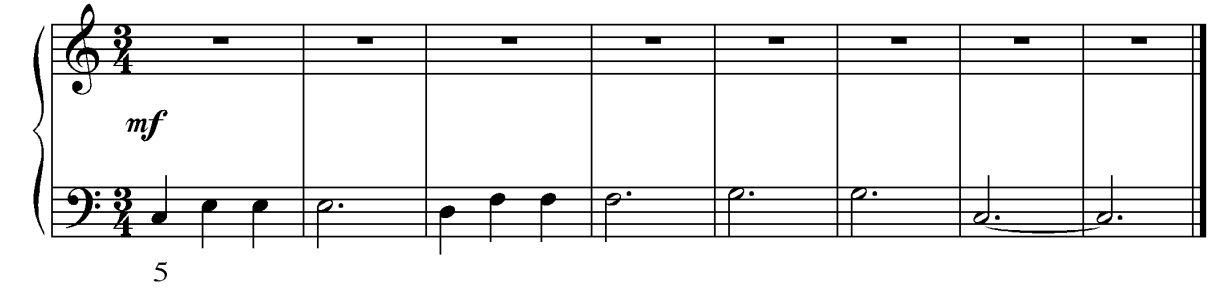
Assessment Skills Practice 6
Sight Reading 2



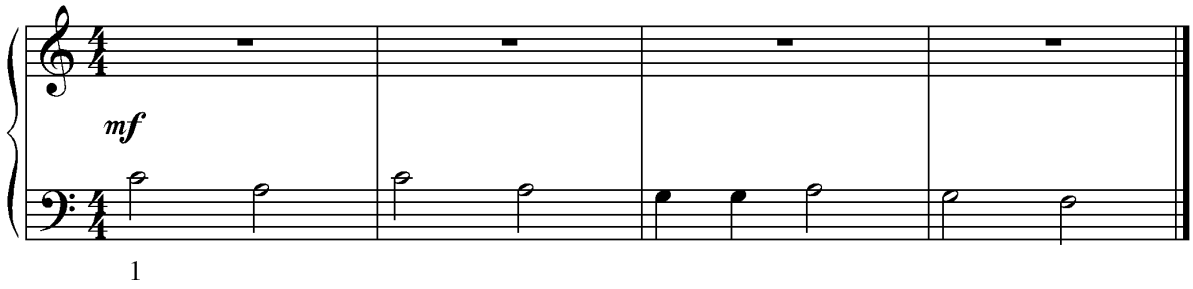
Assessment Skills Practice 6
Visual Memory 1



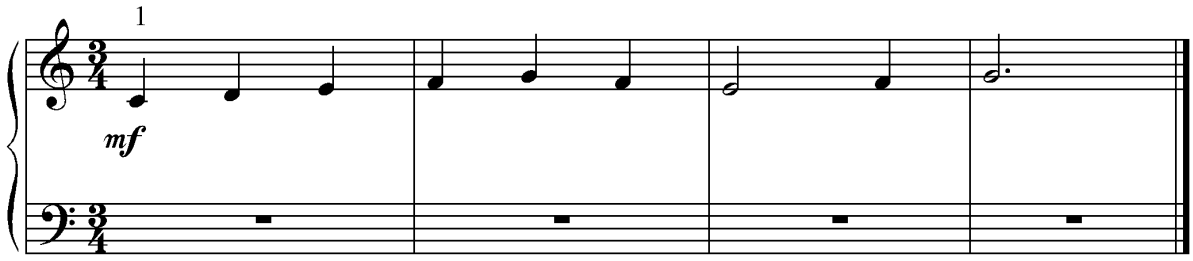
Assessment Skills Practice 6
Visual Memory 2



Assessment Skills Practice 6
Playing by Ear 1



Assessment Skills Practice 6
Playing by Ear 2



APPENDIX J
PUBLISHER PERMISSION LETTERS

Alfred Publishing

Learn • Teach • Play Music

REPRINT AUTHORIZATION LETTER

April 16, 2013

Rebecca Bellelo
Phone:662-417-4362
Email: rcarte8@tigers.lsu.edu

Re: *Alfred's Premier Piano Course, Lesson Book 1A (22356) - Dissertation*

Dear Rebecca,

With respect to your request, this letter will serve as our authorization to you to reprint musical excerpts from the above referenced publication into your dissertation at Louisiana State University. This item is not be sold or made available to the general public without further permission. This permission is granted to you at no charge.

Any copies made must include the following copyright notices:

PREMIER PIANO COURSE: LESSON BOOK 1A
By DENNIS ALEXANDER, GAYLE KOWALCHYK, E. L. LANCASTER,
VICTORIA MCARTHUR, and MARTHA MIER

In the event your project is canceled, please write ***VOID*** and return this letter to us.

If we might be of service in the future, please let us know.

