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PRESCHOOL TEACHERS IN SHANGHAI, CHINA: PRE-SERVICE PIANO SKILL DEVELOPMENT, PERCEPTION OF ADEQUACY, AND CURRENT INSTRUCTIONAL USAGE

Chenyan Dai
University of the Pacific, 154309482@qq.com

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By

Chenyan Dai

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By

Chenyan Dai

APPROVED BY:

Dissertation Advisor: Ruth V. Brittin, Ph.D.
Dissertation Co-Advisor: Elizabeth Haydon Keithcart, Ed.D., MT-BC
Committee Member: Rachelle Kisst Hackett, Ph.D.
Assistant Dean of Benerd College: Steven L. Layne, Ed.D.
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By

Chenyan Dai
DEDICATION

This dissertation is dedicated to my music education career.
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Abstract

By Chenyan Dai

University of the Pacific
2019

This study investigates the influence of preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their use of piano skills with their students in Shanghai, China. In addition, the study explores the possible influence of these adequacy perceptions regarding their piano skills training on their usage of various piano skills in the classroom. The researcher-designed questionnaire covered twelve specific functional piano skills including improvisation, playing piano repertoire, accompaniment, sight reading, solo singing with self-accompaniment, composition, score reading, techniques, chord progressions, harmonization, transposition and modulation. They also reported on their perceived use and training adequacy of piano skills as a whole. Cluster sampling was used to recruit preschool teacher participants who graduated between 2013 and 2018 from six Shanghai preschool teacher preparation programs and had at least one year’s teaching experience. There were 567 participants who returned usable, completed surveys.

Using descriptive statistical analyses and sequential multiple regression, the researcher found that nearly all (99.1%) of the preschool teachers reported receiving less than three years of piano training before college. The analysis suggests that preschool teachers’ overall perception of the adequacy of college-level piano training they received affects their overall frequency of
using piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Not only was this true for their perceptions regarding their training as a whole, but the same was found for 11 of the 12 specific skills investigated. That is, as perceptions of adequacy increased, so did usage of the particular skill in preschool teaching. The one exception was “score reading” which was not statistically significant. Specifically, 9.1% of the variation in piano skills usage, overall, can be predicted from their perceptions of undergraduate piano training adequacy, as a whole. Implications for college trainers and in-service teachers are discussed and suggestions for further research are offered. Caution is advised, however, when inferring cause from non-experimental designs such as the survey research employed in this study.
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CHAPTER 1: INTRODUCTION

The piano is considered to be an important instructional tool in classroom teaching (Chen, 2000; March, 1988; Redfern, 1983; Sonntag, 1980). More specifically, some researchers have found that the piano is the most widely used instrument in current pre-service preschool music education (Gao, 2008; Jin, 2007; Lee, 2009; Li, 2018). Accordingly, piano skills training courses are essential for the preparation of preschool teachers. Chen (2000) pointed out that piano study should focus on functional skills that can be easily applied in classroom teaching. At present, Chinese preschool education programs mainly teach pre-service preschool teachers to master functional piano skills in the form of group piano instruction (Chen, Gao & Jiang, 2011; Li, 2012; Shen, 2004; Sun 2010b; Zhang, 2008). This mode of piano teaching emphasizes basic and practical piano skills. However, some Chinese scholars have come to realize that preschool teachers and pre-service preschool teachers often demonstrate poor piano skills (Du, 2011; Gao, 2011; Li, 2013; Sun, 2010b; Wang, 2011).

In order to provide a solid and explicit picture of the concerning situation, this study examines the influence of the perceptions of the adequacy of undergraduate piano skills training on the frequency of piano skills usage in preschools in Shanghai, China.

The reason for focusing on perception of adequacy is because that is related to individual’s self-efficacy and behaviors. Self-efficacy ties into perceptions of adequacy of piano skills training in college preschool preparation programs, as a kindergarten teacher’s belief in their strength in using the piano affects his or her use of the skills in kindergarten settings.

In this chapter, the researcher first presents the background of the study and then discusses the research problem, research purpose, specific research questions and the
significance of the study relative to the larger field of inquiry in which it is situated. Finally, the delimitations of the study and operational definitions associated with the undertaking of it will be presented.

**Background of the Study**

Preschool education is an important part of the basic education structure in China. Hence, the Ministry of Education of the People’s Republic of China (MEPR) has released many relevant documents in succession in an effort to implement and develop preschool education. As part of this effort, the government has paid a great deal of attention to the professional abilities and training of preschool teachers. As part of this, it aims to train pre-service preschool teachers to demonstrate high levels of piano skill applicable to their profession and can adapt to the demands of an ever-changing society (MEPR, 2012).

**Relevant Policies Regarding Preschool Education in China**

In September of 1995, *The Education Law of the People’s Republic of China* set forth the requirement that preschool and associated educational institutions should have qualified teachers (MEPR, 1995). *Teaching Guideline for Preschool Education*, issued by the MEPR in July 2001, emphasized that universities and colleges which offer majors in preschool education should reform their current preschool education curricula and teacher training methods (MEPR, 2001). Similarly, in *The National Medium and Long-term Program for Education Reform and Development (2010-2020)*, issued in July, 2010, the MEPR paid a great deal of attention to the training of preschool teachers in higher education and various requirements for the improvement of the overall quality of preschool teachers (MEPR, 2010). This outline pointed out that the state should make its responsibility in this matter clear, that is, to execute the standards of preschool teachers’ qualification strictly, strengthen the training of preschool teachers and improve the
overall quality of preschool teachers. It also stressed that the improvement of the quality of these teachers is a core task relative to the development of higher education in China. Hence, the state should make determined efforts to train high quality teachers to develop outstanding creative talent with persistent beliefs, good moral character and rich knowledge, in order to promote the scientific development of true careerism in preschool education. In *The Opinions Expressed by the State Council on the Current Development of Preschool Education*, issued in November, 2010, it is clearly emphasized that preschool teachers should have excellent professional skills, the training system of preschool teachers should be improved, and the major of preschool education in normal universities should be taken seriously and carefully managed (MEPR, 2010). Although the MEPR stressed the significance of preschool teacher training in colleges and universities, there is no body of specific documentation designed to guide and strengthen the training of preschool education in colleges and universities.

Further, in *The Professional Standards of Kindergarten Teachers (Trial Version)*, issued in 2012, there are 62 standards related to preschool teachers. However, only one standard deals with the arts. It states that preschool teachers should have certain knowledge of art appreciation and performance (MEPR, 2012). In practical terms, this means that preschool teachers must have some level of knowledge regarding art appreciation and performance. However, the government documents do not specify what skills are needed to accomplish this in relation to the instructional activities of preschool teachers.

**The Types and Number of the Preschools in Shanghai, China**

At present, there are mainly five types of preschools in Shanghai, China. According to Zhang’s study (2008), Chinese preschools are under the direct authority of local government educational departments, generally adopt the unified leadership approach of the central
governmental educational department and employ a hierarchical management approach. Based on recent cultural and economic developments, the local educational administrative departments set forth certain acceptance criteria and rules in order to classify the specific preschool type. Accordingly, preschools are divided into five grades: model preschools at city level, model preschools at district level, first-class preschools, second-class preschools and undetermined grade preschools.

*Analysis and Prediction on Industry of Chinese Preschool Education from 2010 to 2012,* issued in June 2011 from the Website of Decision of China’s Industrial Investment, states that the number of preschools had reached 13.82 million by 2009 in China. According to the statistics reported for 2010, the number had reached 1252 preschools in Shanghai alone, among which 32% of preschools (396) are private preschools. The report indicated that 100 preschools would be set up or rebuilt and expanded before 2013. The number of preschools in Shanghai currently stands at around 1664, according to the website of Shanghai Preschool Education in 2019. They are located in sixteen districts and in Chongming County in Shanghai, China, as shown in *Figure 1*. The districts are as follows: Huangpu, Xuhui, Changning, Jing’an, Putuo, Hongkou, Zhabei, Yangpu, Minhang, Baoshan, Qingpu, Songjiang, Jiading, Fengxian, Jinshan, and Pudong.
The Structure of Preschool Teacher Education in Shanghai, China

In China, the educational background required for preschool education majors has transitioned from early technical secondary school trained preschool teachers, to vocational college and then to four-year college undergraduates (Li, 2012). At present, the system for overseeing the preschool education major resides in the MEPR. The standards are set by the MEPR and program evaluation experts are appointed by the MEPR. The review process is also organized by the MEPR. This approach is designed to guarantee that the educational processes associated with college-level preschool teaching education operates at a high level (Peng, 2007).
At present, there are six preschool education programs in five colleges and universities (including four-year colleges and three-year vocational colleges) which train and cultivate pre-service preschool teachers. These include East China Normal University, Preschool and Special Education School (for associate degree); East China Normal University, Preschool and Special Education School (for bachelor’s degree); Shanghai Normal University, College of Education; Shanghai Xingjian College; Shanghai Normal University Tianhua College; and Xianda College of Economics and Humanities, Shanghai International Studies University. They set up their preschool education majors in 1983, 2002, 2002, 2006 and 2011, respectively. Among them, the East China Normal University Preschool and Special Education School and the Shanghai Normal University College of Education are the two public full-time four-year undergraduate schools offering this program. Shanghai Normal University Tianhua College and Xianda College of Economics and Humanities, Shanghai International Studies University are private full-time four-year undergraduate schools. Shanghai Xingjian College is a public three-year vocational college.

According to the above six program admission brochures published in 2018, the total number of students enrolled in preschool programs was 809, among which Xianda College of Economics and Humanities, Shanghai International Studies University had 110 students; Shanghai Normal University Tianhua College had 310 students; Shanghai Normal University, College of Education had 55 students; East China Normal University, Preschool and Special Education School (for associate degree) had 80 students; East China Normal University, Preschool and Special Education School (for bachelor’s degree) had 70 students; and Shanghai Xingjian College had 184 students.

These colleges and universities mainly recruit students from Shanghai, China and prepare numerous cohorts of professional preschool educators for kindergartens across the city of
Shanghai, China. Therefore, to a large extent, the ability level of preschool teachers in Shanghai relates directly to, and is the result of, the educational process and teaching requirements of these colleges and universities.

**Music Education for Pre-service Preschool Teachers in Shanghai Colleges and Universities**

As the training institutions designed to convey a high-level quality education relative to the teaching of preschool children, the preschool education major in colleges and universities needs both a deeper sense of theoretical knowledge with regard to music instruction and a certain emphasis on artistic practice ability in order to meet the work requirements in preschool at a truly professional level (Li, 2012; Liang, 2010). The college of Preschool Education and Special Education at East China Normal University is an important center for talent cultivation and academic research in the fields of Chinese preschool and special education. Hence, the undergraduate pre-service preschool teachers training plan is, to a certain extent, representative. It points out that the teaching objective here is to cultivate preschool teachers, preschool education administration staff, scientific institutional preschool education researchers and other workers in related children’s service institutions who can all morally, intellectually and physically adapt to changing needs in preschool education career development and work successfully in various types of childcare facilities (Department of Preschool Education, College of Preschool Education and Special Education, n.d.).

Music education, as one of the specialized courses in preschool education, addresses, for the most part, music, musical instrumental playing method and basic courses in playing musical instruments and singing. These represent three current types of music curricula developed at The College of Preschool Education and Special Education in East China Normal University. In this context, the term “music” tends to refer to a kind of general music instruction, such as music
theory. On the other hand, “musical instrumental playing method” refers to the actual teaching of the playing of music instruments, especially the playing of piano. This music course requires that pre-service preschool teachers develop basic techniques of performance, such as scales and arpeggios. The program’s basic courses in playing and singing teach comprehensive piano skills. This requires pre-service preschool teachers to acquire various piano skills, such as accompaniment, improvisation, modulation, composition, score reading, sight reading, and transposition.

These three courses are offered over a period of two and a half years to three years and represent between 162 hours (5 credits) and 216 hours (8 credits) of music training. They account for 8 credits of the total 74 specialized course credits, or 10.8% of the total credit count. That includes 72 hours and 2 credits of specialized compulsory courses; 72 hours and 2 credits of musical instrumental playing method; and 18 hours and 1 credit of basic courses in playing and singing.

MEPR issued *The Professional Standards of Kindergarten Teachers (Trial Version)* in 2012. As noted above, given the total of 62 standards related to preschool teachers, there is only one standard pertaining to the arts, and it is related to capabilities of art appreciation and performance.

**Problem Statement**

There is limited research on teaching piano to preschool education majors and applying that instruction to the practical work of preschool teaching in the Chinese context. Cook (1970) emphasized that piano teaching in teacher education programs should cater to the professional needs of general music teachers. Sonntag (1980) pointed out that institutions’ course offerings for music teacher training must be more closely aligned with the demands of the school music
teacher. Therefore, Jang (1988) stated that teacher education should be continuously assessed with regard to how effectively the program addresses the practical needs of classroom teachers and keeps pace with an ever-changing society.

Yuan (2011) indicated that preschools that have teachers with good music skills are attractive to parents. Lee (2006) evaluated the quality of music teachers and thought that a successful music teacher should possess basic music skills, including singing, rhythm movement, listening, instrument playing, melody improvisation, and composition. In addition, some researchers not only realized the importance of functional piano skills for musicians (Buchnan, 1964; Chen, 2000; Chin, 2002; March, 1988; Shockley, 1986; Taylor, 1970), but also placed an emphasis on functional piano skills training for teacher education (Buchnan, 1964; Chen, 2000; Corbett, 1977; Taylor, 1970). Researchers have suggested that functional piano skills should be studied more and improved relative to their use in teacher education. However, Bainger (2010) pointed out that preschool teachers are struggling with teaching music because of lack of confidence and skills.

Although Corbett’s study (1977) indicated that, although elementary classroom music teachers have adequate piano training, which was found to be the most beneficial of all their undergraduate training, overall, the results of many surveys show that the piano training in college-level music education is inadequate (Case, 1977; Corbett, 1977; March, 1988). For example, Corbett found that training in innovative techniques, such as Orff, Kodaly and Dalcroze, is inadequate for elementary class music teachers.

Redfern (1983) and March (1988) concluded that the work is quite inconsistent with the requirements associated with piano training in colleges or universities. Case (1977) determined that many piano skills emphasized in the program were not emphasized in teaching. Freehur...
(2002) and Graff (1984) indicated that many graduates or school instructors are still not fully prepared to apply piano skills to their future professional activities. Further, they appear to be generally dissatisfied with the piano training available in higher education (Buchanan, 2011; Kein, 2008; Fish, 2009).

Corbett (1977) and Young (2010) found that different musical occupations have requirements for the use of functional piano skills at different levels. As noted above, although music abilities for preschool teachers are important, at present, there is no published research dealing with specific functional piano skills which are frequently used by preschool teachers in the classroom. In addition, there is a gap in the research regarding whether pre-service piano skills training in college is adequate for preschool teachers. The types of piano skills training prior to entering college affect the frequency of musicians’ use of functional piano skills in their musical working practice (Redfern, 1983; Young, 2010), and also have a relationship with the perception of the adequacy of collegiate piano training (Young, 2010). Therefore, the perception of adequacy of piano learning in college is considered to be an important factor with regard to the use of piano skills for preschool teachers.

In addition, Young (2010) indicated that there was no significant relationship between the perception of adequacy of musicians’ (including faculty members, professional performers, and private music instructors) piano skills training and the amount of group piano lessons they took in college. Moreover, the more semesters of group piano lessons that musicians took in colleges, the less important they thought piano was to their career. Current teaching requirements in Shanghai are various, and China lacks requirements and standardization. Sonntag (1980) states that it is necessary to form a certain degree of uniformity in standards with regard to minimum piano skills requirements.
Pounds (1974) discussed two types of piano instruction in college: private piano lessons and group piano lessons. Pounds indicated that students who identified with regular piano experience would receive private piano lessons in college. In contrast, pre-service preschool teachers with no prior piano experience would be advised to take group piano lessons in college. Hence, it seems to be suitable for pre-service preschool teachers to take group piano lessons to acquire piano skills. However, pre-service preschool teachers’ piano skill levels are uneven (Wang, 2010); some pre-service preschool teachers have had some foundation in piano skills, and some have even had higher levels of piano training (Sun, 2010b). Therefore, it is challenging to train and cultivate all pre-service preschool teachers in the group piano setting. At present, there is no related research studying the connection between the perception of adequacy of piano skills training in group piano setting in college and the frequency of use of piano skills in preschools in China. Only through closely connecting the teaching content of preschool education in colleges and universities with the demands of the social structure and educational system, regardless of the amount of piano skills training prior to entering colleges and universities, can the optimum function of this course of study be achieved.

There are two dissertations similar to this present study that inquiries into these issues as they apply to the situation in Taiwan. One of these dissertations (Chen, 2000) reports on the results of teachers’ piano skill training in colleges and universities relative to their secondary school teaching practice. The goal of Chen’s study is similar to this study, but Chen researched a different set of participants. Chen’s study mainly investigates nine chairpersons of music departments at nine universities and 241 junior high school music teachers selected from 721 schools. In addition, the participants of another dissertation (Lee, 2006) are similar to those who participated in the present study, but the content of Lee’s study is different. The area of
investigation in Lee’s study is broader than that of the current study. Lee placed an emphasis on the investigation of Taiwanese in-service preschool teachers’ personal attitudes toward music teaching and their concepts of the competencies necessary for music teaching. This study investigates the narrower topic of the viewpoints of preschool teachers toward functional piano skills specifically and the perception of adequacy of piano training in Chinese higher educational settings. This serves to fill a research gap that exists relative to the teaching of piano in teacher preparation programs at colleges and universities and the relation of this to the work requirements of in-service preschool teachers.

It should be noted that there are several dissertations that evaluate piano teaching in tertiary colleges and the application of piano skills in music career per se. Researchers have discussed various music professions relative to the acquisition and usage of functional piano skills (Case, 1977; Corbett, 1977; Redfern, 1983; Sonntag, 1980; Young, 2010). In addition, although there are a number of articles about piano teaching and its practical application in the West, there appears to be a lack of research discussing teaching piano to preschool education majors and applying that instruction to the practical work of preschool teaching in the Chinese context. Thus, this study will also serve to fill gaps in the literature on this topic.