Sincerely,

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FABER
PIANO ADVENTURES

April 19, 2013

Rebecca Bellelo
Louisiana State University
Baton Rouge, LA 70803
rcarte8@tigers.lsu.edu

Dear Rebecca,

We have received and reviewed your written request for permission to reprint excerpts from one of our publications. Your request cited these specific examples from the **Piano Adventures®** **Primer Level Sightreading Book** written by Nancy and Randall Faber:

Day 2: Driving in the G Clef - p. 12
Day 4: Driving in the G Clef - p. 13
Day 5: Driving in the G Clef - p. 14
Day 1: Gorilla in the Tree - p. 16
Day 3: Gorilla in the Tree - p. 18
Day 6: Frogs on Logs - p. 37
Day 6: Let's Play Ball! - p. 41
Day 1- Come See the Parade - p. 46
Day 1: Elephant Ride - p. 54
Day 4: Elephant Ride - p. 56
Day 5: Elephant Ride - p. 56
Day 6: Elephant Ride - p. 57
Day 1: Yankee Doodle -p. 58
Day 6: Yankee Doodle - p. 61
Day 1: Lemonade Stand - p. 78

It is our understanding that these reprints will be included in your dissertation, titled: ***Musical Achievement and Attitude of Beginning Piano Students in a Synchronous Videoconferencing Lesson Environment.***

We are happy to grant you permission to include those samples in your dissertation, and ask that you include the appropriate credits:

Piano Adventures® Primer Sightreading Book,
by Nancy and Randall Faber
© 2011 Dovetree Productions, Inc.
c/o Faber Piano Adventures
3042 Creek Dr., Ann Arbor, MI 48108.

If you could send a copy of those pages of your dissertation when you are finished, we would appreciate the opportunity to see them. If you have any other questions, please email or call the Faber Piano Institute at (734) 975-1995.

We wish you great success with your research and writing!

Best regards,

Debra Hoffman
Brand / Marketing Manager
Faber Piano Adventures

APPENDIX K
WEEKLY PRACTICE LOG

Lesson Date: _____

I will practice _____ days this week.

Day	**Did I practice today?**	**Songs I played (page numbers):**	**Things I want to work on:**
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Parent signature: _____

APPENDIX L
SIGHT READING, AURAL, AND VISUAL MEMORY ACHIEVEMENT SCORING FORMS

Instructions: You will hear the following excerpts played. Score each beat for pitch and rhythmic accuracy. If the pitch or the rhythm is inaccurate, place a tally mark in the box, appropriate for either pitch or rhythm.

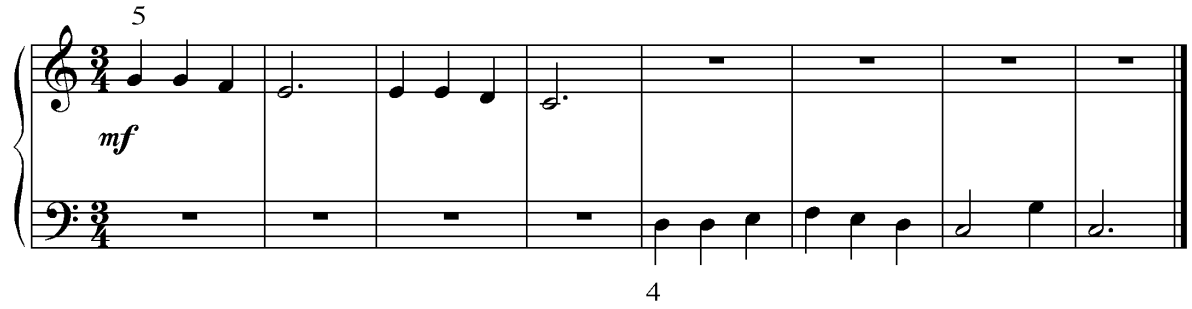
- A pitch error is any note that was added to or omitted from what is written in the score, or if an incorrect note was played.
- A rhythm error is defined as holding through a rest, holding rather than playing a repeated note, not holding a note for its full value, holding a note longer than its full value (up to one full beat), and any note value added, omitted, or not played at all.
    - Each beat can only receive one pitch error and one rhythm error.

Give a total score for each excerpt, including pitch and rhythm accuracy, deducting the tally marks from the total possible points.

You may hear the piece as many times as needed in order to score the piece most accurately.

Student: _____ Score:_____/48

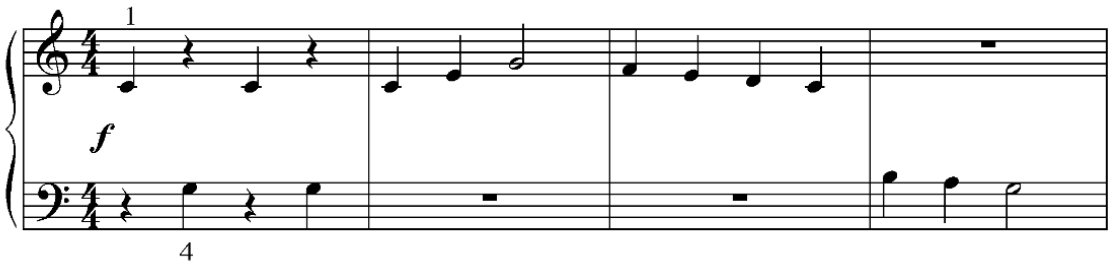
Sight Reading #1



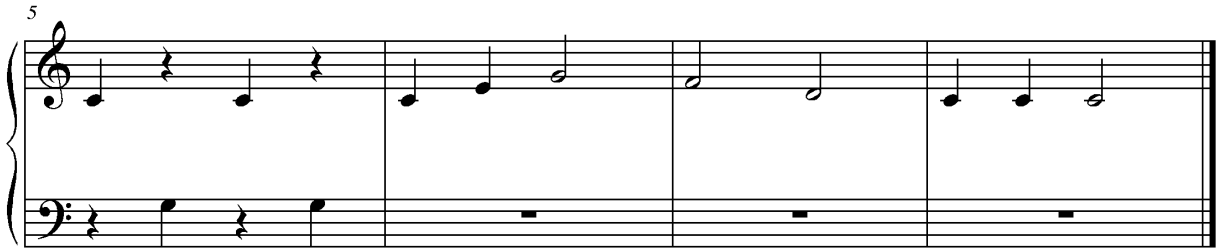
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Pitch																								
Rthm.																								

Student: _____ Score _____/64

Sight Reading #2



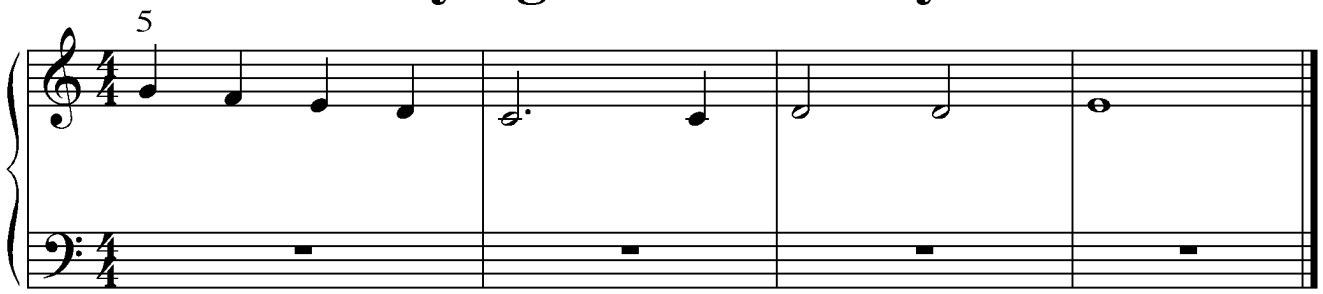
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Pitch																
Rhythm																



	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
P																
R																

Student:_____ Score:_____/32

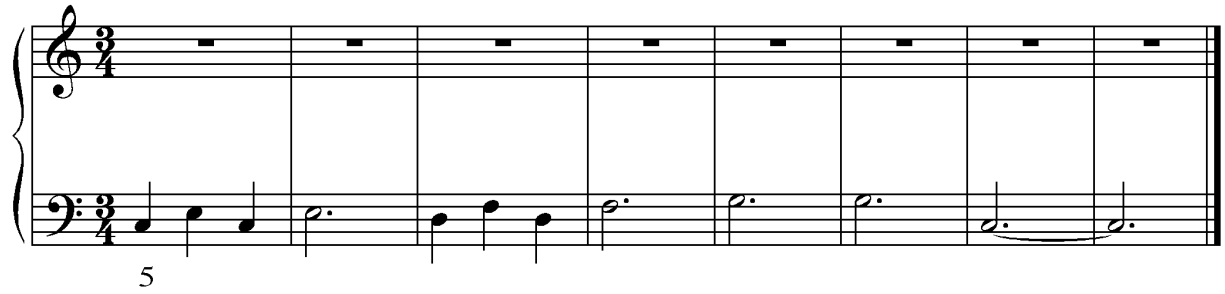
Playing from Memory #1



	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Pitch																
Rhythm																

Score _____/48

Playing from Memory #2

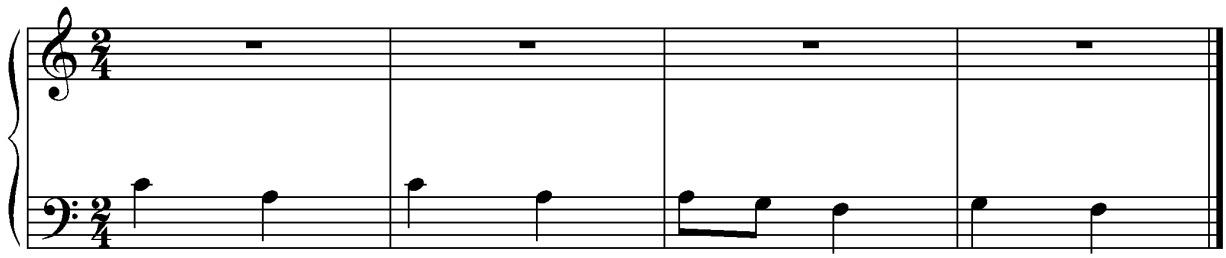


	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Pitch																								
Rhythm																								

Student:_____

Score:_____/16

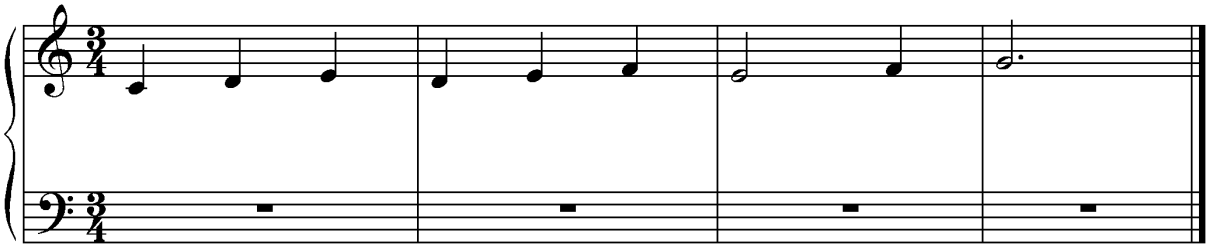
Playing by Ear #1



	1	2	1	2	1	2	1	2
Pitch								
Rhythm								

Score _____/24

Playing by Ear #2



	1	2	3	1	2	3	1	2	3	1	2	3
Pitch												
Rhythm												

APPENDIX M
PERFORMANCE SCORING FORM

Instructions: You are grading the overall performance quality of an elementary piano student's recital piece. By clicking on the shared file in the Dropbox folder, you will hear an unedited audio recording of each student's performance. Circle or mark the overall score based on the recording heard, by scoring the student in the following characteristics: rhythmic accuracy, note or pitch accuracy, continuity, and musicianship, expressiveness, and character qualities. One point is least accurate or the lowest score, and 5 points are most accurate or the highest score. Sum all points for an overall performance score and include any written comments that you would like.