**Purpose of the Study**

The purpose of this study is to examine the influence of the Shanghai preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their piano skills usage with preschool students.

**Research Questions**

The following research questions will serve as the basis for the inquiry herein which seeks to address these issues:
1. What levels of piano training do preschool teachers receive prior to entering college?
2. What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers? What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?
3. How often do preschool teachers use overall functional piano skills in their current teaching practice? How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?
4. Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college?

**Significance of the Study**

This research inquiry will seek to fill gaps in the extant literature regarding preschool education majors’ self-perceived adequacy of piano learning and their use of functional piano skills in the practical work of preschool education in the Chinese context. Findings from the study may form the basis for recommendations for preschool education programs which could allow such programs to better cultivate future preschool teachers’ by supporting their acquisition of valuable functional piano skills in order to meet the instructional and program needs of preschools in providing high quality educational experiences to their students.

First, this study may provide useful information about the present application of functional piano skills in preschools and with which would help pre-service preschool teachers gauge their own perception of adequacy of the piano skills training in college-level piano classes in Shanghai, China. This inquiry may provide a better understanding of the current requirements for preschool teachers relative to piano skills and music abilities. The findings from this study may help pre-service preschool teachers become aware of their current skill level and work on improving any ability gaps regarding piano skills, so as to make piano skills a more available tool in their future teaching activities.
Second, the results of this investigation may be valuable and meaningful for teacher educators, researchers and policy makers in their efforts to create reasonable, effective and targeted piano training classes and identify key functional piano skills that meet the needs of preschool teachers and their students. Since preschool teachers’ perception of functional piano skills indicate the actual needs of music teaching practice in real preschool classroom, the study can help teacher educators, researchers and policy makers understand better their pre-service music teacher training. With improved knowledge in this regard, they would be able to alter the preschool education music curriculum in order to have pre-service preschool teachers well-prepared for their future music teaching in preschools.

Moreover, as noted above, very few studies appear to have focused on the perception of the adequacy of piano skills training and the usage of piano skills by preschool teachers, especially in the Chinese educational context. Hence, this study will help fill research gaps by examining the relationship between the perception of the adequacy of piano training in college and the frequency of use of music activities in preschool. It can serve to increase the body of knowledge relative to an important aspect of research in Chinese education.

Definitions of Terms

The following definitions of terms will be used in the study.

*Functional Piano Skills:* Abilities associated with the physical act of playing the piano. These are essential skills for preschool education music activities. In this study, twelve functional piano skills will be discussed, including improvisation, playing piano repertoire, accompaniment, sight reading, solo singing with self-accompaniment, composition, score reading, techniques (scales, arpeggios, etc.), chord progression, harmonization, transposition and modulation.
Harmonization: Selection of chords for a melody by reading letter symbols or roman numerals, or choosing chords for accompanying a melody without reading symbols.

Modulation: When a song starts off in one key and then moves to a different key.

Normal universities: A form of tertiary education in China designed to train students to be teachers. The goal here is to inculcate teaching standards or norms. Most such schools are now also referred to as teachers’ colleges.

Preschool: a specialized school for educating children three to six years old in China and is supervised by the MEPR. In this study, it is interchangeable with the term “kindergarten”, where children are divided into three levels of classes according to their ages, including juniors (3-year old), middle (4-year old) and senior (5-years old) (Tregay et al., 2017). In China, children begin primary education the age of six; attend secondary school between 12 and 17. Secondary schools are divided into junior middle schools and senior middle schools, each lasting three years long.

Preschool teacher: In this study, this term refers to a person whose occupation is working in a Chinese kindergarten to take care of and teach children ranging in age from three to six years.

Pre-service Preschool Teacher: An undergraduate student who is enrolled in a tertiary institution and majoring in preschool education. This person will be taught relevant and advanced forms of professional knowledge related to preschool education and acquire certain music skills required for their future career.

Technical Secondary School: A form of secondary vocational school and occupies a lower level in the educational system than vocational school or college. The duration of training is generally three years. The goal of this kind of secondary education is similar to vocational
school or college in that it aims at cultivating students’ specific technical skills in order to meet the needs of society and the workplace.

*Transposition*: Playing an entire piece of music in a different key (same piece, different key).

*University or College*: One of two forms of tertiary education in China. The course of study lasts four to five years and results in the granting of a formal degree and/or credential. This form of tertiary education emphasizes the ability to engage in advanced forms of study and thinking. The goal here is to cultivate students’ research abilities and ask students to master knowledge in order to move into true career tracks in various fields.

*Vocational School or College*: There are two types of tertiary education in China, including vocational colleges and universities. Vocational college or school lasts two to three years and does not result in a formal degree. This form of tertiary education mainly focuses on simple theoretical knowledge and primarily cultivates students’ operational and practical skill sets. The goal of this kind of higher educational institution is focused on technical skill development for application in the work place.

### Chapter Summary

The purpose of this study is to examine the influence of the Shanghai preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their piano skills usage with preschool students. In order to achieve this goal, the author organized the dissertation on the results of this study into five chapters, a reference list, and appendices in the following manner.

In Chapter One, the author reviewed the background of the study. This chapter includes the relevant policies of preschool education in China, the types and number of preschools in
Shanghai, the six programs in Shanghai that offer preschool education majors and the music curriculum of pre-service preschool education programs. The author then presents the statement of the problem, the research questions and the significance of the study. Finally, delimitations and operational definitions are presented and discussed.

Chapter Two takes this discussion further and concentrates on a review of the literature that emphasizes three main points: (1) pre-service music education for preschool teachers and piano training, (2) piano training and the acquisition of functional piano skills for future teaching careers, and (3) the development of group piano instruction and the functional piano skills acquired through it. This literature review offers additional information and insights relative to the problem this study address, the purpose this study seeks to fulfill and the key issues that underlie the research questions upon which this inquiry is based.

Chapter Three discusses the quantitative research methodology and research design that will be employed to complete the study. This includes the instrument used to gather the data, the data collection process, and data analysis procedures. Chapter Four reports the results of the data analysis, and Chapter Five offers the discussion, implications and recommendations for improving the pre-service preschool music curriculum, as well as recommendations for further research.
CHAPTER 2: LITERATURE REVIEW

The purpose of this study is to examine the influence of the Shanghai preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their piano skills usage with preschool students. This chapter presents a review of the relevant literature in the broader field of inquiry. The author first introduces the pre-service music education for preschool teachers and related piano training. Then the researcher focuses on piano training as it relates to functional piano skills applicable to the future career needs of preschool teachers. Finally, the author reviews functional piano skills acquired from group piano instruction and the development of this instructional approach in China.

**Pre-service Music Education for Preschool Teachers and Related Piano Training**

Researchers have come to the conclusion that the position of music education and curriculum for pre-service preschool teachers has been impaired and/or decreased in terms of its role in teacher preparation (Ehrlin & Wallerstedt, 2014; Gillentine, 2010; Hill, 2003; Raver & Zigler, 2004; Zalar, 2011). However, researchers emphasize the importance of pre-service music education for preschool teachers (Hae & Kemple, 2011; Lamont, 2008; Lee, 2006; Pramling & Garvis, 2013; Young & Gillen, 2007) especially with regard to piano training (Gao, 2008; Jin, 2007; Lee, 2009; Li, 2012; Li, 2013; March, 1988; Redfern, 1983; Skroch, 1991; Ye, 2010; Wang, 2011; Yuan, 2011; Zhang and Zhang, 2013).

**Pre-service Music Education for Preschool Teachers**

Lee (2006) indicated that music is a substantial part of early childhood education and teaching music plays an important role in preschool. Hae and Kemple (2011) summarize the key features of and discussed the importance of preschool music education. They found that music is
an active tool and plays an important and positive role in children’s development and learning in
many ways. Lamont (2008) and Young and Gillen (2007) note that music is an important part of
children's lives as they are surrounded by music during virtually all of their waking hours
through toys, television, radio, computer games and smart phones. Pramling and Garvis (2013)
asserted that music lies at the heart of preschool education. Therefore, Lee (2006) emphasized
that pre-service preschool teachers’ music abilities is vital.

Although music education for pre-service preschool teachers is important and Ho (2011)
considered that “curriculum is often an important means to instill in students certain values (real
and perceived) that are acceptable to society and the state authority” (p.195), some researchers
have observed that pre-service music education curriculum for preschool teachers has been
decreased in content, deemphasized and marginalized in recent years. Ehrlin & Wallerstedt
(2014), Hill (2003) and Raver and Zigler (2004) indicated that educational policy throughout the
world has gradually shifted emphasis toward academic achievement in what were seen as “core”
subjects, such as mathematics, science and language due to social and political pressure. As
mentioned in Chapter One, both the requirements of The Undergraduate Preschool Major
Cultivation Program of The College of Preschool Education and Special Education in East China
Normal University and The Professional Standards of Kindergarten Teachers (Trial Version)
issued by MEPR in 2012 are consistent with this shift in global educational policy.

Similarly, Zalar (2011) investigated the early childhood and preschool education
undergraduate and graduate program at the University of Zagreb in Croatia. This researcher
listed generic and specific competences for bachelor and master’s degree students in early
childhood and preschool education. There was only one listing pertaining to music competence
at the undergraduate level, namely, possessing the capacity for using various forms of artistic
expression. Interestingly, there is no requirement relevant to music ability whatsoever at
graduate level. Zalar reviewed the three-year curriculum of undergraduate early childhood and
preschool education which includes 15 credits of music training. This accounts for 8.3% of the
total 180 undergraduate program credits. There are three credits of music instruction required
for the first semester. Then there are four credits of learning the playing of instruments (guitar/
piano/ accordion) required for the second and third semesters and two credits of learning
instrumental accompaniments and singing (guitar/ piano/ accordion) required for the third and
fourth semesters. Finally, there are six credits of learning music teaching methodology required
for the fifth and sixth semesters. It should be noted that there are no relevant preschool music
education courses at all under the early childhood and preschool education graduate program.
This seems to indicate that music education accounts for very little of the overall preschool
teacher education program at this institution – again, in line with global shifts in the emphasis of
preschool preparation.

Gillentine (2010) reviewed the requirements relative to the National Board Certification
for early childhood teachers in the United States. This researcher indicated that nine important
ey early childhood teaching standards are identified and proposed by the National Board for
Professional Teaching Standards (NBPTS). They include: 1) understanding young children; 2)
equity, fairness, and diversity; 3) assessment; 4) promoting child development and learning; 5)
knowledge of integrated curriculum; 6) multiple teaching strategies for meaningful learning; 7)
family and community partnerships; 8) professional partnerships; and 9) reflective practice. In
addition, six areas in early childhood education are identified as assessment benchmarks to be
assessed in order to demonstrate candidates’ content knowledge for teaching. These include
literacy and English language arts, mathematics, science, social studies, children’s play and
physical education, health, and safety. The NBPTS includes no requirements relative to music education for the National Board Certification for early childhood teachers.

Ehrlin and Wallerstedt (2014) pointed out that music has lost the strong position it held previously in preschool teacher training. They explained that preschool music education is deemphasized because the teaching content of contemporary preschool teacher education is “no longer focused on performing skills but to theoretically understand children’s aesthetic learning processes” (p. 3). The result of this is likely to be that pre-service preschool teachers pay little attention to music learning in their preparation programs. Sun (2010b) pointed out that pre-service preschool teachers lack consciousness of active learning and do not realize the importance of music education, especially piano skills, relative to teaching in preschool education.

**The Importance of Piano Training for Pre-service Preschool Music Education**

Sun (2010b) pointed out that the demands of society determine the direction of educational policy and practice. Preschools employing teachers with good music skills are attractive to parents (Yuan, 2011). In addition, music skills will directly connect with and influence preschool teachers’ confidence in their teaching practice. Bainger (2010) indicated that preschool teachers tend to struggle with teaching music, due to a lack of confidence and skills. Although music is regarded as an essential part of early childhood education, the provision of music in many preschools and day-care centers still consists of putting on a CD to which the children can dance and sing a few traditional nursery rhymes. Ehrlin & Wallerstedt (2014) indicated that preschool teachers are not competent in singing and playing instruments together with children.
Hae and Kemple (2011) explained the cause of the lack of confidence of pre-service preschool teachers with regard to music training and practice. Low levels of confidence in musical fields may result from a shortage of music content knowledge and skills. Music education could serve to increase pre-service preschool teachers’ confidence in using music. Therefore, Hae and Kemple suggested that pre-service preschool teachers should take more courses designed to develop their music abilities and ensure that they acquire the confidence to engage in music-based learning activities in their teaching practice.

However, as discussed above, global trends in education and Chinese educational policies and teacher preparation program structures indicate that it may be difficult to incorporate more music courses in the Chinese preschool education program. Lee (2006) suggested that music courses should be considered for inclusion into these programs as core courses required for students to take in order to graduate from higher educational institutions and early childhood training programs more specifically. Lee emphasized that music courses should be more focused on skills related to enhancing teaching abilities. Therefore, it is necessary to explore the relationship between pre-service functional piano skills training and the application of functional piano skills in actual preschool teaching practice. Only through effective training in piano skills can pre-service preschool teachers and in-service preschool teachers develop professional confidence levels relative to critically important music-based teaching activities in preschool.

Some researchers have studied music teaching ability in depth, especially with regard to specific piano skills. In fact, the piano has been characterized as an indispensable tool in teaching practice by number of researchers (March, 1988; Redfern, 1983; Skroch, 1991). Piano is the most frequently used musical instrument by preschool teachers in their classrooms and plays an important role in the careers of preschool teachers (Lee, 2009). Li (2012) noted that
piano is a means for implementing various educational activities in preschool. Gao (2008), Li (2012) and Jin (2007) demonstrated that piano is considered to be a popular pre-service preschool teaching instrument. In addition, more generally, piano plays an irreplaceable role in music education practice (Wang, 2011). Highly qualified preschool teachers must have professional piano skills (Li, 2013; Yuan, 2011). Hence, piano has become the most prominent instrument taught in pre-service preschool music curriculum in China and is heavily used in preschool teaching practice.

Li (2012) summarized the importance of piano skills for preschool education students and indicated that piano skills training for preschool education major is an important part of music education for this group of teacher candidates. Piano skills courses such as those covered under musical instrumental playing methods or basic course of playing and singing at The College of Preschool Education and Special Education in East China Normal University are designed to broaden pre-service preschool teachers’ knowledge, strengthen the humanistic quality of instruction, and develop expressive skills and music appreciation ability in preschool education (Ye, 2010). The goal of these piano skills courses is to lay a foundation for the acquisition of music knowledge and skills required for preschool teaching activities (Sun, 2010b).

However, this type of course can be challenging for pre-service preschool teachers. This is because most of the pre-service preschool teachers are admitted from general high schools and technical secondary schools, and, most of them have not taken entrance examinations that test students’ music skills (Jin, 2007; Sun, 2010b). In addition, pre-service preschool teachers’ piano skill levels are uneven and most pre-service preschool teachers have not had access to or experience with pianos before their entrance into college (Wang, 2010). For example, some pre-
service preschool teachers may have had some foundation in piano skills and others may have had higher levels of piano training (Sun, 2010b).

Due to the increasing enrollment in preschool education programs in China, the overall quality of pre-service preschool teachers has become more varied and uneven (Chen, Gao & Jiang, 2011). This may serve to make the music competencies of these students even more questionable and result in generally lower skill levels (Sun, 2010b). Wu (2007b) has shown that the number of higher education institutions in China has increased a great deal over time. Although the increase in the numbers of higher education institutions resolves the difficulties associated with acceptance and enrollment, in practical terms, it brings many difficulties with regard to music teaching. Wu (2007b) indicated that expanding enrollment has made it more difficult to ensure high quality among the graduates of teacher preparation programs. Therefore, the current study is significant in that it explores current in-service preschool teachers’ perception with regard to the adequacy of pre-service piano training and the frequency of piano skills using in preschool against the background of a decreasing the role for music learning in pre-service music education curriculum from global and Chinese perspectives.

### Piano Training and the Acquisition of Functional Piano Skills for Future Teaching Careers

The demands of society determine the direction of educational policy and practice (Sun, 2010b). Young (2010) pointed out that piano skills were valuable to musicians in their career. Therefore, the goal of pre-service music education and its piano training should center on acquiring functional piano skills for future social needs. There is an inseparable relationship between acquired functional piano skills and the actual needs of society. Hence, the importance and characteristics of functional piano skills must align with the requirements of the walks of life to which they are applicable.
The Importance and Characteristics of Functional Piano Skills

Functional piano skills have been addressed in the U.S. by the following music organizations since 1929: National Association of Schools of Music (NASM), American Association of Teachers Colleges (AATC), Music Educators National Conference (MENC) and Music Teachers International Association (MTNA). Currently, the NASM continues to publish guidelines on this form of instruction every two years. The 2018-2019 guidelines recommended and clearly emphasized that students engaged in professional undergraduate degrees in music should “acquire the skills necessary to assist in the development and advancement of their careers” (p.101).

Researchers have recognized the importance of functional piano skills and have regarded functional piano skills as a basic and vital music competency (Chen, 2000; Chin, 2002; March, 1988) in many music activities (March, 1988) and for teacher education specifically (Chen, 2000). Shockley (1986) also pointed out that functional piano skills are valuable not only for all levels of piano training, but also for music teaching. Further, Chen (2000) indicated that functional piano skills are deemed as necessary for music teachers regardless of their area of music specialization and can help music teachers be successful in their practice (Chin, 2002). Researchers place an emphasis on functional piano skills training for teacher education, suggesting that functional piano skills should be studied more and improved relative to their use in teacher education (Buchnan, 1964; Chen, 2000; Taylor, 1970).