Recordings may be listened to repeatedly, as many times as needed, as well as out of order. Do not take into account the quality of the recording (i.e., any extraneous background noise or interruptions in the performance due to technology), but rather grade the student again himself and not in comparison to other student performances. There can be multiples of the same score. The music will be provided for you to follow along with each performance; however, a more encompassing evaluation of the overall performance is desired, beyond simply scoring by counting how many correct or incorrect passages are heard.

The following scoring sheet may be copied and pasted for each student.

Student #: _____ Overall Performance Score: _____

Rhythmic Accuracy:

1 2 3 4 5

Note Accuracy:

1 2 3 4 5

Continuity:

1 2 3 4 5

Expressiveness, Musicianship, and Character Qualities:

1 2 3 4 5

Comments:

APPENDIX N
TARGET BEHAVIOR DEFINITIONS

- **Initial Lesson Preparation:** Time between the beginning of the lesson and the first lesson activity or transition. Questions asked about how the student practiced during the previous week is coded as Initial Lesson Preparation.
- Lesson Activities are subdivided into the following throughout the lesson:
    - **Preparation:** An activity of study or practice that is preparing the student for the next piece or activity in the lesson. Preparatory episodes may or may not occur before a performance episode.
        - ***Preparation Instruction***- A series of related questions, implied questions, or statements in which there is a single, correct response that conveys something to be learned or recalled. This can also be a directive for what is about to occur, functioning as a cue for the student to respond to the desired instruction.
        - ***Preparation Explanation***- Specific performance aspects or musical concepts are explained to the student that does not require any desired response.
    - **Performance**
        - ***Student Performance***- Student playing the piano, or anything that serves as a function of practice, such as tapping fingers, humming, clapping, singing, and counting exercises. Included is the teacher count-off. Brief interjections, conducting, and singing by the teacher while the student is performing is considered part of student performance. The behavior is

marked with an asterisk to note as a multi-tasking behavior.

- ***Teacher Performance***- Teacher playing the piano, such as demonstrating or modeling, or any activity that serves as a function of practice, such as tapping fingers, humming, clapping, singing, and counting exercises. Student behaviors, such as pointing along in the score, tapping or clapping, or singing are considered part of the teacher performance.
- ***Interactive Performance***- Teacher and student are playing simultaneously, or are engaged in the same activity, such as playing a duet, tapping fingers, or other functions of practice.

- **Feedback:** Must be directly related to the previous activity or performance. Feedback episodes may or may not occur after a performance or student response.
  - ***Feedback Instruction:*** A series of related questions or statements that are related to the previous activity or performance. Use of single one-word only feedback statements are considered part of the performance activity. This behavior can also include directions to replay the entire piece or part of a piece that should be corrected or changed.
  - ***Feedback Explanation***: Specific details are given by the instructor about the previous activity or performance, but requires no response from the students.
- **Academic:** An activity of study or practice in which the student is primed for learning about concept that is not directly related to any one specific piece, but is a concept or skill that can be transferred.
  - ***Academic Instruction***: A series of related questions or statements in

which there is a single, correct response that conveys something to be learned or recalled, functioning as a cue for the student to respond to the desired instruction.

    - ***Academic Explanation:*** Instruction where specific performance, theory, or technique aspects are explained to the student that does not require any desired response.

- **Transition:** From an episode to another episode. Typically from one lesson activity to the next activity. No academic instruction is given, nor related to the previous or following activity academically.
- **Student Academic:** A student-directed activity that is musically relevant and guides or leads an activity. This behavior is not initiated by the teacher. Can be either verbal or performance.
- **Off- Task**: No academic instruction is given or discussed. Can be student- or teacher-directed activity.
- **Technological Issue:** Any issue related to any technology component, such as malfunction, adjustment, or physically manipulating the computer or camera.
- **Lesson Conclusion**: Verbal comments or questions at the conclusion of the lessons, gathering books and other materials, recalling practicing assignments and goals, and leaving the piano for the end of the lesson.

APPENDIX O
TRANSCRIPTS OF COMPILED RESPONSES FROM LESSON INTERVIEWS

Pre-lesson Interview Questions	Traditional Students	Online Students
1. What do you think your favorite part of piano lessons will be?	• Playing piano and Time with teacher. • Learning how to read music. • Learning how to play the piano. • Playing the piano. • Playing music. • Playing the piano. • Playing the music. • Playing the songs. • Making the sounds and the music.	• Playing the songs • Playing music. • I don't know. • I don't know anything about piano. I think it's gonna be really fun. • I think it will be just learning to play great music. • Playing the piano. • Just doing it. • I think everything. • Learning music. • Playing.
2. What do you think the least favorite part of taking piano lessons will be?	• Don't know. • Don't have one. • The hardness of it. • Sitting. • Don't know. • Nothing. • Taking the test. • When I don't know the song. • Sometimes you might mess up and press one of the wrong keys and it might interrupt you.	• Getting tested. • When we do a long song. • I don't know either. • Stopping and never doing it again. I want to do it every single day. • Well I don't really have a least. • I don't know. • Having to read all the notes. • I don't think there is anything I would not like about piano lessons. • I don't know. • I don't know.
3. Is it important for you to get along with your teacher and build a friendship?	• Yes. • Yes. • Yes. • Don't know. • Yes. • Yes. • Yes. • Yes. • Yes.	• Yes. • Yes. • Yeah. • Yes. • Yes. • Yes ma'am. • Yes. • I'm not sure about that but I think it is. • I don't know.

		• Yes.
4. What are your feelings about playing piano?	• Excited. • Good. • No feelings. • Happy. • No feelings. • Happy. • Happy and excited. • Happy. • It makes me happy.	• Happy. • None. • Good. • Excited. • My feelings are well I'm really excited about having to learning to play songs not just playing little tunes. Like playing real music. • Excited. • I don't really have any feelings about piano. I'm really just want to do drums so I'm starting out to do the piano and then, I wanted to be a good drummer so I'm doing piano first. • Happy, excited. • Good. • Having fun.
5. Do you have anything that you really want to learn in piano lessons?	• Nothing to learn. • Learn a lot of songs. • Chords. • Learn playing piano. • Don't know. • I don't know. • I want to learn how to play by myself. • I don't know. • Music, how to make all the sound.	• Nothing. • Playing songs. • Nope. Oh yeah, Rocky Top! • How to play the piano. I want to play really good, really good, and really fast! • Well what I really want to learn in piano lessons is I want to learn what these buttons and what these keys do. • Just play the piano. • Well I really want to just learn all of it. • To learn the notes. • The notes. • Playing.
6. What do you think taking piano lessons at my home will be like?	• Fun. • Good. • Really Good. • Fun. • Fun. • I don't know.	• Fun. • Fun. • Fun. • Kind of weird. • I think it's going to be more fun than doing face-to-face because I just get to learn how

	• Fantastic. • I don't know. • Fun.	to use technology and piano at the same time. • Um, fun. • Kind of weird. Well we're so far apart. • Um, good. • I don't know. • I don't know.
7. What experience do you have using a computer or other technology?	• Play games. • I don't use a computer. • Play games. • Play games. • Play games. • Play games. • To pull up videos. • I don't use a computer. • I talk to my grandma on it and play games.	• Not really. • Yes, lots. I always use that computer to play games. Sometimes I watch videos on there. • Yes, I have my own computer. Well basically um, games and sometimes, and basically games. Sometimes I go on the Internet. • I take AR tests at school. • Well, I, of course, I have used this with websites and I've been on Skype but I'm not really like, I don't know how to set it up by myself. But I Skype to cousin and stuff. • I usually play games on it. • Not really. I've got some games. • Well I sometimes play games. • Play games. • None.
8. What do you think the differences may be between piano lessons face-to-face and piano lessons over the Internet?	• Might not understand what the teacher means. • On the computer your don't get to do it face-to-face. • That you are somewhere else, but we would both be on the Internet. • Because you could see them on the computer and see them at their house. • You're learning the notes to play the piano. Because you're	• Like, you can't see their whole body. You can only see half of them. • That you were daddy and daddy was talking to you. • Um, I don't have to use as much electronics. • The piano teacher like she shows the motions to the kids, ad you're like, your on the internet. Or Lydia's teacher is in person, and I don't' see you in person because you're on the Internet.

	not actually playing the piano. • More fun, but not really any difference. • I think they are good. I think they would be fun. • I don't know. • You're using the computer when you're on the Internet and you're right beside each other at someone else's hour and you can see each other really good.	• Well the difference is since we're not face-to- face, I have to look into a compute rand all that, and the difference is from face-to-face and computer, we can actually see each other and we wouldn't need the technology to see each other play. You could just watch me. But over the computer, you have to set up and the light up stuff. • Uh, I don't know. • Well we would be closer. Well, I don't know. • Except you are using technology on the computer. And you are not using it face-to-face. • I don't know. • You on the computer and she would be in the room.

Post-lesson Interview Questions	**Traditional Students**	**Online Students**
1. What do you think the best parts of your music lessons were?	• Don't know. • Learning the notes and playing the songs. • When I get to play songs. • "The Happy Stream" and "The Old Clock."	• Learning songs and learning all the keys. • Playing the music. • Piano. • Um, let's see. Um so far my teacher and practicing music.

	• Doing my recital piece. • I don't know. • Playing the music. • I don't know.	• Like the listening. Like when you played the notes and I had to close my eyes and copy you. • Doing them with you. • Learning my recital piece. • I don't know. • Learning how to read the notes. Actually, playing the songs, playing the songs were the best. • Probably doing that smiley face thing and that.
2. Is there anything specific that happened that you really liked?	• My recital piece. • My favorite song was "Pony Express." It's challenging and I like challenging notes. • Christmas songs. • No. • Playing the Christmas songs. • No. • Picking my recital piece. • Practicing my recital piece with my new friend, you.	• Um, I liked, I really like when I could be able to play Jingle Bells. • What I really like was playing music. • Doing the thumbs up, I don't know, and the thumbs down. • Um Roller Skate Ride and the Trumpet Song. I really liked those songs. The only other thing I can think of is that I kept on missing theory. • Not really. • Everything. Everything was great. • Um, playing music with you. • I think doing my, doing this, my recital piece. • We played some of my favorite songs, Allegro, the Parade. I really like to play Bananappeal. It's pretty easy to remember too. • Pretty much all the same.
3. Was there anything that happened in your lessons that you didn't like?	• Nothing. • Not really. • No. • The memory flashcards. • No • No • I don't know. • Nothing.	• No. • Not really. • Playing on the black keys. I like when we played on the white keys. • No not really. • This. C position warm-up. • Trying to figure out the letters. When I first started playing

		piano I thought I could just do but it turned out it was a lot harder than I expected. Well, figuring out the letters and I had no idea that piano was just as hard because I would go to my grandm'a almost every year and I would just play notes. I didn't know what they were but now I.didn't know anything. I would just open the song book and I didn't know how to play any of the songs but now I do. • No. • I don't know. • No, nothing happened that I didn't like. • Memory and playing it. I only like the listening one.
4. Overall, did you feel comfortable working with me in this environment?	• Yes. • Yes. • Yes. • Yes. • Yes. • Yes. • Yes. • Yes.	• Yes. • Yes. • Good. • Yes. • Yes ma'am. • Yes, but I do think piano lessons face-to-face would have been better because my parents didn't tell them were gonna be on Skype. Well because I could actually um, the teacher could actually help me and place my hands where they need to be if I couldn't find it. Remember that lesson when we couldn't find it? When we couldn't find that note. It took me like 15 minutes. If we were doing it face-to-face you could have pointed to that note and showed it. • Yes. • Yes. • Yes. • Yes ma'am.