However, other researchers have pointed out that piano training for teacher education requires nothing more than the acquisition of basic and practical piano skills (Chin, 2002; Meurer, 1974) and does not require what some consider to be an over-specialization in music (Meurer, 1974). Jang (1988) noted that pre-service music teachers need to develop the
appropriate attitude, knowledge, and skills in their music training. Taylor (1970) and Meurer (1974) set forth the idea that piano instruction is a requirement for teacher education and suggested that piano training should be more concerned with reality and practicality than theory and ideals. Therefore, teacher education institutions should discern the changing needs of school populations and the professional needs of music teachers (Taylor, 1970). Piano teaching in teacher education programs should cater to the professional needs of general music teachers (Cook, 1970). If the core nature of piano skills should be functional in nature, then the goal of piano training should be to connect with the actual requirements of teaching practice (Chen, 2000) and the future professional needs of teachers (Chao, 1997).

In the field of preschool education, several researchers emphasized that piano skills training should align with actual working experience in preschool. Wang (2010) indicated that the training objective of music courses in the preschool education major should be positioned through the guidance of work demands in order to cultivate the practical application of the music ability of preschool teachers. Wang (2010) suggested that pre-service preschool teachers need not learn music skills systematically and professionally and need to acquire only a basic level of knowledge. Sun (2010b) pointed out that, for preschool teacher education, the learning of piano skills doesn’t require a high level of performance ability or the ability to engage in skillful performances of difficult piano pieces. Rather, the emphasis should be placed on the acquisition of core skill sets related to the practical ability levels tied directly to the actual needs of teaching in kindergarten after graduation. This opinion is consistent with the aim of functional piano skills in teacher education and efforts to improve the preparation of pre-service preschool teachers in colleges and universities better.
Types of Functional Piano Skills

Although music organizations and numerous researchers attach importance to and emphasize the role of functional piano skills for the future career development of teachers, there are no specific publicly disseminated documents that designate how many – or which - piano skills should be studied or researched. Scholars emphasize or deemphasize certain piano skills which they think are important or, conversely, unimportant, largely on basis of the personal judgments of study participants, the educational context, cultural setting, and/or the findings of previous studies.

For example, Case (1977) conducted research with regard to 184 public school music teachers who teach music in grades K-12 in North Carolina. These participants involved in the study included five groups of music fields – band, choral, elementary, general, and orchestra. Nineteen functional piano skills were listed, including accompanying, chord progressions, chords, compositions, dynamics, ensemble playing, fingering, harmonization of a melody, improvisation, note accuracy, open score reading, pedaling, phrasing, rhythms, scales, score reduction, sight reading, technique and transposition.

Chen’s study (2000) investigated secondary school music teachers’ attitudes with regard to piano training and piano teaching practice in Taiwan, identifying nine critical piano skills, which were different piano skills than those listed by Case. Chen’s list includes the following: solo repertoire, technical development, sight reading, chord progression, harmonization, transposition, accompanying, improvisation and score reading. It can be seen that different music careers require different piano skills.

Several researchers have used surveys to investigate functional piano skills. The following eight piano skills have been the most investigated and emphasized by a number of
researchers (Chen, 2000; Christensen, 2000; March, 1988; Redfern, 1983; Skroch, 1991; Young, 2010) - sight reading, improvisation, transposition, harmonization, accompaniment, chord progression, piano repertoire, and techniques.

In order to demonstrate the importance of piano skills, certain studies subdivide important piano skills into two, three or four content areas. For example, Christensen’s study (2000) listed twenty piano skills within four content areas covering sight reading skills. These included sight reading vocal or instrumental open scores, sight reading vocal or instrumental closed scores, sight reading accompaniments, and sight reading alto or tenor clef parts. Young’s study (2010) deals with three kinds of sight reading, including vocal or instrumental open scores, sight reading accompaniments, and alto or tenor clef parts. In addition, Christensen (2000) and Young (2010) divided the piano skill of improvisation into improvising melodies and improvising accompaniments. They divided the piano skill of transposition into transposing simple melodies, transposing instrumental parts to concert pitch on the piano, and transposing simple accompaniments. They divided the piano skill of harmonization into harmonizing melodies with symbols and harmonizing melodies without symbols. Finally, they divided accompaniment into accompanying soloists and accompanying groups.

The type of functional piano skills discussed in this study will be primarily based on skills emphasized in several previous Chinese studies (Du, 2011; Hao, 2012; Li, 2003; Li, 2012; Li 2013; Wang, 2010; Wang, 2011; Yuan, 2011; Zhang & Zhang, 2013). In accordance with Chinese educational contexts and cultural settings, twelve piano skills will be applied in this study. Five functional piano skills have been selected from Chinese studies which overlapped with the above Western studies to include accompaniment, improvisation, sight reading, techniques, and transposition (Christensen, 2000; March, 1988; Redfern, 1983; Skroch, 1991;
Young, 2010). Chinese researchers discussed four other piano skills, namely, composition (Li, 2003; Wang, 2011), modulation (Wang, 2010), score reading (Wang, 2010; Wang, 2011) and solo singing with self-accompaniment (Du, 2011; Hao, 2012; Li, 2012; Wang, 2010; Yuan, 2011; Zhang & Zhang, 2013). In addition, three piano skills which are frequently discussed by Western researchers will also be taken up in the current study (Case, 1977; March, 1988). This is largely due to the fact that these skills - playing piano repertoire, chord progression and harmonization - also appear in Chen’s study (2000). Chen’s questionnaire, which was administered in Taiwan, is highly applicable to the study conducted in mainland China as there are similar educational contexts as well as a very similar cultural setting. So, ultimately, twelve functional piano skills will be investigated in the current study from the standpoint of the current use of these skills by preschool teachers in China. These include:

1. Improvisation
2. Playing piano repertoire
3. Accompaniment
4. Sight reading
5. Solo singing with self-accompaniment
6. Composition
7. Score reading
8. Techniques
9. Chord progression
10. Harmonization
11. Transposition
12. Modulation

**Studies on Functional Piano Skills acquired by Musicians in Western Countries**

Sonntag (1980) believed that functional piano skills are often used in different kinds of music institutions.
Different Music Abilities for Different Musical Occupations

Corbett (1977) found that different musical occupations require various levels and types of abilities relative to music instruction. For instance, elementary school music teachers felt that they needed more training in innovative techniques, such as Orff, Kodaly and Dalcroze (Redfern, 1983); choral teachers felt that they need more training in Broadway show production and guitar instruction (Christensen, 2000), whereas instrumental teachers were more concerned about marching band and improvisational techniques. Redfern’s study (1983) randomly selected 375 music teachers who taught vocal and instrumental (band and orchestra) from Connecticut, Indiana, and Arizona. These participants ranked the frequency of use of 16 piano skills and noted that accompanying, chords, improvising accompaniments and harmonizing melodies were the functional piano skills most frequently used in working settings.

Young’s study (2010) also indicated that different occupations have different requirements relative to the use of and need for functional piano skills. Young studied 109 musicians, including 43 faculty members, 38 professional performers and 28 private music teachers. Young listed 19 functional piano skills and gathered information about the piano skills each type of professional most used in their careers. The results indicated that there are subtle differences among the above three groups in terms of the frequency with which they use certain functional piano skills in their working lives. Three functional piano skills, that is, regularly transposed melodies, sight-read accompaniments and playing scales, are the most used by musicians. Faculty members most frequently used the functional piano skills of playing by ear, playing chord progressions and accompanying soloists. Professional performers most frequently used the skills of transposed accompaniments, harmonizing melodies and accompanying soloists.
Private music teachers most frequently use the skills of sight reading, open scores and transposing accompaniments.

Although some researchers found that different music occupations need different functional piano skills in their practice, the results of many surveys show that the piano training in college-level music education is inadequate (Case, 1977; Corbett, 1977; March, 1988). March’s (1988) study noted that 44.5 percent of the school music teacher participants (i.e. general music teachers, choral teachers and instrumental teachers) thought that their piano training in college was less than adequate or very inadequate. Redfern (1983) and March (1988) concluded that the work requirements associated with the application of functional piano skills in post-college career work is quite inconsistent with the requirements associated with piano training in colleges or universities. Case (1977) found out that many piano skills emphasized in training were not the most ones emphasized in teaching (p.80). Redfern (1983) noted that only one or two important functional piano skills (i.e. chords and sight reading) were required by undergraduate curricula. This means that some functional piano skills covered by college-level courses, such as scales, playing piano solos, are not seen as meaningful in the broader work world beyond college.

March (1988) stated that the majority of the curricula were not designed to meet the needs of public school music teachers. College instructors’ responses indicated that harmonizing, accompanying and improvising were known to be important functional piano skills for music teachers. However, only harmonizing was dealt with in colleges. Accompanying, ranked second in importance by the teachers, received the least attention in college instruction. However, piano repertoire - ranked last in importance among the nine functional piano skills by the teachers – was stressed in instruction at three of the colleges studied. Similarly, Young’s
(2010) investigation indicated that faculty members, professional performers, and private music instructors never used the following piano skills in their careers: improvising accompaniments, playing practiced and memorized piano solos, devising modulations, composing a new vocal or instrumental piece, and accompanying an ensemble.

Therefore, it seems that piano training in college does not meet with the needs generated by the social demands associated with music careers. Many graduates are not fully prepared to apply piano skills to their future professional activities (Freehurne, 2002; Graff, 1984). Further, they appear to be generally dissatisfied with the piano training available in higher education (Buchanan, 2011; Kein, 2008; Fish, 2009). It is entirely possible that institutions’ course offerings for music teacher training have not been closely aligned to the demands of the school music teacher. That is to say, the teaching requirements are various, and lack uniformity and standardization (Sonntag, 1980). Therefore, Sonntag (1980) argued that it is necessary to form a certain degree of uniformity in standards with regard to minimal piano skill requirements.

**Research Pertaining to Piano Skills Training Prior to Entering College and During College**

Researchers have discussed ways that the factor of piano skills training prior to entering college will affect the perception of adequacy of piano skills training during college and the frequency of use piano skills in music teaching in career (Redfern, 1983; Young, 2010). They indicated that the amount of piano training, whether prior to entering college or during college, will be related to the frequency of using piano skills in later careers.

In research conducted by Redfern (1983), there is a significant relationship between the amount of piano study before college and the application of piano skills in music career. Redfern reported that the mean years of participants’ piano learning prior to college was 6.7. It implied that the number and frequency of using piano skills incline to increase with the number
of years of piano training. Although 55.7 percentage (n=152) of elementary and secondary public school music teachers from the states of Connecticut, Indiana and Arizona had taken private piano lessons before entering college, Redfern still indicated that the type of piano training was not significantly related to the use of piano skills. This result is consistent with Case’s research (1977). Case reported that of 184 respondents, 94 percent reported receiving private piano lessons instead of group piano lessons prior to entering college. Results indicated that most students who were trained in piano skills before entering college received primarily private piano lessons. In addition, Young (2010) indicated that the amount of precollege piano training effects the perception of adequacy of piano training in college regardless of taking private lessons or group piano lessons in prior to college. Young’s results validated the viewpoint of Redfern and indicated that the amount of piano skills training prior to entering college is significantly related to the frequency of use piano skills in teachers’ careers.

Pounds (1974) discussed two types of piano instruction in college, private piano lessons and group piano lessons. Pounds indicated that students participating in regularly piano experiences may receive private piano lessons. In contrast, students with no previous piano experience will suggest taking group piano lessons. Young’s research (2010) indicated that there are obvious differences between private piano lessons and group piano lessons. Young found a significant correlation between the amounts of private piano lessons took during collegiate music coursework and teachers’ perception of adequacy of their training in colleges. Meanwhile, Young (2010) indicated that the more semesters of taking private piano lessons in colleges, the greater value musicians place on piano skills training in their teaching practice. However, it has no significant relationship between the amount of group piano lessons taken in college and the perception of adequacy of piano skills training. The more semesters of taking group piano
lessons in colleges, the less important musicians (including faculty members, professional performers, and private music instructors) regarded piano skills were to their career. Still, the result of piano skills training prior to entering college or during college is similar – it also has a significant correlation between the amount of collegiate piano skills training and the frequency of use of musicians.

**Studies on Piano Training and Preschool Teachers’ Music Abilities in China**

Preschool teacher music training and abilities in China can’t be placed on a par with that done in Western countries, Chinese scholars have placed a certain amount of focus on the music training involved in preschool education in colleges and universities, as well as the application of music skills in the practice of preschool teachers. For example, some researchers have studied music teaching ability in depth, especially with regard to specific music skills. Zhang and Zhang (2013) indicated that music skills, such as dancing, singing and piano playing, are indispensable music abilities for preschool teachers. Lee (2006) deemed the ability of rhythm and singing to be the most important music competencies for preschool teachers and also pointed out that singing and rhythm movement are the most frequent activities in preschool.

In addition, researchers have emphasized improvised accompaniment and solo singing with self-accompaniment as important music skills for preschool teachers (Du, 2011; Li, 2012; Sun, 2010b; Wang, 2011). Improvised piano accompaniment by preschool teachers plays an important and large role in the artistic development of children in preschool (Sun, 2010b; Wang, 2011). Preschool teachers usually use improvised accompaniment instead of teaching language to inspire children’s understanding and performance of music (Sun, 2010b). Wang (2011) emphasized the importance of this piano skill and set forth the idea that the piano skill of improvised accompaniment must be mastered by highly qualified preschool teachers. Sun
(2010b) also supported this position and advanced the view that improvised accompaniment belongs among the required courses in professional piano skills for pre-service preschool teachers. Sun states that the reason for this is the emerging consensus view that improvised accompaniment ability is one of the indispensable piano skills that highly qualified preschool teachers should possess. Sun also emphasized that this is a comprehensive application ability that can demonstrate preschool teachers’ skill levels with regard to techniques, artistry and creativity.

Moreover, Du (2011) advanced the proposition that solo singing with self-accompaniment is an indispensable skill in music teaching, and is a necessary and basic professional skill for preschool teachers. The level of this skill demonstrated by preschool teachers’ directly influences the result and quality of music teaching in their classroom. Li (2012) also pointed out that the ability of solo singing with self-accompaniment is an especially important link in preschool teachers’ skill acquisition. Hao (2012) agreed with this and indicated that solo singing with self-accompaniment is applied widely in teaching activities in preschool and is a basic component of the design of music lessons in preschool. Therefore, Hao stated that solo singing with self-accompaniment is a professional skill that must be possessed by preschool teachers.

Though many researchers think that the music abilities above - especially piano skills are important and should receive a good deal of attention, some scholars have raised the issue that preschool teachers and pre-service preschool teachers often have poor piano skills (Du, 2011; Gao, 2011; Li, 2013; Sun, 2010b; Wang, 2010; Wang, 2011). Wang (2011) pointed out that the musical abilities of preschool teachers are generally low and that they cannot adapt to the demands of society with regard to the musical instruction of children in this age group. Gao
(2008) observed that a considerable number of preschool education graduates from colleges and universities lack the knowledge and training required to adapt to work needs regarding music teaching activities. They possess poor piano skills and cannot carry out solo singing with self-accompaniment. Sun (2010b) identified problems in the quality and extent of piano teaching in preschool teaching preparation programs at the college level. Sun indicated that, because most pre-service preschool teachers’ and in-service preschool teachers’ piano skills are poor and they lack the critical piano skills of improvised accompaniment and solo singing and playing, they cannot apply their piano skills effectively in their studies and work place teaching practice.

Through an investigation of the levels of solo singing with self-accompaniment among 514 preschool teachers in Wuxi, China, Du (2011) found that the overall level of preschool teachers’ solo singing with self-accompaniment is very uneven and generally not at very high level. This was the case, despite the fact that nearly 90% of preschool teachers in the study thought solo singing with self-accompaniment plays an important role in music teaching. The results of Du’s study indicate that only 30% of preschool teachers play and sing by themselves in every music lesson and only 50% of preschool teachers think they are equal to the task of teaching preschoolers with solo singing with self-accompaniment. This lack of skill and confidence results in most preschool teachers replacing keyboard instruments and other instruments with digital music media or recorders. In light of this, Du believes that preschool teachers’ levels of skill in piano solo singing with self-accompaniment should be improved.

Wang’s research (2011) indicated a lack of optimism relative to preschool teachers’ music abilities in China. As mentioned above, preschool teachers’ teaching skill level and music abilities are uneven. In this study, 82.9% of preschool teachers think that their music ability is
insufficient, 77.3% think that their ability level is superficial and weak, and only 22.7% think that they have good improvised accompaniment and composition abilities. Li (2013) states that preschool teachers currently apply the keyboard poorly in practical work, especially with regard to piano sight-reading, improvised accompaniment, and solo singing with self-accompaniment. As Sun (2010b) mentioned, the demands of society determine the direction of educational policy and practice. Therefore, the piano training of pre-service preschool teachers cannot rest only on piano teaching for its own sake, but should serve to strengthen the application of keyboard abilities to meet the needs of actual teaching practice in Chinese preschools.

In addition, many Chinese scholars have come to realize not only the importance of practical piano skills in preschool. They have also suggested specific requirements in this regard (Li, 2013; Wang, 2010; Yuan, 2011; Zhang and Zhang, 2013). A qualified preschool teacher should have certain piano skills, such as being able to perform simple children’s songs (Yuan, 2011); improvise melodies; have abilities in sight-reading; solo singing with self-accompaniment; perform stave and numbered musical notation of common children’s songs; and being able to engage in transposition and modulation according to children’s actual vocal ranges (Wang, 2010).

Zhang and Zhang (2013) hope that preschool teachers develop the abilities of solo singing with self-accompaniment, playing accompaniment for children, and performing new songs for children. They pointed out that preschool teachers cannot use just one tuning and should choose appropriate tuning for accompaniment according to the actual situation while playing the accompaniment for children. In addition, preschool teachers should not use only one chord in one song, but should use different chords to make accompaniment rich and colorful and
stimulate enthusiasm for singing among children. Li (2013) opined that, according to the basic features of children’s music, preschool teachers should master creative approaches for children’s music education, compose children’s songs and music games, and possess the ability of accompaniment for children’s songs in order to create children’s aesthetic experiences and develop children’s creativity. Li pointed out that these music abilities are needed most in preschool teachers’ actual work and are requirements for the training of highly qualified pre-service preschool teachers. In the current study, the author will refer the above-mentioned piano skills that Chinese researchers have emphasized in preschool teaching, which are more suitable for the Chinese educational context.

In summary, Chinese scholars seem to think that Chinese preschool teachers’ piano skills are not ideal for the instructional activities they are increasingly called upon to perform. Birkeland’s study (2013) compares Norwegian and Chinese preschool teachers’ educational ideals from a cultural and historical perspective. This researcher indicated that Chinese teachers have the responsibility to prepare each individual as much as possible in order to manage the demands of society and to adjust to these demands because of the mounting pressure associated with individual survival in contemporary China. Therefore, pre-service preschool teachers’ piano training and the feedback of in-service teachers should be studied in an effort to improve the piano instruction given to pre-service preschool education majors and to strengthen courses in early childhood music education. This study will pursue this line of inquiry.

**The Development of Group Piano Instruction and Acquired Functional Piano Skills**

Group piano instruction is a primary teaching vehicle for the instruction of functional piano skills in China especially for pre-service preschool teachers. The development of group piano instruction spans more than 30 years in China (Kou, 1985). It has solved problems with
regard to the demand that rising enrollments have created for classroom pedagogy and the process has become a popular teaching mode for cultivating non-piano major and non-music major students (Chen, 2001). In addition, some researchers have begun to focus more heavily on the study of effective teaching modes in group piano settings and have published relevant materials for group piano instruction (Burkett, 1982; Chin, 2002; Fisher, 2006; Huang, 2011; Hutcherson, 1955; Jerks, 1984; Johnson, 1987; Kim, 2000; Lancaster, 1981; Locke, 1987; Mehr, 1968; Shockley, 1982; Young, 2010).

The Development and Characteristics of Group Piano Instruction in China

Group piano instruction in China started in the 1990s and has steadily gained popularity as a teaching method (Li, 2004). As a result, the collective piano teaching method has become possible across a wider spectrum of instructional venues. Li reviewed and summarized the origin and development of group piano instruction. Due to the significant increase in the number of students attending art institutes in the 1970s and the gradual development of culture in China with an attendant increase in the popularity of piano among the Chinese people in the late 1980s, a serious lack of piano teachers has now manifested itself. This situation led to proposals for group piano instruction in 1992. Li Wuhanna, a professor from Carnegie Mellon University, played an important role in the teaching of group piano instruction in China. She introduced the latest teaching method of group piano instruction used in the U.S. She also introduced these techniques to China through the dissemination of teaching materials and demonstration teaching. This has inspired and enlightened Chinese piano teachers and aroused their interest in this technique (Schmidt, 2014).

Some researchers have indicated that group piano instruction not only solves the actual educational problem of having a larger number of students learning piano skills in colleges and
universities, but it also addresses the problem of piano teacher shortages (Chen, Gao and Jiang, 2011; Huang, 2011; Luo & Kong, 2010; Shen, 2004; Zhang, 2008). In addition, Chen, Gao and Jiang (2011) pointed out that group piano teaching also serves to simplify teachers’ workloads by reducing the teaching time required for students to learn piano skills. Zhang (2008) agreed that increasing enrollment numbers and the relatively small number of faculty make group instruction a more cost-effective alternative.

Li (2012) summarized and generalized the advantages of using group piano in class. He opines that group piano be joined with the timbre of many other musical instruments in order to enrich its expressiveness beyond the timbre of piano alone. Teachers can let students play alone, in groups or together through computer and console, which greatly enriches teachers’ instructional methods. Students can have separate targeted communication with the teacher through online headphones and microphones, practice ensembles or duets through connected computers, and clearly see the teacher’s model performances through projectors and large screens. Sheets (1983) distinguished between group piano lessons and private piano lessons and indicated that group piano courses focus on functional skills while private piano lesson stressed repertoire. Kim (2000) emphasized the function and advantage of group piano instruction and indicated that this instructional approach helps students become familiar with a greater repertoire and acquire numerous piano skills they need for their future development.

As mentioned above, Chinese researchers realized that this kind of group piano instruction not only solves felt educational problems but also – in any event - is a good way to teach students’ functional piano skills. So, group piano teaching is a popular and powerful vehicle through which to foster students’ functional piano skills. Hines (1994) agreed that the most common way to cultivate functional piano skills is through group piano teaching methods.
This method of piano teaching emphasizes basic practical piano skills in music teaching and learning (Chao, 1997; Gao, 2008; Li, 2005; Li, 2012; Schokley, 1986; Sun, 2010b; Wang, 2010). In addition, it has been demonstrated to be an effective way of teaching some of the skills needed by music educators in their practice (Hunter, 1974; Wang, 2010). Although Chen’s research (2000) noted that key functional piano skills can be taught in a group piano setting and that this kind of instruction can provide pre-service teachers with comprehensive music abilities that they can apply in their teaching practice. However, Chen (2000) indicated uncertainty about whether group piano teaching would be more effective than private instruction and whether group instruction would be beneficial for students in meeting course requirements in their preparation as secondary school teachers. Nonetheless, group piano instruction still can be considered in the functional piano curriculum (Chin, 2002), which can serve to develop basic and practical piano skills relevant to the future professional needs of students when they enter the classroom.

Chen (2000) and Hines (1994) noted that group piano instruction in colleges has been mainly taught to non-piano major students. Shen (2004) stated that there are two main types of students for who group piano instruction is suitable: non-piano majors and non-music majors. She considers the adoption of group teaching methods as a scientific and reasonable measure in music education, especially for non-piano majors. Shen indicated that at the time, pre-service preschool teachers in China acquire piano skills mainly through group piano instruction. Wang (2010) suggested that the piano instruction provided to preschool education majors should be in the form of group piano courses, so as to teach pre-service preschool teachers functional skills and music appreciation in the use of multimedia teaching equipment. The effort here is to have pre-service preschool teachers become more willing to listen to all kinds of music and thereby increase their level of enthusiasm and interest for music and music instruction. In addition, a
body of research asserts that the Chinese preschool education program has, for the most part, adopted group piano instruction for the purpose of helping pre-service preschool teachers master certain key piano skills (Chen, Gao & Jiang, 2011; Li, 2012; Shen, 2004; Sun, 2010b; Zhang, 2008). Therefore, as is the case with non-piano majors, teaching basic piano skills to pre-service preschool teachers in group setting seems to be an effective approach relative to the mastery of key and core functional piano skills (Gao, 2008; Li, 2012).

**The Teaching Modes and Methods in the Group Piano Instructional Setting in China**

In order to investigate whether the teaching effect of group piano instruction is applicable to the cultivation of piano skills among Chinese students and whether it is entitled to be an established music curriculum, the first scientific research group of piano instruction was established in Shanghai from 1993 to 1995, in 1996 and again in 1998 (Li, 2004). Three types of persons were studied as research subjects, children between 4 and 5 years old, children between 5 and 6 years old, and normal school students between 18 and 20 years old. Li’s findings indicated that the teaching method of group piano instruction is suitable and acceptable for Chinese students in all these age groups. These results indicate that students can follow the requirements in this type of class and improve their music sensibility to various degrees, especially in the aspects of musicality, rhythm sensation, spectrogram identification ability and music playing ability. It turns out that the teaching mode of group piano instruction is very scientific in the sense that it is research based, systematic and reasonable. It is, therefore, conductive to the actual development of music education in China (Shen, 2004), in terms of increasing enrollment numbers of students and addressing the shortage of teachers. Li (2005) stated that group piano instruction is suitable and effective for Chinese piano instruction, and it can be seen as a modern curriculum of music appropriate for Chinese normal school students in
learning the basic skills of piano playing (Li, 2005). This experimental research indicated that
the teaching mode of group piano instruction is feasible and is useful in the Chinese context.
However, there is no relevant research that serves to illustrate and verify that the perception of
adequacy of the teaching of piano skills in group piano settings in college or the dynamics of
piano teaching in the practice of preschool teachers.

Although there is lack of empirical studies on the perception of adequacy of the teaching
of piano skill instruction, several researchers have reviewed and explored various piano teaching
methods used to meet different piano skills levels of students and stimulate their interest (Chen,
in group settings should apply various teaching methods in order to cultivate pre-service
preschool teachers’ interest according to their different piano skill levels. Zhang indicated that
music skills courses can adopt a combination of group teaching and individual teaching,
specifically, using the group method to solve common problems and the individual method to
solve individual problems.

Chen, Gao and Jiang (2011) opined that combining multilevel crossing to conduct
hierarchic stepwise teaching can be of value in promoting the optimal development of pre-
service preschool teachers’ music skills at different skill levels. Chen et al. (2011) pointed out
that through the stepwise teaching mode, pre-service preschool teachers can reach a certain level
of comprehensive music quality which includes six kinds of ability, including reading staff, sight
reading, application, reflecting, solo singing with self-accompaniment, and composing. These
researchers also made suggestions with regard to piano teaching for pre-service preschool
teachers at different skill levels and how to motivate their interest. As discussed above, piano
teaching should cater to the actual social and career needs of general music teachers (Cook,
1970). The goal of teaching modes and teaching methods, then, is to cultivate fully-prepared pre-service preschool teachers relative to the requirements of their teaching practice. At present, no articles were found which explore whether pre-service preschool teachers’ perceptions indicate the adequacy of functional piano skills that, meet critical social and career demands.

This is not to say that many experts and educators have not explored methodologies and published materials in order to assist preschool teachers to better carry out group piano teaching. This body of literature include works such as *Piano Basic Course* by Li, Wang and Yuan (2011), *Piano Practical Course (2nd version)* by Chen (2008), *Basic Piano* by Xia (2012), *Preschool Education Piano Basic Course* by Du (2013) and *Piano Foundation (2nd version)* by Li (2013). In addition, in order to enhance pre-service preschool teachers’ skills in improvised piano accompaniment and solo singing with self-accompaniment ability, some music educators have written specific teaching materials designed to improve pre-service preschool teachers’ piano skills. For example, Zhao wrote *Piano Improvised Accompaniment* (2011), Pan and Chen wrote *Piano Improvised Playing and Singing Course* (2008), Ding wrote *Piano Improvised Accompaniment Practical Course* (2008), and Hou and Zhao wrote *Children’s Songs Piano Improvised Accompaniment Method (2nd version)* (2011). These works seem to indicate that group piano instruction is a popular music curriculum and that functional piano skills, such as improvised piano accompaniment for singing, are being seriously investigated by music experts and educators.

In summary, the teaching method using group piano instruction has helped to address the issue of the increasing number of students taking piano instruction and the corresponding insufficient numbers of teachers available for piano instruction in China. The development of additional materials related to preschool piano instruction embodies the ever expanding
popularization and development of group piano instruction in China. In China, the primary aim of group piano instruction is to cultivate pre-service preschool teachers’ basic piano skills in order to apply them in their future careers.

**Chapter Summary**

This literature review first discussed pre-service music education and piano training for preschool teachers. Pre-service music education was addressed, especially the importance of piano training for pre-service preschool music education. Through investigating the importance, characteristics and types of functional piano skills, as well as reviewing previous Western and Chinese studies on piano training and music teaching practice, the researcher has sought to develop a deeper understanding of the significance and function of functional piano skills. Finally, group piano instruction, as a main teaching vehicle to cultivate pre-service preschool teachers, has been discussed from the standpoint of the development of the practice, the functional characteristics of the practice, effective teaching mode and published materials.

Chapter Three focuses on the quantitative research methodology and design proposed to investigate into this area of inquiry.
CHAPTER 3: METHODOLOGY

The purpose of this study is to examine the influence of the Shanghai preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their piano skills usage with preschool students. Therefore, according to the purpose of the study, four related research questions are presented:

1. What levels of piano training do preschool teachers receive prior to entering college?
2. What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers? What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?
3. How often do preschool teachers use overall functional piano skills in their current teaching practice? How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?
4. Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college?

Research Design

This study uses quantitative methodology to investigate the above research questions. Creswell (2002) stated that one of the characteristics of quantitative research is to describe research problems through a description of trends or a need for an explanation of the relationship among variables. Consistent with this, McMillan & Schumacher (2006) noted that the purpose of quantitative research is to establish relationships and explain the causes of changes in measured social facts. In this study, the author will provide descriptive statistics of the application of functional piano skills by preschool teachers. And then the researcher also examined the influence of the perceptions of the adequacy of undergraduate piano skills training on the frequency of piano skills usage by preschool teachers in Shanghai, China.
Selection of Participants

The researcher used cluster sampling to recruit participants. The population targeted in this study were made up of preschool teachers who graduated from six Shanghai preschool teacher preparation programs at preschool teacher education institutions in Shanghai, the Peoples’ of Republic of China. The focus of the inquiry is to study the preschool teachers who learn piano skills primarily from college education. Thus, the research recruited participants who had not passed or participated in the Band 4 Examination of Piano for Amateur in China before they had entered college, which means the participants had had a lower level of functional piano skills before they had entered college. The researcher contacted and selected teachers who had graduated from colleges within the last five years, and who had at least one year’s teaching experience. The reason why the researcher selected graduates from the past five years is that they were newer to the field and more likely to follow their college music program curriculum in teaching.

First, preschool teachers who had graduated from six preschool teacher preparation programs in the past five years were assumed to be able to accurately report specific information on the usage of functional piano skills as a teaching technique and held opinions on how useful college training in piano skills had been relative to actual preschool teaching activities. Second, college–level music curricula of piano training may change over time, which would influence the application of piano training in the preschool settings. Third, participants should have at least one year’s teaching experience so that they had enough teaching experience to use their acquired functional piano skills. Therefore, the researcher preferred to choose participants who had graduated recently.
To address the fourth research question, the researcher used a multiple regression to analyze the data. Based on the calculation of G* Power where alpha was .05, power was .80 and effect size was small (f square was .02), the lowest sample size should be 395. Thus, the researcher attempted to recruit about 400 or more participants.

To protect the human rights of the subjects, the researcher obtained IRB approval from the University of the Pacific. Moreover, the participants’ information was coded. All the data gathered in the course of the research study were treated as confidential. The author used pseudonyms for the participants as well as the preschool sites, and password to protect the computer files, and held physical documents in locked file cabinets. Research materials were not accessed by anyone other than the researcher and her research project associates. All electronic and paper documentation were retained in accordance with IRB timelines and destroyed in a controlled and secured manner.

**Instrumentation**

Based on items in surveys used in similar dissertations studies (Chen, 2000; Christensen, 2000; March, 1988; Redfern, 1983; Skroch, 1991; Young, 2010), the survey used in this study were designed by the author. In order to determine which functional piano skills were included in the study, to be conducted in Shanghai, China, the author reviewed several relevant Chinese studies (Du, 2011; Hao, 2012; Li, 2012; Li, 2013; Sun, 2010b; Wang, 2010; Wang, 2011; Yuan, 2011; Zhang & Zhang, 2013). The following nine functional piano skills were considered to be essential in Chinese preschool music teaching and are the focus of the current study. These are as follows: accompaniment (Li, 2013; Zhang & Zhang, 2013), composition (Li, 2003; Wang, 2011), improvisation (Li, 2013; Sun, 2010b; Wang, 2010; Wang, 2011), modulation (Wang, 2010), score reading (Wang, 2010; Wang 2011); sight reading (Li, 2013; Wang, 2010), solo
singing with self-accompaniment (Du, 2011; Hao, 2012; Li, 2012; Wang, 2010; Yuan, 2011; Zhang & Zhang, 2013), transposition (Wang, 2010) and techniques (Zhang & Zhang, 2013). In addition, another three functional piano skills, namely playing piano repertoire, chord progression, and harmonization, are included from Chen’s study (2000). Further, Chen’s questionnaire, which was administered in Taiwan, is highly applicable to the current study in mainland China because of the similar educational contexts and cultural settings. Finally, then, twelve functional piano skills were tracked in the course of this proposal.

The questionnaire used here contains a total of twenty-four items with four sections and includes demographic information, information regarding undergraduate piano training and any piano training received prior to college, information pertaining to participants’ current use of piano skills in their preschool teaching, and comments. The types of questions presented include fifteen single items, six multiple choice items, two Likert scales and one open-ended question. The survey approximately took 10-20 minutes to complete.

Demographic information. The purpose of this section was to obtain information about Shanghainese preschool teachers’ personal and professional profiles. To be specific, these eight close-ended questions requested information about the following: age, gender, highest degree earned, name of the university at which the degree was earned/graduate college and university, major, preschool district (region), the type of preschool at which the participant works, and years of work experience.

Information on preschool teachers’ piano training. This section contains seven close-ended questions. Each participant provided information with regard to their piano training experience and the length of piano training time prior to entering college and during their undergraduate college education.
Information on preschool teachers’ current use of piano skills in preschool teaching. Two Likert scale questions explored the following: preschool teachers’ evaluation of the perceived adequacy of their piano skills training in college and the frequency of preschool teachers’ use of their piano skills in their teaching practice. In addition, six multiple choice items were included in order to discuss pre-service preschool teachers’ perceptions of their acquisition of functional piano skills through college-level music curricula.

Comments. This final section contains one open-ended question, which allowed preschool teachers to address their expectations and opinions regarding their piano training in college.

Nevertheless, to address the research questions, only item # 10 (regarding the level of piano training received prior to entering college), item # 16 (regarding the perceived adequacy of acquiring functional piano skills in college-level piano training), and item # 17 (regarding the usage in preschool teaching practice) were used in the study. Other questions in the survey questionnaire were not analyzed and discussed but would be kept for further research.

In order to ensure the content validity of this questionnaire, the research invited a panel of six experts, including three music education professors, two professors working in preschool teacher preparation colleges in Shanghai to review the original Chinese version of questionnaire, and one language expert to review English version of the questionnaire and made suggestions for revision. First, five professors evaluated the questionnaire to validate that the twelve functional piano skills in this survey comprise the necessary piano skills base for using the piano for preschool instructional purposes. The researcher first translated the Chinese version into English. One language expert who can speak both English and Chinese with education major background was invited to review the English version of the survey questionnaire so as to avoid
any translation mistakes or misleading sentences. Regarding reliability of the instrument, due to the factual nature of the questions, and the fact that no subscales are to be created or tested in this study, traditional indexes of reliability are not deemed necessary.