5. How would you describe your musical progress from these lessons?	• A long way. • I've lot lots of notes, lots of music. I think I'm good at it. • Good. • I learned Middle C, Treble G, and D and E and F. • Learning how to play the songs. • I started on the black keys, then I ended up on the white keys. • A lot of songs. • It may be a little hard but it's fun and you can keep on trying.	• Good. • I don't know. • I've learned how to read and how to play. • Music that Aunt Sasha plays. • I learned Old MacDonald. Yankee Doodle. • I would describe it very good. I think I've made alot of progress playing piano since I started lessons. • Um, I learned new notes that you have to put different positions in. And um, that's it. • I don't really know. • It's a perfect job and an A-plus. • I don't know what that means.
6. Did you learn everything that you wanted to learn?	• Yes. • Yes. • Yes. • Yes. • Yes. • Yes. • Yes. • Yes.	• Yup. • Yes. • Yes. • Yes I learned how to read music, I learned to how to play, and I learned to like my music. Actually I already knew that! • Yes ma'am. All my, one of my friends played Old MacDonald, but they played it like this. • Yes. • Yes. • Yes. • Yup. I want to learn more. • Yes ma'am.
7. Was there anything that you were disappointed with in the lesson experience?	• No. • No. • No.	• No. • No. • Except when I had to play on the black keys. • No. • I don't know. I wasn't mad

	• No. • No. • No. • No. • No.	at you ever, I don't think so. • No. • No. • No. • Nope. • No ma'am.
8. What were the parts about the lessons that made learning easy?	• The beginning songs they were easy. • You helping me with it. • Some of the first few of the songs because there really wasn't a music staff. • "The Old Clock, because it was only two notes. • Learning those first few songs. Learning the recital piece without the paper. • I don't know. • The songs that had the letters in the notes. • Practicing the songs over and over again.	• Um, like, the theory helped, and just like taking time and practicing. • Like when it has letters in side them. • I don't know. • Um, let's see. At the beginning it started out easy and then got harder. So that makes it pretty good, I mean easy. The first two had 1 and 2 so you knew what fingers to play. And the second ones had letters inside the music. Those were easy. I liked the harder ones. • Old MacDonald, Yankee Doodle. • Just sitting down, looking at a computer, and having fun with my teacher. • Starting with the fingers. • I think the notes. • Reading the notes. • Probably those first notes that I learned. Those were the easiest.
9. What were parts about lessons that made learning hard?	• Nothing. • No. • The black keys. • The memory. • I don't know. • Sometimes when we do a duet.	• Like when you have to from C all the way to G, like you had to skip so many keys and stuff. • The hard part is like when I'm trying to count how many beats. • When I was just learning on this kind of notes. When I was learning on these notes and finishing like, finishing like, it was when I was

	• Nothing. • That song was pretty hard, but once I just started it kind of got easy	finishing these notes and I got into those notes. • Learning the notes. • Playing the song where my hands went all over the piano. • The flashcards. When you could have brought them or brought a special book with the flashcards in them. • Not really. • I think the one we had to do skips. • The parts jumping to the other keys. Sortof hard to remember those. • I don't know because it was a lot of things, kindof. Well, those flashcard things and uh, let's see, that's probably it.
10. Describe the relationship you have with your teacher. How do you think [the computer/coming to my home] affected the relationship that we have?	• I don't know. • I feel great about it. • Happy. • Happy. • Happy. • Happy. • Good. • It's really fun because you get to learn to much together and we get to see each other every Monday.	• I really like it. • I feel good. The computer doesn't work good. It works like mini robots, you know mini robots go slow? • Good. • I feel really good. And I feel really good and really good. That's all I can think of. I feel that way because I like my teacher. • Good. I think it change the lessons because all of my friends, some of my friends take piano lessons. And then I wanted to take piano lessons too and they said they go in a giant room and sit down and play and the teacher is right in front to them. And I was like Cool. And then, I noticed there was a computer and I thought they were both cool, and I thought this was cooler and I wanted to do the cool one. Good. I don't

		know how to describe better than good. Enormous, better than great. • It's very fun and my mom is still wondering why it's not on Wednesdays anymore. • I feel excited, happy. That's it. • I don't know. • Good. • I feel good.
11. Do you think there were musical communication problems? Do you think any other parts of the lesson were effected by the computer/by coming to my home?	• No. • No. • No. • No. • No. • No. • No. • No.	• No not that I think of. • I don't think so. • Not really. • Yes, we've had a lot of them. The microphone gets muted a lot. The Internet MIDI's not connected right sometimes so sometimes we can't hear you, sometimes you can't hear us. Yes, cause usually it's the microphone. • Probably when I was late doing my homework. Whenever I do the pages, sometimes I miss the problems in it. • Maybe finding some notes but not really. • Yes. Like um you couldn't um get on our screen, and we couldn't hear each other. Um, and when you couldn't see me. We couldn't hear you. • Yeah, like that time when the computer wasn't really working. And the other time when the screen, we couldn't see each other. • Yes. Like you know that echoing, and sometimes the sound doesn't come, and sometimes the um, Internet MIDI doesn't work. And I can't really hear your voice, and um. Like, it wasted