In addition, the author conducted a pilot study before distributing the questionnaire in order to ensure that the respondents had a clear understanding of the questions, format and physical layout of the questionnaire. Then 10 preschool teachers in Shanghai were selected and asked to evaluate the questionnaire and gave suggestions and comments on the survey instrument. These pilot participants received the paper survey. They were informed of the significance and general purpose of the study, and asked to examine the relevance of the questionnaire to the research questions, provide comments on the procedures to be used in the study, give their opinion on the length of time required to complete the survey questionnaire and suggest possible revisions to the questionnaire so as to make the instrument clearer and easier to understand. Based on these preschool teachers’ opinions and comments, the researcher modified the procedural structure of the study, the wording of the research questions, and edited the survey questionnaire in order to make it more suitable for the population and the parameters of the current study.

**Research Procedures**

The author telephoned her former students, alumni working in various kindergartens in Shanghai, to notify them of the research project, and invited them to participate in this study. If these individuals agreed, the author would ask their help in recruiting additional participants from among their colleagues at their schools. The author mailed to the primary contacts the informed consent forms, the questionnaires in Chinese, self-addressed, stamped envelopes, and gift pens for all potential participants at the school. The primary contacts were
asked to distribute those materials to his or her colleagues who agreed to participate. After signing the consent form, the primary contact collected and sent all consent forms to the author in a self-addressed, stamped envelope. Upon completing the questionnaire, each participant mailed his or her finished questionnaire to the author individually.

The researcher promised to keep their identity and information confidential to protect the rights of the participants. All participants were asked to complete the survey within two weeks after receiving it.

**Data Analysis**

After collecting the data through survey methodology, the results were organized and compiled through the use of SPSS software. Preschool teachers’ demographic information was first presented in order to describe the background characteristics of these Shanghai preschool teachers. This included age, gender, the highest degree earned, graduate college, majors, districts of the preschools, types of preschool and working experience.

1. What levels of piano training do preschool teachers receive prior to entering college?

The researcher gave a descriptive analysis of the variable: the amount of time in learning piano before college.

2. What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers? What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?

The researcher gave a descriptive analysis of the variables: 1) overall perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers. 2) perceived adequacy of college-level piano training relative to 12 piano skills.

3. How often do preschool teachers use overall functional piano skills in their current teaching practice? How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?
The researcher gave a descriptive analysis of the variables: 1) the overall frequency of using functional piano skills in their current teaching practice. 2) the frequency of using 12 functional piano skills in their current teaching practice.

4. Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college?

The researcher conducted two sequential regressions to answer the research sub-questions. To address the first sub-question: The overall frequency of the usage of functional piano skills in their practice was viewed as the outcome variable. The level of piano training received prior to entering college is control variable. The influence variable is overall preschool teacher’s perception of the adequacy of college-level piano training. To address the second sub-question each specific skill were analyzed separately. For example, how frequently preschool teachers use improvisation in their practice was viewed as the outcome variable. The regression model includes the control variable (the level of piano training received prior to entering college) and influence variable (how adequate preschool teachers feel their improvisation training in college was). This was repeated for the remaining 11 skills. The following table illustrates the data analysis were employed in the present study.

Table 1
Method of Data Analysis for Research Questions

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Method of data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What levels of piano training do preschool teachers receive prior to entering college?</td>
<td>Descriptive analysis: item #10</td>
</tr>
</tbody>
</table>
(Table 1 Continued)

<table>
<thead>
<tr>
<th>2. What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers? What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?</th>
<th>Descriptive analysis: item #16</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. How often do preschool teachers use overall functional piano skills in their current teaching practice? How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?</td>
<td>Descriptive analysis: item #17</td>
</tr>
</tbody>
</table>
| 4. Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college? | Sequential multiple regression analysis
Influence Variable: How adequate preschool teachers feel their piano skills’ training in college was. (item #16)
Outcome Variable: How frequently preschool teachers use piano skills in their practice. (item #17)
Control Variable: The amount of time spent on piano training received prior to entering college. (item #10) |

**Research Questions**

**Research Questions 1.** What levels of piano training do preschool teachers receive prior to entering college?

**Research Questions 2.** What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers? What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?
**Research Questions 3.** How often do preschool teachers use overall functional piano skills in their current teaching practice? How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?

In order to interpret the responses to the above three questions, descriptive statistical methods were employed for analysis. McMillan and Schumacher (2006) indicated that descriptive statistics, namely summary statistic, “… transforms a set of numbers or observations into indices that describe or characterize the data” (p.150). Therefore, it is appropriate to describe and focus on what is with regard to the above three variables of the study.

The above three research questions explored the information about participants’ piano training experience and the amount of time spent on piano training received prior to entering college, preschool teachers’ perception of the adequacy of acquiring functional piano skills in college-level piano training and the frequency of piano skills usage in preschool. A five-point Likert type scale were used for research questions two and three. For the Likert-scale items the participants were asked to rate the degree of perception of adequacy (1 = Inadequate, 2 = Somewhat adequate, 3 = Adequate, 4 = Very adequate, 5 = Most adequate) and frequency (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very Often) on a five-point scale. A score were obtained through item 10, 16 and17 in the questionnaire, from which the perception of adequacy of twelve piano skills in college and the frequency of twelve piano skills in preschools could be inferred. The non-Likert type scale responses for question one were analyzed using frequency statistics. The first question of item 10 explored the information about the length of piano skills training before college.

**Research Questions 4.** Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in
preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college?

Since functional piano skills in this study were categorized into twelve subtypes of piano skills in preschool (i.e. improvisation, playing piano repertoire, accompaniment, sight reading, solo singing with self-accompaniment, composition, score reading, techniques, chord progressions, harmonization, transposition and modulation), multiple regression were conducted repeatedly for twelve times to determine the relationship between teachers’ perceptions of the training adequacy with regard to specific piano skills taught within the collegiate music curricula and the frequency of use in preschools for each functional piano skills.

For example, in order to explore accompaniment (one of the specific skills), the researcher modeled the outcome variable (the frequency of usage of accompaniment piano skill in preschool), by entering an influence variable (how adequate preschool teachers felt their accompaniment piano skills training in college was) and a control variable (the level of piano training received prior to entering college) at the same time. If the standardized coefficient of the influence variable (the degree of perception of adequacy of accompaniment training during college) is significant ($p<.05$), the results will be interpreted as suggesting that in-service preschool teachers’ use of that particular skill (accompaniment) may be influenced by the perceived adequacy of the collegiate training that they received in regards to this skill since the perception of adequacy accounts for additional variance in usage beyond that associated simply with pre-collegiate training. Similarly, the author investigated the other eleven functional piano
skills in the same way by employing multiple regression. For each of the 12 functional piano skills, a set of tables were produced. First, the correlations between the influence, control, and outcome variables were displayed. Then the multiple regression results were presented which showed the regression coefficients and their statistical significance levels (p-values) with a footnote added regarding the model as a whole (the change in R squared and an ANOVA summary statement).

**Assumptions**

The following statistic assumptions are supposed to be met.

1. The dependent variable is a linear function of the independent variable.
2. Each person (or other observation) should be drawn independently from the population.
3. The variance of the errors is not a function of any of the independent variables.
4. The errors are normally distributed (Keith, 2006, p.186).

Participants honestly and accurately responded to each item of the survey instrument and to the best of their ability. In addition, they responded to the survey instrument meaningfully - that is, the participants possessed a depth of professional experience and technical knowledge sufficient to provide informed and useful responses so as to reflect the current situation of piano skills training for preschool teachers. In addition, the survey of participants’ piano skills training and use of functional piano skills in their preschool career provided accurate personal and demographic information. Furthermore, the questionnaire in this study was accurately translated from English to Chinese and back translated from Chinese to English so as to be clearly understood by the Chinese preschool teacher participants.

**Chapter Summary**

This chapter discussed the conceptual and physical parameters of a study designed to address the research problem introduced in Chapter One. In order to address this research
problem, the present study employed a quantitative correlational research design. A survey instrument was used to gather data for analysis. The researcher described the broad demographic profile of the subjects and the development and administration of the self-designed questionnaire. Following that, the concrete procedure of conducting the study was described in detail. The researcher also provided the rationale for the data analysis and how the data were analyzed. Finally, the assumptions and limitations of the study were discussed.
CHAPTER 4: RESULTS

The purpose of this study is to examine the influence of the Shanghai preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their piano skills usage with preschool students. Therefore, four research questions were presented:

1. What levels of piano training do preschool teachers receive prior to entering college?
2. What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers? What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?
3. How often do preschool teachers use overall functional piano skills in their current teaching practice? How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?
4. Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college?

Preliminary Analyses

The preliminary analyses concerned the evaluation of statistical assumptions underlying the use of multiple regression. Specifically, the focus is on the first part of the fourth research question where the overall usage and perceptions of adequacy of training overall are involved. To begin with, the researcher checked the assumption of linearity. In line with Keith’s (2006) recommendation, the dependent variable should be a linear function of the independent variables. Accordingly, the residuals against the independent variables were plotted to examine whether a lowess fit line comes near to the horizontal line with a mean of zero. This assumption of linearity is met in the study (as shown in Figure 2 and 3 in Appendix B). Besides, the plotting of residuals against the predicted values was also conducted to scrutinize whether the lowess line approached the straight regression line. Again, the lowess line does not suggest any departure
from linearity (as shown in Figure 4 in Appendix B). In short, the data in this study meet the linearity assumption.

Concerning the testing of homoscedasticity assumption, it is recommended that the predicted values be divided into five equal categories to compare the variance of the residuals at each of these five levels (Keith, 2006, p.191). One rule of thumb is that a ratio of high to low variance is less than 10 (Keith, 2006, p.192). For the present study, the ratio of high variance (1.261) to low variance (0.522) is 2.416, less than 10 (as shown in Figure 5 in Appendix B). Thus, the present study also meets the assumption of homoscedasticity. Additionally, the histogram and q-q plot of the residuals also demonstrates that the assumptions of normality of residuals are not violated, as shown in Figure 6 and Figure 7 in Appendix B.

Finally, regression diagnostics focusing on distance, leverage, and influence were also conducted to spot problematic data. It turned out that two unusual cases were singled out as outliers. However, the first analyses with the two extreme cases and second analyses without the two extremes cases did not make much difference as to the result of the main regression analyses. Therefore, the researcher kept the two cases in the study and presented the following results.

As for the other 12 specific piano skills, assumptions for multiple regression have also been tested, and the results showed that sequential regression analyses were reasonable and valid.

Main Analysis

**Research Question 1.** Research Question 1 asks, “What levels of piano training do preschool teachers receive prior to entering college?” A descriptive analysis of the amount of time in learning piano before college was conducted to answer this question (see Table 2).
Table 2
The Amount of Time Spent on Piano Training Received Prior to Entering College (RQ#1)

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>475</td>
<td>83.8</td>
<td>83.8</td>
<td>83.8</td>
</tr>
<tr>
<td>1 year or less</td>
<td>35</td>
<td>6.2</td>
<td>6.2</td>
<td>89.9</td>
</tr>
<tr>
<td>2-3 years</td>
<td>52</td>
<td>9.2</td>
<td>9.2</td>
<td>99.1</td>
</tr>
<tr>
<td>4-6 years</td>
<td>2</td>
<td>.4</td>
<td>.4</td>
<td>99.5</td>
</tr>
<tr>
<td>7-9 years</td>
<td>3</td>
<td>.5</td>
<td>.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>567</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 2, 99.1% preschool teachers reported they had fewer than three years’ piano training before college. Moreover, 475 (83.8%) participants had no piano training experience before college. Thus, the distribution was very positively skewed.

**Research Question 2.** Research Question 2 asks, “What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers? What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?” To address this question, a descriptive analysis of the overall perceived adequacy of college-level piano training relative to overall piano skills and perceived adequacy of college-level piano training relative to 12 skills piano skills. was conducted (see Table 3).
Table 3
The Perceived Adequacy of Acquiring Functional Piano Skills in College-Level Piano Training (RQ#2)

<table>
<thead>
<tr>
<th>Survey Item #16</th>
<th>Number of Teacher Respondents (n)</th>
<th>Percentage of Valid Responses (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inadequate</td>
<td>Somewhat adequate</td>
</tr>
<tr>
<td>Improvisation</td>
<td>75</td>
<td>126</td>
</tr>
<tr>
<td>Playing piano repertoire</td>
<td>97</td>
<td>101</td>
</tr>
<tr>
<td>Accompaniment</td>
<td>53</td>
<td>112</td>
</tr>
<tr>
<td>Sight reading</td>
<td>82</td>
<td>110</td>
</tr>
<tr>
<td>Solo singing with self-accompaniment</td>
<td>65</td>
<td>85</td>
</tr>
<tr>
<td>Composition</td>
<td>97</td>
<td>219</td>
</tr>
<tr>
<td>Score reading</td>
<td>100</td>
<td>68</td>
</tr>
<tr>
<td>Techniques (scales, arpeggios, etc.)</td>
<td>90</td>
<td>93</td>
</tr>
<tr>
<td>Chord progression</td>
<td>93</td>
<td>108</td>
</tr>
<tr>
<td>Harmonization</td>
<td>97</td>
<td>129</td>
</tr>
<tr>
<td>Transposition</td>
<td>98</td>
<td>126</td>
</tr>
<tr>
<td>Modulation</td>
<td>77</td>
<td>163</td>
</tr>
<tr>
<td>Overall functional piano skills</td>
<td>43</td>
<td>123</td>
</tr>
</tbody>
</table>

Note: The mean and standard deviation are based on the following coding: Inadequate (1); Somewhat adequate (2); Adequate (3); Very adequate (4); and Most adequate (5).
According to Table 3, more than 40% of respondents reported higher level (very adequate and higher) in the training of “solo singing with self-accompaniment” and “score reading” than the other specific items.

Among the five response options (inadequate, somewhat inadequate, adequate, very adequate, and most adequate), “adequate” was the most frequently chosen response (i.e., it was the mode) for nine functional piano skills. The training received for “improvisation” was reported to be adequate by 37.4% of the respondents ($M=2.81, SD=1.039$). Similarly, training for “playing piano repertoire” was adequate for 33.2% ($M=2.81, SD=1.094$), “accompaniment” 36.5% ($M=2.99, SD=1.003$), “sight reading” 35.8% ($M=2.85, SD=1.067$), “techniques” 34.6% ($M=2.89, SD=1.110$), “chord progression” 30.7% ($M=2.86, SD=1.131$), “harmonization” 32.5% ($M=2.74, SD=1.109$), “transposition” 35.8% ($M=2.71, SD=1.089$), and “modulation” 39.3% ($M=2.65, SD=0.987$).

The modal response differed for three skills. Reports of “very adequate” were the most common regarding “solo singing with self-accompaniment” 36.2% ($M=3.06, SD=1.063$), “composition” 38.6% ($M=2.46, SD=1.016$) and regarding “score reading” 36.7% ($M=3.00, SD=1.183$). However, 38.6% participants considered “composition” only “somewhat adequate” ($M=2.46, SD=1.016$).

In addition, when asked about the overall perceived adequacy of the functional piano skill training received, over half 51.3% ($M=2.84, SD=0.859$) of the respondents reported it to be “adequate” (the modal response).

**Research Question 3.** Research Question 3 asks, “How often do preschool teachers use overall functional piano skills in their current teaching practice? How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?” A
descriptive analysis of the variables: 1) the overall frequency of using functional piano skills in current teaching practice and 2) the frequency of using 12 functional piano skills in their current teaching practice was conducted (see Table 4).

As shown in Table 4, for seven of the twelve specific skills (“playing piano repertoire,” “composition,” “techniques,” “chord progression,” “harmonization,” “transposition,” and “modulation,”) over 50% of the respondents indicated that they “rarely” or “never” use the skill. “Modulation” was the least often used ($M=2.11, SD=.860$) whereas “Solo singing with self-accompaniment” was the most often used ($M=3.30, SD=1.238$). For five of the specific skills, over 50% of the respondents indicated that they either “sometimes,” “often,” or “very often” use the skill, namely, “Improvisation,” “Accompaniment,” “Sight reading,” “Solo singing with self-accompaniment,” and “Score reading.”

In addition, when asked about their use of functional piano skills overall, only 7.1% reported that these skills were “never” used; yet 37.6% indicated they were “rarely” used. The modal response (42.3%) was that they were “sometimes” used.
Table 4
Usage in Preschool Teaching Practice (RQ#3)

<table>
<thead>
<tr>
<th>Survey Item #17</th>
<th>Number of Teacher Respondents (n)</th>
<th>Percentage of Valid Responses (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>Improvisation</td>
<td>76</td>
<td>202</td>
<td>147</td>
<td>85</td>
</tr>
<tr>
<td>Playing piano repertoire</td>
<td>98</td>
<td>229</td>
<td>163</td>
<td>53</td>
</tr>
<tr>
<td>Accompaniment</td>
<td>48</td>
<td>117</td>
<td>185</td>
<td>146</td>
</tr>
<tr>
<td>Sight reading</td>
<td>72</td>
<td>159</td>
<td>193</td>
<td>98</td>
</tr>
<tr>
<td>Solo singing with self-accompaniment</td>
<td>47</td>
<td>105</td>
<td>173</td>
<td>114</td>
</tr>
<tr>
<td>Composition</td>
<td>165</td>
<td>222</td>
<td>114</td>
<td>47</td>
</tr>
<tr>
<td>Score reading</td>
<td>78</td>
<td>154</td>
<td>160</td>
<td>106</td>
</tr>
<tr>
<td>Techniques (scales, arpeggios, etc.)</td>
<td>173</td>
<td>200</td>
<td>129</td>
<td>46</td>
</tr>
<tr>
<td>Chord progression</td>
<td>117</td>
<td>191</td>
<td>169</td>
<td>67</td>
</tr>
<tr>
<td>Harmonization</td>
<td>115</td>
<td>179</td>
<td>176</td>
<td>72</td>
</tr>
<tr>
<td>Transposition</td>
<td>134</td>
<td>196</td>
<td>137</td>
<td>67</td>
</tr>
<tr>
<td>Modulation</td>
<td>185</td>
<td>205</td>
<td>119</td>
<td>43</td>
</tr>
<tr>
<td>Overall functional piano skills</td>
<td>40</td>
<td>213</td>
<td>240</td>
<td>59</td>
</tr>
</tbody>
</table>

Note: The mean and standard deviation are based on the following coding: Never (1); Rarely (2); Sometimes (3); Often (4); and Very Often (5).
**Research Question 4.** Research Question 4 asks, “Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college?” Sequential multiple regression was conducted to address this question. The regression model includes the control variable (the amount of time spent on piano training received prior to entering college) and influence variable (how adequate preschool teachers feel about their piano skills’ training in college). The control variable enters in the first block; then the influence variable enters; the change in R squared is used to estimate the percentage of variation in the outcome that the influence variable (perceptions of training adequacy) explains (see Table 5).

<table>
<thead>
<tr>
<th>Variables</th>
<th>R Square Change</th>
<th>b</th>
<th>Std. Error β</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvisation</td>
<td>.058</td>
<td>.271</td>
<td>.046</td>
<td>.241</td>
<td>5.937</td>
</tr>
<tr>
<td>Playing piano repertoire</td>
<td>.051</td>
<td>.211</td>
<td>.038</td>
<td>.227</td>
<td>5.526</td>
</tr>
<tr>
<td>Accompaniment</td>
<td>.096</td>
<td>.350</td>
<td>.045</td>
<td>.309</td>
<td>7.734</td>
</tr>
<tr>
<td>Sight reading</td>
<td>.064</td>
<td>.264</td>
<td>.043</td>
<td>.253</td>
<td>6.207</td>
</tr>
<tr>
<td>Solo singing with self-accompaniment</td>
<td>.105</td>
<td>.377</td>
<td>.046</td>
<td>.324</td>
<td>8.129</td>
</tr>
<tr>
<td>Composition</td>
<td>.075</td>
<td>.282</td>
<td>.041</td>
<td>.274</td>
<td>6.817</td>
</tr>
</tbody>
</table>
**Improvisation.** The analyses suggest that preschool teachers’ perception of the adequacy of improvisation may affect the frequency of the usage of improvisation in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of improvisation explains 5.8% of the variance in the frequency of the usage of improvisation in preschool teaching, $\beta=.241$, $t=5.937$, $p<.001$.

**Playing piano repertoire.** The analyses suggest that preschool teachers’ perception of the adequacy of playing piano repertoire may affect the frequency of the usage of playing piano repertoire in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of playing piano repertoire explains 5.1% of the variance in the frequency of the usage of playing piano repertoire in preschool teaching, $\beta=.227$, $t=5.526$, $p<.001$.

**Accompaniment.** The analyses suggest that preschool teachers’ perception of the adequacy of accompaniment may affect the frequency of the usage of accompaniment in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of accompaniment
explains 9.6% of the variance in the frequency of the usage of accompaniment in preschool teaching, \( \beta = .309, t = 7.734, p < .001 \).

**Sight reading.** The analyses suggest that preschool teachers’ perception of the adequacy of sight reading may affect the frequency of the usage of sight reading in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of sight reading explains 6.4% of the variance in the frequency of the usage of sight reading in preschool teaching, \( \beta = .253, t = 6.207, p < .001 \).

**Solo singing with self-accompaniment.** The analyses suggest that preschool teachers’ perception of the adequacy of solo singing with self-accompaniment may affect the frequency of the usage of solo singing with self-accompaniment in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of solo singing with self-accompaniment explains 10.5% of the variance in the frequency of the usage of solo singing with self-accompaniment in preschool teaching, \( \beta = .324, t = 8.129, p < .001 \).

**Composition.** The analyses suggest that preschool teachers’ perception of the adequacy of composition may affect the frequency of the usage of composition in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of composition explains 7.5% of the variance in the frequency of the usage of composition in preschool teaching, \( \beta = .274, t = 6.817, p < .001 \).

**Score reading.** The analyses suggest that preschool teachers’ perception of the adequacy of score reading may not affect the frequency of the usage of score reading in preschool
teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of score reading explains none (0.0%) of the variance in the frequency of the usage of score reading in preschool teaching, $\beta=.021, t=.492, p=.623$.

**Techniques.** The analyses suggest that preschool teachers’ perception of the adequacy of techniques may affect the frequency of the usage of techniques in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of techniques explains 3.3% of the variance in the frequency of the usage of techniques in preschool teaching, $\beta=.181, t=4.374, p<.001$.

**Chord progression.** The analyses suggest that preschool teachers’ perception of the adequacy of chord progression may affect the frequency of the usage of chord progression in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of chord progression explains 3.7% of the variance in the frequency of the usage of chord progression in preschool teaching, $\beta=.193, t=4.661, p<.001$.

**Harmonization.** The analyses suggest that preschool teachers’ perception of the adequacy of harmonization may affect the frequency of the usage of harmonization in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of harmonization explains 4.8% of the variance in the frequency of the usage of harmonization in preschool teaching, $\beta=.220, t=5.439, p<.001$. 
Transposition. The analyses suggest that preschool teachers’ perception of the adequacy of transposition may affect the frequency of the usage of transposition in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of transposition explains 14.2% of the variance in the frequency of the usage of transposition in preschool teaching, $\beta=.379$, $t=9.739$, $p<.001$.

Modulation. The analyses suggest that preschool teachers’ perception of the adequacy of modulation may affect the frequency of the usage of modulation in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ perception of the adequacy of modulation explains 6.0% of the variance in the frequency of the usage of modulation in preschool teaching, $\beta=.246$, $t=6.096$, $p<.001$.

Overall functional piano skills. The analyses suggest that preschool teachers’ overall perception of the adequacy of college-level piano training may affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teachers’ overall perception of the adequacy of college-level piano training explains 9.1% of the variance in the overall frequency of the usage of specific piano skills in preschool teaching, $\beta=.302$, $t=7.549$, $p<.001$.

Chapter Summary

This chapter reports the results of the preliminary and main analyses. The statistical assumptions of multiple regressions were met. Descriptive analyses and multiple regression were employed to address the research questions. In the final chapter the findings are
summarized and related to previous studies, implications are noted, and suggestions for further research are suggested.
This chapter first discusses results of the study as they relate to previous research findings reported in the literature concerning overall and specific functional piano skills. Then it gives implications for instructional practice in college teacher preparation programs, as well as suggestions for future research.

Research Question 1 asks, “What levels of piano training do preschool teachers receive prior to entering college?” This study found that, of 567 participants, 99.1% preschool teachers reported receiving fewer three years’ piano training before college. In addition, 475 (83.8%) participants reported having no piano training experience before college.

This finding is consistent with previous studies involving preschool majors’ lack of musical literacy before college (Chen, 2018; Su, 2016; Sun, 2016; Wang, 2013; Wang, 2016; Yan, 2018; Zhao, 2018). In a study comparing two preschool education programs in Shanghai, Zhao (2018) indicated that as many as 78% of students in one program never received specific music training before college while in the other program, 80% of preschool education majors never received music training prior to college. Yan (2018) in her research concluded that fewer than 10% of preschool teachers were capable of playing certain musical instrument or dancing before college, while Wang (2016) mentioned that only 11% of preschool majors learned musical theories prior to higher education. In general, pre-service preschool teachers are weak in musical theories and practice before entering college due to lack of specific training.

This unsatisfactory current situation may be explained by the following reasons.

For one thing, when the college admissions department decides whether a high school graduate will be admitted by a college preschool education program, musical test is not a
necessity, nor is such musical discipline knowledge is included in National College Entrance Examination (Wang, 2013). Thus, high school graduates may not be motivated to learn music before college.

For another, many pre-service preschool teachers acknowledge not having music fundamental knowledge before college because they missed the optimum learning period. They tended to believe they possessed weak singing capabilities, inflexible fingers or uncoordinated limbs, therefore coping with college music lessons in a negative, passive, and reluctant way (Zhao, 2018).

This weak and uneven music level raises challenges for college teachers in managing their classes. Meanwhile, such problems bring challenges to pre-service preschool teachers on music learning in terms of emotion, methodology, and creativity, leading to their lack of motivation and initiative (Wang, 2013; Jin, 2019).

Research Question 2 asks, “What is the perceived adequacy of college-level piano training relative to overall piano skills according to practicing preschool teachers?”

Generally speaking, as for the overall piano functional skills acquirement in college, 70.7% believed it was “adequate” or more than that (“adequate” + “very adequate” + “most adequate”) ($M=2.84$).

This result validates findings of other researchers who conducted similar studies related to music teachers’ perception on teacher education programs (Ballantyne & Packer, 2004; He, 2009; Ma, 2019; Shumaker, 1978; Su, 2016; Varis, 2012; Yu, 2014; Zhao, 2018). Although 70.7% is a satisfactory number regarding perceived adequacy of overall functional piano skills, yet we want to focus on the room for improvement on college piano instruction so as to give
suggestions to stake holders. Reasons from the following three aspects may account for those findings-- individual students, music teachers, and administrators.

First, the majority of pre-service students majoring in preschool education tended not to have solid foundation on piano before college (Su, 2016), therefore hindering learning motivation when encountering difficulties and boredom in the teacher training process (Zhao, 2018). In addition, aspiring preschool students may hold an unclear understanding of their career paths, without ascertainment of the importance of musical literacy as well as the extent to which the musical quality should be raised up. Consequently, they do not devote enough time and energy as required to develop musical skills.

Second, college music instructors may take partial responsibility in preschool students’ perception of inadequacy in piano skills. College music teachers in preschool preparation programs generally graduate from performance music programs in conservatories, or music schools in comprehensive universities, or music programs in normal universities. Therefore, they may not receive enough training on early childhood music, which would lead to lack of effectiveness in instruction to pre-service preschool majors. Meanwhile, college music teachers, due to a lack of knowledge about early childhood education music education, may set inappropriate goals of piano curriculum, making the difficulty levels higher than the requirement for the field. Therefore, students have to bear the burden or stress of learning more piano skills than necessary for the profession of teacher preschoolers (Zhao, 2018). Music teachers may focus more on theoretical knowledge rather than cultivation of practical playing skills, which may result in students’ lack of piano playing capabilities (Su, 2016).

In addition, college administrators, taking into consideration their budget, cost, and management of limited resources, may arrange group digital piano lessons as the form for piano
courses for pre-service students. Though this kind of collective instruction has reduced the stress of music teachers and been enough for beginners, yet there are deficiencies in this arrangement that the individual students’ potential problems or challenges may be neglected, and the students’ personalities may be suppressed. Thus, this kind of class arrangement is not optimal for developing students’ piano skills (Ma, 2019). Piano classes may be too much for some students, while they may be too little for others (Su, 2016), thus obstructing their motivation for more intense commitment to piano training. Furthermore, for preschool education majors, piano is only one of many courses, ranging from one to four semesters (Sun, 2016; Zhao, 2018). That students take a limited number of units in piano study courses may be another cause that restrains them from sufficient piano training and practice.

Research Question 2 also asks “What is the respective perceived adequacy of college-level piano training relative to 12 functional piano skills according to practicing preschool teachers?” Specifically, 12 piano skills are discussed, as follows.

As for improvisation, 64.6% respondents showed positive perception on adequacy in improvisation skills (adequate + very adequate + most adequate), with mean score being 2.81 out of five, ranking the seventh or eighth (tied with “playing piano repertoire”) among all the 12 piano skills in terms of perceived adequacy in preparation. This result is consistent with findings from Chen’s (2000a) research, an investigation into Taiwan junior high school music teachers’ perceptions of their piano training and the use of the piano in general music teaching. In Chen’s (2000a) study, 169 junior high school music teachers ranked improvisation the eighth among nine piano skills in terms of preparation--score reading, accompaniment, techniques, chord progression, sight reading, improvisation, playing solo repertoire, harmonization, and transposition. Ranking of means by order of preparation of piano skills by junior high school
music teachers is as Table 6, while ranking of means by order of self-perceived adequacy of piano skills usage by present research participants is as Table 7.
### Table 6
*Ranking of Means by Order of Preparation of Piano Skills by Junior High School Music Teachers (Chen, 2000a)*

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Playing solo repertoire</th>
<th>Technical development</th>
<th>Sight reading</th>
<th>Chord progression</th>
<th>Harmonization</th>
<th>Transposition</th>
<th>Accompanying</th>
<th>Improvisation</th>
<th>Score reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

### Table 7
*Ranking of Means by Order of Self-perceived Adequacy of Piano Skills Usage by Present Research Participants*

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Solo singing with self-accompaniment</th>
<th>Score reading</th>
<th>Accompaniment Techniques (scales, arpeggios, etc.)</th>
<th>Chord progression</th>
<th>Sight reading</th>
<th>Improvisation</th>
<th>Playing piano repertoire</th>
<th>Harmonization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>M</td>
<td>3.06</td>
<td>3</td>
<td>2.99</td>
<td>2.89</td>
<td>2.86</td>
<td>2.81</td>
<td>2.81</td>
<td>2.74</td>
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</table>
Similarly, present result is consistent with another study (Chen, 2000b), where 129 in-service kindergarten teachers were asked about usefulness of the music content of their teacher training programs in South Taiwan. The general mean score for improvisation (together with composition) is 2.8 out of four. Generally speaking, though kindergarten teachers are not fully confident in improvisation (Ebbeck, Yim, & Lee, 2008), the overall response indicates that general circumstance is fairly good, as more than half of respondents reported positive perception on adequacy in this field.

In terms of playing piano repertoire, 65.1% respondents showed positive perception on adequacy in playing piano repertoire (adequate + very adequate + most adequate), with mean score being 2.81 out of five, ranking the seventh or eighth (tied with “improvisation”) among all the 12 piano skills in terms of perceived adequacy in preparation. This finding, however, is inconsistent with Chen’s (2000a) research about Taiwan junior high school music teachers’ perception, which ranked “playing piano repertoire” the first among nine piano skills. Chen’s (2000a) study showed more adequacy in repertoire playing, which can be explained by the participants’ background difference. In Chen’s (2000a) study, among all the respondents, 83.33% were music majors in college, during which approximately 40% were piano majors, who took an average of seven semesters of piano instruction and 91.06% indicated that they had private lessons prior to college, while only 5.59% had no previous piano training. For participants who had prior piano training, the average years of piano study duration was 10 years.

However, in this present study, as indicated in results of Research Question 1, 83.8% of participants had no piano training experience before college. Therefore, respondents from Chen’s (2000a) study tended to be more proficient and competent in piano playing, and reported
high perceived adequacy in playing piano repertoire. This explanation can also be applied to the discrepancy between the respondents in the two studies in terms of techniques (scales, arpeggios, etc.) \( M = 2.89 \), harmonization \( M = 2.74 \), and modulation \( M = 2.65 \).

Accompaniment is an effective method of enlivening the kindergarten class atmosphere, attracting children’s attention, arousing enthusiasm and optimizing learning effect (Sun, 2016). In this study, 70.9% respondents showed positive perception on adequacy in accompaniment skills, with mean score being 2.99 out of five, ranking the third among all the 12 piano skills in terms of perceived adequacy in preparation. This result echoes Chen’s (2000b) finding that the mean score for accompaniment is three out of four among kindergarten teachers in South Taiwan, and accompaniment ranks the fifth in Chen’s (2000a) research for junior high school teachers in Taiwan. Generally speaking, the perception for accompaniment is fairly adequate.

Regarding sight reading, 66.1% respondents showed positive perception on adequacy in sight reading, with the mean score being 2.85 out of five. It ranks the sixth among all the 12 piano skills in terms of perceived adequacy in preparation. Respondents tended to feel neutral in their piano preparation in teacher training. However, junior high school respondents in Chen’s (2000a) study were more positive, ranking sight reading the third among nine. Reasons that justify the difference may be the same as mentioned above. Respondents embodied more solid training experience and background, thus showing more competence in sight reading.

When talking about solo singing with self-accompaniment, an essential skill for kindergarten teachers (Chen, 2018; Sun, 2010a), 73.6% respondents showed positive perception on adequacy in solo singing with self-accompaniment, with mean score being 3.06 out of five. It ranks the first among all the 12 piano skills in terms of perceived adequacy in preparation. The cultivation of solo singing with self-accompaniment skill requires the integration of instrument
playing, solfeggio, music theory, and accompaniment improvisation (Zhu, 2014). The fact that respondents in this research reported perceived adequacy in this aspect indicates satisfactory and effective training on basic theoretical and practical skills for pre-service preschool major students in Shanghai, China.

As for composition, 44.3% respondents showed positive perception on adequacy in composition skills, with the mean score being 2.46 out of five. It ranks the last among all the 12 piano skills in terms of perceived adequacy in preparation. This result is consistent with a study by Ebbeck, Yim, and Lee (2008), who concluded low level of confidence in composing (together with improvisation) among early childhood teachers in Hong Kong. Also, Zhao (2018) found preschool education students in college were weak on average in composition in her comparative study of two college preschool education programs in Shanghai, China.

Kindergarten teachers’ composition skills are helpful in cultivating children’s creativity and facilitating language development. However, considering the kindergarten teachers’ abilities, Sun (2010a) suggested that composition is limited to the adaption of lyrics rather than creation of melody. Ma (2019) also mentioned that, in the reform of college preschool education programs, pre-service teachers are encouraged to attempt to compose music pieces in order to deepen their understanding of piano rather than a necessity. In addition, students’ lack of a solid piano foundation and creativity training may explain this circumstance.

Score reading, as the basic music theoretical knowledge, is the premise of learning music (Sun, 2010a; Zhao, 2014). Kindergarten teachers should be able to read scores (Sun, 2010a). In kindergarten books, music is marked with numbered musical notation, while in college preschool education programs both vocal music or piano classes, the musical staff is used to enhance piano playing ability (Zhao, 2018).
In this present study, 70.4% respondents showed positive perception on adequacy in accompaniment skills, with the mean score being 3.00 out of five. It ranks the second among all the 12 piano skills in terms of perceived adequacy in preparation. This result is consistent with Zhao’s (2018) finding, which shows excellent score reading skills among preschool education majors.