		time. But it just wasted time. • Probably sometimes like getting on the Internet and stuff.
12. Do you think this method was as good as taking piano lessons face-to-face/taking lessons from my home?	• I think they are the same. • I like coming to your house and playing on this piano. • No because it is better seeing people in person than the computer screen. • Yes. • Kind of hard to see and listen. • Yes. • Yes. • Yes.	• Yes. • I think it was good. • Yeah! • Yeah, I think it's even better. Hm, because I like laptops. • I think it's better than face-t-face. Because sitting in front of you teacher could be loud. You don't want lots of other kids sitting beside. You won't have to wait your turn to play piano. • Yes and no. Yes because we still get to see each other. No because like I said before you could help me better if we were face-to-face. • Yes. • Yes. I think I like it on the computer more. It's just that I don't really know. • Yes. • Yes.

Lesson Conclusion	
Technology Issues	
Off-task	
Student Academic	
Transition	
Academic Explanation	
Academic Instruction	
Feedback Explanation	
Feedback Instruction	
Interactive Performance	
Teacher Performance	
Student Performance	
Preparation Explanation	
Preparation Instruction	
Initial Lesson Preparation	

APPENDIX P
MEANS AND STANDARD DEVIATIONS OF TARGET LESSON BEHAVIORS

Lesson Group X Behavior

Traditional *Mean*	2.38	23.43	0.73	23.77	2.46	8.50	11.33	1.57	12.69	1.15	7.08	.60	1.90	.00	2.41
Traditional *SD*	1.61	9.82	1.19	8.90	3.83	5.34	4.82	1.51	5.78	1.17	3.72	1.90	1.82	.00	1.75
Online *Mean*	2.92	21.73	0.35	20.92	2.98	0.20	10.12	1.52	8.79	0.93	9.98	0.85	2.90	13.17	2.64
Online *SD*	1.92	10.69	0.88	7.13	2.37	0.81	5.95	2.24	6.00	1.45	4.03	1.74	3.25	12.94	1.75

Lesson Time X Behavior

	Initial Lesson Preparation	Preparation Instruction	Preparation Explanation	Student Performance	Teacher Performance	Interactive Performance	Feedback Instruction	Feedback Explanation	Academic Instruction	Academic Explanation	Transition	Student Academic	Off-task	Technology Issues	Lesson Conclusion
Lesson 1 *Mean*	2.53	21.33	0.45	18.99	4.14	5.68	10.40	0.83	13.14	0.98	6.80	0.36	1.55	9.47	3.35
Lesson 1 *SD*	1.70	6.80	0.89	4.79	4.08	7.65	5.08	0.75	3.75	1.09	2.03	0.87	1.67	13.81	2.20
Lesson 2 *Mean*	2.11	29.13	0.55	19.73	0.59	3.03	9.12	1.07	13.02	1.75	7.88	0.33	2.62	6.93	2.14

Lesson 2 *SD*	1.42	10.82	1.20	5.77	1.08	3.61	5.35	1.57	5.42	1.68	4.04	0.91	3.13	12.69	1.02
Lesson 3 *Mean*	3.30	17.28	0.63	28.32	3.43	4.33	12.66	2.74	6.05	0.39	10.90	1.48	3.03	3.36	2.09
Lesson 3 *SD*	2.04	9.19	1.10	9.60	2.43	4.87	5.43	2.43	6.32	0.61	4.73	2.77	2.85	4.58	1.54

Lesson Group X Lesson Time X Behaviors

	Traditional-Lesson 1		Online-Lesson 1		Traditional-Lesson 2		Online-Lesson 2		Traditional-Lesson 3		Online-Lesson 3	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Initial Lesson Preparation	2.39	1.10	2.67	2.23	1.69	0.96	2.54	1.74	3.06	2.47	3.55	1.79
Preparation Instruction	25.67	5.52	16.99	5.34	30.74	9.61	27.52	12.63	13.90	6.36	20.67	10.80
Preparation Explanation	0.83	1.21	0.07	0.17	0.91	1.74	0.19	0.26	0.45	0.72	0.80	1.42
Student Performance	18.98	5.71	19.00	4.41	20.58	6.13	18.89	5.94	31.75	9.80	24.88	9.12
Teacher Performance	3.95	6.04	4.32	1.60	0.69	1.40	0.50	0.84	2.73	2.80	4.14	2.09

Interactive Performance	11.37	7.63	0	0	5.58	3.51	0.47	1.39	8.54	3.46	0.12	0.27
Feedback Instruction	8.83	3.68	11.97	6.07	12.26	5.58	5.98	3.29	12.90	5.24	12.42	6.14
Feedback Explanation	0.86	0.89	0.80	0.69	0.97	1.24	1.18	1.95	2.89	1.63	2.58	3.16
Academic Instruction	14.75	2.10	11.53	4.46	14.88	4.87	11.16	5.76	8.42	7.68	3.67	4.41
Academic Explanation	1.21	0.79	0.75	1.35	1.71	1.67	1.79	1.86	0.52	0.80	0.25	0.41
Transition	5.90	1.52	7.70	2.21	5.85	2.83	9.90	4.27	9.49	5.37	12.33	4.14
Student Academic	0.47	0.81	0.32	1.01	0	0	0.65	1.17	1.39	3.33	1.57	2.39
Off-Task	1.13	0.87	1.96	2.20	2.44	2.88	2.80	2.62	2.15	1.34	3.92	3.71
Technology Issues	0	0	18.95	14.24	0	0	13.86	15.27	0	0	6.71	4.17
Lesson Conclusion	3.72	1.92	2.98	2.58	1.71	0.67	2.57	1.19	1.81	1.93	2.38	1.24