As for chord progressions, 64.6% respondents showed positive perception on adequacy in accompaniment skills, with the mean score being 2.86 out of five, ranking the fifth among all the 12 piano skills in terms of perceived adequacy in preparation. This result is consistent with Chen’s (2000a) research, where chord progression ranks the sixth among nine piano skills for junior high school music teachers in Taiwan. Both studies showed fair perceived adequacy among in-service teachers in this aspect.

In terms of transposition, 60.5% respondents showed positive perception on adequacy in accompaniment skills, with the mean score being 2.71 out of five, ranking the tenth. This result is consistent with Chen’s (2000b) research, where transposition averages 2.6 out of four among kindergarten teachers in south Taiwan. Both studies showed fair perceived adequacy among in-service kindergarten teachers in this aspect.

Research Question 3 asks, “How often do preschool teachers use overall functional piano skills in their current teaching practice?”

Generally speaking, 55.3% kindergarten teachers reported applying 12 functional piano skills at work “sometimes” or more than that (“sometimes” + “often” + “very often”) on a five point Likert scale ($M=2.64$). This finding implies big room for improvement on overall functional piano usage in kindergarten settings, echoing previous research by Zhao (2014), who focused on the evaluation on preschool education program majors of the extent to which music
knowledge and skills acquired in college will be applied in kindergarten fieldwork in Xinjiang Province, China. Among 318 respondents, 42% showed negative expectation on application of what they learned to their practical fieldwork, with only 28.5% holding positive belief.

One reason that accounts for this unsatisfactory current situation may be that some preschool education graduates find it difficult to meet the practical demand at kindergarten. They feel at a loss and incapable during the transition from students to in-service teachers, without knowing how to apply the knowledge they learned in college or how to solve problems (Zhao, 2018). This condition could explain the gap between instructional content in college music class and practical teaching in kindergarten at work. Meanwhile, extensive usage of multimedia technology in kindergarten, on one hand, is helpful in relieving the teachers’ burden, while on the other hand, reduces frequency in piano usage, thus depriving teachers’ opportunities in practicing piano playing. These opportunities could have been used to enhance the teachers’ musical competence. Compared with multimedia devices, the sound of real piano provides a more immersive and entertaining atmosphere, which is helpful in attracting preschoolers’ attention and provide appropriate stimuli for the development of their sense of hearing. Zhou (2018) proposed that kindergarten teachers develop their musical literacy in ways that are progressive and developmental. Practice at work, with application and reflection, is an important way for kindergarten teachers to consolidate their own musical literacy.

Research Question 3 also asks “How often do preschool teachers use 12 functional piano skills in their current teaching practice respectively?”

As for improvisation, “rarely” outweighs the other four options (“never”, “often”, “very often”), taking up 35.6%; its mean score is 2.73 on a five point Likert scale, ranking the fifth among all the 12 piano skills in terms of frequency in preschool teaching practice. This finding
is consistent with Chen’s (2000a) research about Taiwan junior high school music teachers, who ranked improvisation the sixth among nine piano skills in terms of usage importance at work. Ranking of means by order of importance of piano skills usage by junior high school music teachers is as Table 8, while ranking of means by order of usage frequency of piano usage skills by present research participants is as Table 9.
Table 8. 
Ranking of Means by Order of Importance of Piano Skills Usage by Junior High School Music Teachers (Chen, 2000a)

<table>
<thead>
<tr>
<th></th>
<th>Accompanying</th>
<th>Harmonization</th>
<th>Sight reading</th>
<th>Transposition</th>
<th>Chord progression</th>
<th>Improvisation</th>
<th>Technical development</th>
<th>Playing solo repertoire</th>
<th>Score reading</th>
</tr>
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<tbody>
<tr>
<td>Ranking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
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</table>

Table 9
Ranking of Means by Order of Frequency of Piano Skills Usage by Present Research Participants

<table>
<thead>
<tr>
<th></th>
<th>Solo singing with self-accompaniment</th>
<th>Accompaniment</th>
<th>Score reading</th>
<th>Sight reading</th>
<th>Improvisation</th>
<th>Harmonization</th>
<th>Chord progression</th>
<th>Playing piano repertoire</th>
<th>Transposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
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<tr>
<td>M</td>
<td>3.3</td>
<td>3.13</td>
<td>2.88</td>
<td>2.8</td>
<td>2.73</td>
<td>2.49</td>
<td>2.45</td>
<td>2.43</td>
<td>2.42</td>
</tr>
</tbody>
</table>
Respondents in both Chen’s (2000a) study and this present study feel neutral about improvisation, which is also the case in chord progression ($M=2.45$). Further, improvisation was rarely used by college faculty members, professional performers, and private music teachers in America (Young, 2013), even though the Manhattanville Music Curriculum Program encourages creativity in student activities, including improvising and composing with novel musical techniques (Madsen & Kuhn, 1994). However, in Christensen’s (2000) study, improvisation was frequently used among elementary general music teachers in America. In her study, up to 30.88% reported daily usage and 26.74% monthly usage of improvisation. Possible reasons that account for the inconsistency may be explained by the difference between target students and teachers’ competence. Young’s (2013) research focuses primarily on college faculty members, professional performers, and private music teachers, whose work tends to be relatively fixed and less flexible. These musicians don’t have need to perform improvisation in their trades. However, in Christensen’s (2000) study, elementary general music teachers have to maintain an active and flexible environment for lively pupils, so improvisation is used more often. However, in this study and Chen’s research, low usage of improvisation may be attributed to a lower level of competence.

Regarding playing piano repertoire, “rarely” outweighs the other four options, at 40.4% with a mean score of 2.43 on a five point Likert scale, ranking eighth among the 12 piano skills in terms of frequency of use in preschool teaching practice. This finding is consistent with Chen’s (2000a) research with Taiwan junior high school music teachers, who ranked playing piano repertoire the eighth among nine piano skills in terms of usage frequency at work. This finding echoes Christensen’s (2000) study, where elementary general music teachers never or rarely use playing piano repertoire. This low frequency can be attributed to class instruction
demands. Students need guidance and facilitation instead of teachers’ solo performance of his or her own repertoire. In addition, teachers in either kindergarten or elementary school must adapt to their students’ pace, which is constantly changing. Therefore, the rehearsal of specific pieces of music in the repertoire in advance is not necessary or requested. Further, teachers’ heavy reliance on multimedia during instruction contributes to this phenomenon.

In terms of accompaniment ($M=3.13$), sight reading ($M=2.8$), and score reading ($M=2.88$), “sometimes” outweighs the other four options. This finding is consistent with other studies (Chen, 2000; Christensen, 2000; Young, 2013), all of which reported highly frequent usage of accompaniment, and may be explained by the use of flexible teaching content. As mentioned above, the class organization should be student centered, where teachers provide facilitation and guidance as needed. Thus, the skill of piano accompaniment is frequently used to cater to the students’ flexible need during class sessions.

Regarding solo singing with self-accompaniment ($M=3.30$), “sometimes”, at 30.5%, outweighs the other four options. It ranks as the highest among all 12 piano skills in terms of frequency in preschool teaching practice. This finding indicates high demand for the preschool teacher to sing while self-accompanying to provide modeling to lead the whole class. This skill is also necessary in creating lively environment that engages the students’ attention and participation.

In terms of composition ($M=2.18$) and modulation ($M=2.11$), “rarely” outweighs the other four options. This finding is consistent with other studies (Christensen, 2000; Young, 2013), all of which reported rare usage in both the elementary and college classroom. This circumstance can be attributed to a low demand for these skills during instruction. In class, the
skills of composition and modulation find no place to manifest unless under special circumstances such as the employment of Dalcroze teaching philosophy.

Concerning techniques (scales, arpeggios, etc.) \( M=2.19 \), and transposition \( M=2.42 \), “rarely” outweighs the other four options. It ranks the tenth and ninth, respectively, among all the 12 piano skills in terms of frequency in preschool teaching practice, indicating low or moderate usage. This finding is consistent with results from Chen (2000a) and Christensen (2000). However, this item is regularly used as indicated in Young’s (2013) research, implying that frequent use of techniques in piano playing among college music faculty members, professional performers, and private teachers, groups of musicians who possess high level skills in piano playing and have the demand and opportunities to use these piano skills.

Similarly, for harmonization \( M=2.49 \), “rarely”, was indicated at 31.6% and “sometimes” 31%. Harmonization ranks sixth among the 12 piano skills in terms of frequency in preschool teaching practice. This finding is consistent with results from Young (2013), who reported medium usage of harmonization among musicians with high level skills. However, Chen (2000a) and Christensen (2000) reported regular and daily usage of harmonization among junior high school music teachers in Taiwan and elementary general music teachers in America. Possible reasons for these findings are that respondents in this present study indicated low perceived adequacy in harmonization, therefore displaying low usage in practice, while participants in Chen’s (2000a) and Christensen’s (2000) studies found the development of a solid foundation in piano, and that their respondents received music training before college. Thus, they showed more frequent usage of this skill at work. The subjects in Young’s (2013) research possessed advanced level of music skills; their occasional usage of harmonization may be the result of a lack of demand in their position.
Research Question 4 asks, “Does preschool teachers’ overall perception of the adequacy of college-level piano training affect the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college? Does preschool teachers’ perception of the adequacy of college-level piano training affect the frequency of the usage of 12 specific piano skills in preschool teaching respectively, after controlling for the amount of time spent on training received prior to entering college?”

The analysis indicates that preschool teachers’ overall perception of the adequacy of college-level piano training significantly affects the overall frequency of the usage of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. Specifically, preschool teacher’s overall perception of the adequacy of college-level piano training explains 9.1% of the variance in the overall frequency of the usage of specific piano skills in preschool teaching, $\beta=.302$, $t=7.549$, $p<.001$. Such significant correlation is also true to specific piano skills, except score reading.

The perceived adequacy of college-level piano training, either low or high, indicates students’ competence in music, and this study focuses on kindergarten teachers who have fewer than five years of teaching experience after college. Their musical literacy can be represented by their perceived adequacy of piano training in college. In other words, the usage frequency depends on competence, which was gained primarily in college.

The reason why no significant correlation is found in score reading might be explained by in the use of two music notation systems. In kindergarten books, music is marked with numbered musical notation which has been widely used in K-12 education in China, while in college preschool education programs, either in vocal music or piano class, the musical staff is
used to enhance piano playing ability. Therefore, the perceived adequacy of score reading in college piano training is not significantly related to its usage frequency at work.

In addition, preschool teacher’ perception of the adequacy of college-level piano training in transposition explains 14.2% of the variance in the frequency of the usage of transposition skill in preschool teaching, $\beta=.379$, $t=9.739$, $p<.001$.

Transposition shows the strongest connection among 12 specific skills. This might be attributed to lack of use in kindergarten teaching and perceived inadequacy in college piano training. Transposition refers to playing an entire piece of music in a different key, which is of extensive use in kindergarten instruction as children’s larynx is still developing, with limited register. Therefore, preschool teachers have to adjust the key of the score to cater to children’s level in playing piano. However, according to the result of present research, 39.5% (inadequate + somewhat adequate) reported self-perceived inadequacy while 58.2% (never + rarely) reported lack of frequency in using transposition in kindergarten teaching settings. The ranks of perceived adequacy and frequency in kindergarten instruction usage are also similar, 10th and 9th respectively, among all 12 specific piano skills. Consequently, transposition shows the strongest connection among 12 specific skills.

Solo singing with self-accompaniment shows a strong connection among 12 specific skills except transition. Preschool teacher’ perception of the adequacy of college-level piano training in solo singing with self-accompaniment explains 10.5% of the variance in the frequency of its usage in preschool teaching, $\beta=.324$, $t=8.129$, $p<.001$. According to the result of present research, 73.6% (adequate + very adequate+ most adequate) reported self-perceived adequacy while 73.2% (sometimes + often + very often) reported frequent usage in using solo singing with self-accompaniment in kindergarten teaching settings. The ranks of perceived adequacy and
frequency in kindergarten instruction usage are also similar, both being the first, among all 12 specific piano skills. This suggests intensive training in solo singing with self-accompaniment in college music courses, and common usage in kindergarten teaching practice. Solo singing with self-accompaniment is frequently used in kindergarten settings as it is an effective teaching method in attracting preschoolers’ attention, warming up atmosphere, and providing stimuli for children’s sensory development. Accordingly, in some college preschool education programs, solo singing with self-accompaniment receives special emphasis that it is separated as a unique course. Consequently, solo singing with self-accompaniment shows a strong connection among 12 specific skills.

Accompaniment also shows a relative strong connection among 12 specific skills. Preschool teacher’s perception of the adequacy of college-level piano training in accompaniment explains 9.6% of the variance in the frequency of the usage of accompaniment skill in preschool teaching, $\beta=.309$, $t=7.734$, $p<.001$.

According to the result of present research, 70.9% (adequate + very adequate+ most adequate) reported self-perceived adequacy while 70.8% (sometimes + often + very often) reported frequent usage in using solo singing with self-accompaniment in kindergarten teaching settings. The ranks of perceived adequacy and frequency in kindergarten instruction usage are also similar, being the 3rd and 2nd respectively, among all 12 specific piano skills.

Accompaniment has similar functions as solo singing with self-accompaniment, an effective approach in children’s music education. In college preschool education programs, accompaniment is an important section in cultivating preschool majors’ musical literacy. Consequently, solo singing with self-accompaniment shows a strong connection among 12 specific skills.
Implication for Instructional Practice

The findings of this study have implications for researchers, teachers and colleges/university teacher preparation programs, school administrators and policymakers for the Ministry of Education in China.

Teaching Content Should Be Enriched

The primary impact of comprehensive musicianship was on college-level music curricula (Madsen & Kuhn, 1994). Only with appropriate teaching materials can preschool education majors’ piano skills be improved. Students in preschool teacher preparation programs should be, according to levels in piano playing practice, provided with various repertoires, as well as nursery rhymes for future use in kindergarten (Ma, 2019; Wu, 2014b; Yan, 2018; Zhu, 2014). College music teachers should also inform pre-service preschool majors of the importance of musical competency, revolving musical literacy and piano skills (Jiang & Yan, 2018). Teaching content should be enriched in music courses if additional credit hours for piano study are not permitted (Zhao, 2018).

Musical Course Arrangement Should Be Reformed

In some music courses in early childhood programs, musical theories and knowledge are emphasized but students may not have the opportunities to practice the skills (Liu, 2019), due to the limited number of units in piano study course as well as in fieldwork and internship opportunities. However, pre-service preschool teachers must acquire a foundation in musical literacy that is necessary in leading kindergarten musical activities with their future students (Sun, 2010a). In order to achieve this goal, Li and Wang (2018) proposed a new pattern for preschool majors, in which multiple musical skills are integrated in one class -- singing performance, keyboard instrument playing, dancing, and comprehensive acting practice, so that
pre-service preschool students have multiple opportunities to practice instrument playing, singing, and choreography to educate kindergarten children (Jin, 2019; Zhang, 2019).

**Teaching Effectiveness Should Be Increased**

In order to reform piano instruction in preparing preschool education majors, college music teachers should transform teaching philosophy from a teacher-centered pattern to a student-centered focus, understanding and respecting students, to improve pre-service preschool teachers’ musical literacy (Ma, 2019). Jiang and Yan (2018) asserted the value of structuring instruction with competence-based grouping to promote teaching effectiveness and facilitate student engagement. This teaching method revolves around the same content. College piano teachers adopt various instruction forms and flexible assignments, based on student groups’ individual learning pace and competence (Su, 2016). Wang (2016) recommends encouraging groups to present art performances by integrating piano, singing, dancing and other percussion instruments skills to make up a mini-musical. Thus, students may experience happiness in learning, cultivate autonomous learning motivation, and achieve mastery musical knowledge and skills through a comprehensive method of practice.

**Curriculum Evaluation System Should Be Improved**

A comprehensive and scientific evaluation system in learning effect is required for college music education (Wang, 2013). Evaluation methods can be diversified for musical courses in college. First, preschool education majors’ self-evaluation and peer evaluation can be complementary parts of the learning evaluation system. Formative and summative evaluation may be used in assessing student progress. Second, considering the imbalance of college student initial musical literacy levels, other aspects such as the extent of hard work could be incorporated into the rubrics of evaluation, rather than result-oriented (Zhao, 2018).
College musical teachers should monitor preschool education student progress of piano study, and give immediate feedback and encouragement, regardless of their level prior to college (Wang, 2016). This will be useful as students develop initiative and motivation in musicianship, and piano skills.

Suggestions for Further Research

Building Contemporary Nursery Rhyme Repertoire

Nursery rhymes typically include simple melodies and concise structure (Sun, 2016). It is essential to investigate the current situation of contemporary nursery rhymes in preschool education for college instructors and curriculum designers to build a repertoire for future preschool teachers to learn in their college music courses, and use in the preschool setting.

Investigating the Development in College of Other Musical Performance Skills in Relation to Frequency in Usage

This study focuses on pre-service preschool teachers’ piano skills. Recommendations for future study include investigating preschool teachers’ use of other musical performance skills, such as vocal singing, dancing, conducting, creativity, etc. in relation to the perceived adequacy of preparation during the college program and their frequency of use in teaching. In practice, kindergarten teachers may use a variety of musical skills besides functional piano playing, including music theory (Wang, 2016), aural skills (Zhao, 2014), music appreciation (Wang, 2013; Wang, 2016; Zhao, 2014), music history (Zhao, 2014), vocal performance (Chen, 2018; Fan, 2018; Li & Wang, 2018; Sun, 2016), vocal technique (Li & Wang, 2018; Sun, 2010a), singing technique for children (Chen, 2018), sight singing (Sun, 2016), form analysis (Sun, 2010a), percussion skills (Sun, 2016), choral pedagogy, dancing with singing (Wu, 2014a), limb coordination practice (Sun, 2016) and so forth. These are all potential areas to explore regarding
kindergarten teachers’ perceived adequacy in preparation in college, and instructional usage in the preschool setting.

**Improving Efficiency of Group Piano Teaching.**

Piano teaching in education majors in Chinese normal universities tend to be through groups, considering limited budget, faculty, and space. This kind of group piano instruction usually allows dozens of education majors to have piano class together in one classroom, with each of them equipped with an electronic piano. Though Fisher (2010) discussed benefits of group piano instruction, there is room to discuss ways of optimizing teaching effect in Chinese college preschool education preparation settings. Future instruction reform, under the circumstance of group piano instruction, may focus on the investigation of music course orientation and aim including course lists, learning content, repertoire selection, credit hours, semester arrangement, etc. In addition, in order to reach the learning targets, both teachers and students need to be clear about the expectations for piano skills development and required levels of competence. The construction of musical courses for preschool education majors ought to break outdated patterns that emphasize skills training while neglecting basic knowledge learning. Further research might indicate learning plans designed to optimize course sequencing and articulation of piano skills development over time, particularly during the junior and senior years.

Wang (2016) recommends that certain courses, particularly musical theory, music appreciation, accompanying for nursery rhymes, composing children’s songs, and creating dances with preschool children should be offered in developmentally appropriate sequence in preschool education preparation programs.
Further academic research should revolve around the exploration and evaluation of the reform practice on musical courses regarding teacher instruction and student learning in college preschool education preparation programs.

**Limitations of the Study**

This study is limited by the educational and operational contexts in Shanghai, China. The participants selected for this current study were preschool teachers from sixteen districts and one county in the city of Shanghai, China. No other region of or city in China was studied in this particular project. In-service preschool teachers who participated in this study were preschool education majors and had graduated from the following one of the preschool education institution in Shanghai, China: East China Normal University, Preschool and Special Education School (for associate degree), East China Normal University, Preschool and Special Education School (for the Bachelor’s degree), Shanghai Normal University, College of Education, Shanghai Xingjian College, Shanghai Normal University Tianhua College, Xianda College of Economics and Humanities, Shanghai International Studies University. The above six preschool education programs mainly cultivate and train undergraduate pre-service preschool teachers in the group piano setting.

In addition, kindergartens where preschool graduates serve in Shanghai mainly include model kindergartens, first-class kindergartens, second-class kindergartens and undetermined grade kindergartens, which are under the direct authority of local government educational departments regulated by the unified leadership approach of the central governmental educational department, and employ a hierarchical management approach. In accordance with Chinese educational contexts and cultural settings, twelve functional piano skills were applied to
conduct this study. This inquiry was designed to look at impacts, but because it is correlational research, we acknowledge that other factors are another accounted for.

As for some expressions in methodology, although for the sake of communication, we speak in terms of impact and effect, this study is correlational research. This research is designed to look at impacts, but because it is correlational research, we acknowledge that other factors are another accounted for.

Another limitation inherent in this study is the sampling strategy used. The researcher used cluster sampling, and this may limit the ability to generalize data to a larger, more diverse target population. Another limitation of the present study is that it focused on only one type of participant - preschool teachers who had graduated from six preschool teacher preparation programs in Shanghai, China. The viewpoints of preschool principals and the deans of the college or university schools of education where the teachers had been trained were not taken into account here when exploring the application of functional piano skills. Thus, the result of the study may not provide a truly holistic picture of the application of functional piano skills in preschool teaching.

**Conclusion**

The purpose of this study is to examine the influence of the Shanghai preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their piano skills usage with preschool students.

Using descriptive analyses and sequential multiple regression, the researcher found that of 567 participants, 99.1% preschool teachers reported receiving fewer three years’ piano training before college. The analysis indicates that preschool teachers’ overall perception of the adequacy of college-level piano training significantly affects the overall frequency of the usage
of specific piano skills in preschool teaching, after controlling for the amount of time spent on training received prior to entering college. This positive influence is also applicable to 12 functional piano skills respectively except for “score reading”.

This present study demonstrated preschool education majors’ lack of musical literacy before college. It also supplements the research literature regarding self-perceived adequacy of preschool education undergraduate piano skills training and the frequency of piano skills usage in preschool teaching, particularly in China’s setting. The results of the study suggest that improvement be made in terms of enriching college instruction content, increasing teaching effectiveness, reforming curriculum evaluation, and restructuring musical course arrangement.

Piano instruction plays an important role in college preschool preparation programs. It is essential to improve the quality of piano study courses for the sake of kindergarten teachers and ultimately the children in the future.
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College Music Symposium, 22(2), 103-109.


APPENDIX A: INFORMED CONSENT
(English/Chinese Versions)

QUESTIONNAIRE FOR PRESCHOOL TEACHERS’ PIANO SKILLS
IN SHANGHAI, CHINA

Dear Preschool Teacher,

You are invited to participate in a survey study - “Preschool teachers in Shanghai, China: Pre-service piano skill development, perception of adequacy, and current instructional usage.” The study is conducted by Chenyan Dai, candidate for the degree Doctor of Education at the University of the Pacific, Gladys L. Benerd School of Education. You were selected as a possible participant in this study because you are a preschool teacher in Shanghai, China.

The purpose of this study is to examine the influence of the Shanghai preschool teachers’ perceptions of the adequacy of their undergraduate piano skills training on the frequency of their piano skills usage with preschool students. Your participation in the survey will be of benefit to educators, researchers and policy makers to create reasonable, effective and targeted piano training classes and detailed functional piano skills to better meet the needs of preschool teachers. It will take you approximately 10-20 minutes to complete this survey.

There is minimal risk of participation in this study for you. You may feel some anxiety when completing the survey if, for example, you do not feel your training or usage of piano skills is sufficient. You may skip any items you do not care to answer and can discontinue answering if you choose to. There is a very remote chance that you could be identified with your responses obtained by someone other than myself or my advisor, because the data will be safeguarded. Thus, these are minimal risks and do not exceed the risks encountered in daily living. There will be no costs and benefits from participation. The participants’ information will be coded, and all the data gathered in the course of the research study will be treated as confidential. The author will use pseudonyms for the preschool sites, and set password to protect the computer files, and hold physical documents in locked file cabinets. No one other than the researcher and her research project associates will be given access to the research materials. Your participation is entirely voluntary, and you may withdraw at any time. You may also decline to participate. You will not be penalized or loss of benefits in any way for withdrawing or declining.

This study has been reviewed and approved by University of the Pacific Institutional Review Board (IRB). If you have any questions or concerns about your human rights as a research participant, you may call the Office of Research & Sponsored Programs, University of the Pacific (209)946-3903, or email my faculty advisor Dr. Ruth Brittin at rbrittin@pacific.edu or Dr. Elizabeth Keithcart at ekeithcart@pacific.edu. If you have any questions or provide any additional information related to this topic, please feel free to call Chenyan Dai at 15900500560 or send an email to 154309482@qq.com. Thank you in advance for your consideration and support.

SIGNATURES

Your signature indicates that you voluntarily agree to be a part of the study, that the details of the study have been explained to you, that you have been given time to read this
document, and that your questions have been answered. You will receive a copy of this consent form for your records.

**Participant Signature**

______________________________________________

Participant’s Signature  Date
知情同意书

学前教师钢琴技能水平调查

上海，中国

亲爱的幼儿园老师：

您被邀请参与高校音乐课程中钢琴技能习得情况，以及幼儿园音乐活动中钢琴技能使用情况的调查。我是戴沉雁，是美国太平洋大学教育学院的一名博士生。因为您是中国上海的幼儿教师，因此您被选为本次研究的参与者。

本研究的目的是了解高校学前教育专业音乐课程中钢琴技能训练程度对幼儿教师钢琴技能使用频率的影响。您参与本次调查将有利于高校音乐教育工作者，教育研究者和教育决策者更好地思考并开展高校音乐课程教学改革，从而设计合理有效，更有针对性的高校音乐课程，更好地满足幼儿教师的职业需求。完成这项调查问卷大概需要10-20分钟。

参与这项研究的风险很小，除了本人和我的导师以外，没有人可以获得研究资料和结果。参与者的数据将得到安全保护，信息将被编码，研究过程中收集的所有数据将被视为保密信息，并且设置密码保护计算机文件，并将纸质文档保存在锁定的文件柜中。因此，这些信息泄露的风险很小，不会有任何日常生活中遇到的风险。

如果您觉得在调查时有所不适，或感到有些焦虑，您可以跳过任何你不喜欢回答的项目或者停止回答。参与本研究不需要您付出成本，也不会获得物质奖励。您的参与完全是自愿的，不会因为退出或婉拒而受到任何处罚或损失利益。

这项研究已经由太平洋机构审查委员会（IRB）审查并批准。如果您对研究参与者的人权有任何疑问或担忧，可致电太平洋大学研究与赞助项目办公室（209）946-3903、本人导师Ruth Brittin博士或者Elizabeth Keithcart博士，她们电子邮箱分别为rbrittin@pacific.edu以及ekeithcart@pacific.edu。如果您有任何问题或对研究结果感兴趣，可以电话联系15900500560或发送电子邮件154309482@qq.com。再次感谢您的支持和配合。

您的签名表明您已经阅读本知情书，并愿意参与本次研究。

签名

日期
APPENDIX B: INVESTIGATION OF STATISTICAL ASSUMPTIONS

Figure 2. Linearity assumption: unstandardized residual plotted against prior training time scores.
Figure 3. Linearity assumption: unstandardized residual plotted against overall functional piano skills.
Figure 4. Linearity assumption: unstandardized residual plotted against unstandardized predicted values of overall frequency of the usage of specific piano skills.
### Report

**Unstandardized Residual**

<table>
<thead>
<tr>
<th>NPRE_1 predicted</th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.305949</td>
<td>150</td>
<td>0.87003287</td>
<td>0.757</td>
</tr>
<tr>
<td>2</td>
<td>0.3293897</td>
<td>16</td>
<td>1.12301808</td>
<td>1.261</td>
</tr>
<tr>
<td>3</td>
<td>-0.0630658</td>
<td>236</td>
<td>0.75725842</td>
<td>0.573</td>
</tr>
<tr>
<td>4</td>
<td>-0.0989996</td>
<td>52</td>
<td>0.72251090</td>
<td>0.522</td>
</tr>
<tr>
<td>5</td>
<td>0.0900181</td>
<td>113</td>
<td>0.84001830</td>
<td>0.706</td>
</tr>
<tr>
<td>Total</td>
<td>0.0000000</td>
<td>567</td>
<td>0.81543928</td>
<td>0.665</td>
</tr>
</tbody>
</table>

*Figure 5.* Homoscedasticity assumption: comparison of the variance of residuals for different levels of predicted overall functional piano skills frequency.
Figure 6. Normality of residuals assumption: histogram
Figure 7. Normality of residuals assumption: q-q plot.
APPENDIX C: THE INSTRUMENT

Questionnaire

Please fill out this form completely. The following information is very useful to my study on knowing about your piano skills learned in college and how these skills are used in your kindergarten. The information you provide will help me improve the current piano education in college. All the information you provide is confidential. Thank you very much.

1. What is your age?
   (1) 21-25
   (2) 26-30
   (3) 31-35
   (4) 36-40
   (5) 41-45
   (6) 46-50
   (7) Above 50

2. What is your gender?
   (1) Female
   (2) Male

3. What is the highest degree you have earned?
   (1) Below associate degree
   (2) Associates degree
   (3) Bachelor’s degree
   (4) Master’s degree
   (5) Doctoral degree

4. From which of the following colleges/universities did you graduate?
   (1) East China Normal University, Preschool and Special Education School (for associate degree)
   (2) East China Normal University, Preschool and Special Education School (for bachelor’s degree)
   (3) Shanghai Normal University, College of Education
   (4) Shanghai Xingjian College
   (5) Shanghai Normal University, Tianhua College
   (6) Xianda College of Economics and Humanities, Shanghai International Studies University
5. To what district (region) does your preschool belong?
(1) Huangpu District
(2) Xuhui District
(3) Changning District
(4) Jing’an District
(5) Putuo District
(6) Hongkou District
(7) Zhabei District
(8) Yangpu District
(9) Minhang District
(10) Baoshan District
(11) Qingpu District
(12) Songjiang District
(13) Jiading District
(14) Fengxian District
(15) Jinshan District
(16) Pudong District
(17) Chongming County

6. Do you work in public preschool or private preschool?
(1) Public preschool
(2) Private preschool

7. In what type of preschool do you work?
(1) Model preschools at city level
(2) Model preschools at district level
(3) First-class preschools
(4) Second-class preschools
(5) Undetermined grade preschools

8. How many years have you taught preschool?
(1) Less than one year
(2) One year
(3) Two years
(4) Three years
(5) Four years
(6) Five years

9. What type of piano training did you receive prior to entering college?
(1) No training
(2) Group piano lessons
(3) Private lessons
(4) Both private and group piano lessons
10. How many years did you receive piano training prior to entering college?
   (1) None
   (2) 1 year or less
   (3) 2-3 years
   (4) 4-6 years
   (5) 7-9 years
   (6) 10-12 years
   (7) Over 12 years

11. Have you ever taken the Piano Test for Amateur in Shanghai, China?
   (1) Yes (Please do Item 12)
   (2) No (Please do Item 13)

12. What level of Piano Test have you passed before you were admitted to college?
   (1) Level 1
   (2) Level 2
   (3) Level 3
   (4) Level 4
   (5) Level 5
   (6) Level 6
   (7) Level 7
   (8) Level 8
   (9) Level 9
   (10) Level 10
   (11) Performance Level

13. When is the most appropriate semester to begin learning music lessons concerning piano skills?
   (1) The 1st semester
   (2) The 2nd semester
   (3) The 3rd semester
   (4) The 4th semester
   (5) The 5th semester
   (6) The 6th semester
   (7) The 7th semester
   (8) The 8th semester

14. When is the most appropriate semester to end learning music lessons concerning piano skills?
   (1) The 1st semester
   (2) The 2nd semester
   (3) The 3rd semester
   (4) The 4th semester
   (5) The 5th semester
   (6) The 6th semester
   (7) The 7th semester
(8) The 8th semester

15. How long should the music lesson concern piano skills last?
(1) Half a year
(2) One year
(3) One and a half years
(4) Two years
(5) Two and a half years
(6) Three years
(7) Three and a half years
(8) Four years

16. How adequate do you think your college piano training was with regard to the learning and application of the following piano skills in your teaching practice?

<table>
<thead>
<tr>
<th></th>
<th>Inadequate</th>
<th>Somewhat Adequate</th>
<th>Adequate</th>
<th>Very Adequate</th>
<th>Most adequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Playing piano repertoire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accompaniment</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sight reading</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Solo singing with self-accompaniment</td>
<td></td>
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<tr>
<td>Composition</td>
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</tr>
<tr>
<td>Score reading</td>
<td></td>
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</tr>
<tr>
<td>Techniques (scales, arpeggios, etc.)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Chord progressions</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Harmonization</td>
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<tr>
<td>Transposition</td>
<td></td>
<td></td>
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<tr>
<td>Modulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall functional piano skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
17. Based on your working experience, on average, how often do you use the following piano skills in your music activities in preschool?

<table>
<thead>
<tr>
<th>Skill</th>
<th>Never (Never)</th>
<th>Rarely (once per month)</th>
<th>Sometimes (2-3 times per month)</th>
<th>Often (4 times per month)</th>
<th>Very Often (more than 4 times per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Playing piano repertoire</td>
<td></td>
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</tr>
<tr>
<td>Accompaniment</td>
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<tr>
<td>Sight reading</td>
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<tr>
<td>Solo singing with self-accompaniment</td>
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<tr>
<td>Composition</td>
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<tr>
<td>Score reading</td>
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<tr>
<td>Techniques (scales, arpeggios, etc.)</td>
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<tr>
<td>Chord progressions</td>
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<tr>
<td>Harmonization</td>
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<tr>
<td>Transposition</td>
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<tr>
<td>Modulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall functional piano skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. What kind of functional piano skills are trained in Music Theory and Sight Singing lesson in college education (multiple choice)?
- ☐ Improvisation
- ☐ Playing piano repertoire
- ☐ Accompaniment
- ☐ Sight reading
- ☐ Solo singing with self-accompaniment
- ☐ Composition
- ☐ Score reading
- ☐ Techniques (scales, arpeggios, etc.)
- ☐ Chord progressions
- ☐ Harmonization
- ☐ Transposition
- ☐ Modulation
19. What kind of functional piano skills are trained in Basic Vocal lesson in college education (multiple choice)?
☐ Improvisation
☐ Playing piano repertoire
☐ Accompaniment
☐ Sight reading
☐ Solo singing with self-accompaniment
☐ Composition
☐ Score reading
☐ Techniques (scales, arpeggios, etc.)
☐ Chord progressions
☐ Harmonization
☐ Transposition
☐ Modulation

20. What kind of functional piano skills are trained in Basic Piano Skills lesson in college education (multiple choice)?
☐ Improvisation
☐ Playing piano repertoire
☐ Accompaniment
☐ Sight reading
☐ Solo singing with self-accompaniment
☐ Composition
☐ Score reading
☐ Techniques (scales, arpeggios, etc.)
☐ Chord progressions
☐ Harmonization
☐ Transposition
☐ Modulation

21. What kind of functional piano skills are trained in Solo Singing with Self-accompaniment lesson in college education (multiple choice)?
☐ Improvisation
☐ Playing piano repertoire
☐ Accompaniment
☐ Sight reading
☐ Solo singing with self-accompaniment
☐ Composition
☐ Score reading
☐ Techniques (scales, arpeggios, etc.)
☐ Chord progressions
Harmonization
Transposition
Modulation

22. What kind of functional piano skills are trained in Basic Music lesson in college education (multiple choice)?
Improvisation
Playing piano repertoire
Accompaniment
Sight reading
Solo singing with self-accompaniment
Composition
Score reading
Techniques (scales, arpeggios, etc.)
Chord progressions
Harmonization
Transposition
Modulation

23. What kind of functional piano skills are trained in Music Composition lesson in college education (multiple choice)?
Improvisation
Playing piano repertoire
Accompaniment
Sight reading
Solo singing with self-accompaniment
Composition
Score reading
Techniques (scales, arpeggios, etc.)
Chord progressions
Harmonization
Transposition
Modulation

24. Please provide any additional comments and/or suggestions you may have for modifying piano training in college in order to better train pre-service preschool teachers.

_____________________________________________________________________
_____________________________________________________________________

Thank you for your participation in this research study.