Lesson Time X Lesson Group X Behaviors

		Beginning Lesson		Middle Lesson		Ending Lesson	
		Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
Initial Lesson Preparation	Traditional	2.39	1.10	1.69	0.95	3.06	2.47
	Online	2.67	2.23	2.54	1.74	3.55	1.79
	Total	2.54	1.74	2.14	1.45	3.32	2.09
Preparation Instruction	Traditional	25.67	5.52	30.74	9.61	13.90	6.36
	Online	16.99	5.35	27.52	12.62	20.67	10.80
	Total	21.10	6.90	29.05	11.11	17.46	9.40
Preparation Explanation	Traditional	0.83	1.21	0.91	1.74	0.45	0.73
	Online	0.07	0.17	0.19	0.26	0.80	1.42
	Total	0.43	0.91	0.53	1.23	0.64	1.13
Student Performance	Traditional	18.98	5.71	20.58	6.13	31.75	9.80
	Online	19.00	4.41	18.89	5.94	24.88	9.12
	Total	18.99	4.92	19.69	5.92	28.14	9.83
Teacher Performance	Traditional	3.96	6.03	0.69	1.40	2.73	2.80
	Online	4.32	1.64	0.50	0.84	4.14	2.09
	Total	4.15	4.19	0.59	1.11	3.47	2.49
Interactive Performance	Traditional	11.37	7.63	5.58	3.51	8.54	3.46
	Online	0.00	0.00	0.47	1.39	0.12	0.27
	Total	5.38	7.74	2.89	3.65	4.11	4.90
Feedback Instruction	Traditional	8.83	3.68	12.25	5.58	12.90	5.24
	Online	11.97	6.08	5.98	3.29	12.42	6.14
	Total	10.48	5.20	8.95	5.44	12.65	5.58
Feedback Explanation	Traditional	0.86	0.89	0.97	1.24	2.89	1.63
	Online	0.80	0.69	1.18	1.95	2.58	3.16
	Total	0.83	0.77	1.08	1.61	2.73	2.49
Academic Instruction	Traditional	14.75	2.10	14.88	4.87	8.42	7.68
	Online	11.53	4.46	11.16	5.75	3.67	4.41
	Total	13.06	3.82	12.92	5.54	5.92	6.47
Academic	Traditional	1.21	0.79	1.71	1.67	0.52	0.80

Explanation	Online	0.75	1.35	1.79	1.86	0.25	0.42
	Total	0.97	1.11	1.75	1.72	0.38	0.62
Transition	Traditional	5.90	1.52	5.85	2.83	9.49	5.37
	Online	7.70	2.21	9.90	4.27	12.33	4.14
	Total	6.85	2.08	7.98	4.12	10.99	4.85
Student Academic	Traditional	0.41	0.81	0.00	0.00	1.39	3.33
	Online	0.32	1.01	0.65	1.23	1.57	2.52
	Total	0.36	0.89	0.34	0.93	1.48	2.85
Off-task	Traditional	1.13	0.87	2.44	2.88	2.15	1.34
	Online	1.96	2.20	2.80	3.64	3.92	3.71
	Total	1.57	1.71	2.63	3.21	3.08	2.92
Technology Issue	Traditional	0.00	0.00	0.00	0.00	0.00	0.00
	Online	18.95	14.25	13.86	15.27	6.71	4.40
	Total	9.97	14.00	7.30	12.93	3.53	4.64
Lesson Conclusion	Traditional	3.72	1.92	1.71	0.66	1.81	1.93
	Online	2.98	2.58	2.57	1.19	2.38	1.23
	Total	3.33	2.26	2.16	1.05	2.11	1.58

VITA

Rebecca Carter Bellelo graduated from Delta State University in 2006 with a Bachelors of Music. From 2002-2006, Mrs. Bellelo taught piano lessons in the DSU piano preparatory music program.

Mrs. Bellelo received a Masters of Music Degree in Piano Pedagogy from Louisiana State University (2008). Her graduate assistantship duties included teaching all levels of the group piano program for non-keyboard music majors.

In 2008, Mrs. Bellelo was awarded a Flagship Fellowship Assistantship as a doctoral candidate in music education at LSU. Her assistantship duties continued in the group piano department and expanded to the music education courses Principles of Teaching Elementary School Music and Teaching Music in Diverse Settings. While a graduate assistant at LSU, Mrs. Bellelo taught piano lessons in the Performing Arts Academy and group leisure classes with the LSU Union Leisure Classes. In the spring semester of 2011, Mrs. Bellelo completed the teaching certification program and became certified to teach music in grades K-12 in Louisiana.

Mrs. Bellelo is a Nationally Certified Teacher of Music through Music Teachers National Association. She has served as an adjudicator throughout the state of Louisiana. Mrs. Bellelo has presented numerous sessions and posters on state and national levels, including Louisiana Music Teachers Association state conferences, Louisiana Music Educators Association state conference, Music Teachers National Association conferences, National Conference on Keyboard Pedagogy, and National Association for Music Educators Conference.

Mrs. Bellelo is the owner of the Baton Rouge piano studio Piano Pathways LLC, where students of all ages are taught in private, online, or RMM group settings.