An Investigation of the Perceptions of Music Teachers Related to Interactions with Peers in Online Professional Development Courses

by

Hyung Seok Kim

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved February 2015 by the
Graduate Supervisory Committee:

Margaret Schmidt, Co-Chair
Sandra Stauffer, Co-Chair
Jill Sullivan
Evan Tobias

ARIZONA STATE UNIVERSITY

May 2015

ABSTRACT

The purpose of this study was to investigate the experiences and opinions of Arizona music teachers related to interactions with peers in formal online professional development (OPD) courses approved for recertification of their teacher credential. The target population (N = 584) was current music teachers in K-12 schools who are members of the 2014 Arizona Music Educators Association. Ultimately 279 respondents completed a researcher-constructed online survey (response rate = 48%).

The survey instrument explored four primary research questions; (1) Do music teachers in Arizona participate in formal OPD related to recertification of their teacher credential? (2) Do music teachers in Arizona who participate in OPD courses interact with their peers during OPD? (3) What is the nature of self-reported peer interactions among Arizona music teachers who participate in OPD courses? (4) What are Arizona music teachers' opinions regarding peer interaction in OPD courses?

Almost half of the 279 respondents participated in OPD courses for their recertification. Some participated in music-specific OPD courses such as online music classes, webinars, or online degree programs. Many respondents considered OPD courses to be effective because of convenience, location, time savings, and flexibility. Most who took online classes participated in multiple OPD courses.

Of the respondents who took OPD courses, nearly two-thirds indicated that they interacted with peers during those courses. Most of these respondents reported that required interactions were effective. Some benefits were sharing ideas and acquiring information from others. Participants preferred asynchronous interaction with peers to synchronous interaction. Factors that may have prevented these music teachers from

interacting in OPD courses were superficial level message content in discussion boards or low participation from peers. Teachers also reported using informal online interactions in social networks not related to recertification hours.

Findings from this study may help improve teacher interactions with peers in OPD courses. This study may serve to influence instructors in OPD courses, administrators, policy-makers, and online course developers to improve OPD by integrating peer interactions into online courses for music teachers. Additional research on many aspects of OPD for music teachers is needed to improve educational practice.

ACKNOWLEDGMENTS

First of all, I would like to thank God for giving me an opportunity to pursue my doctoral degree in Arizona State University. He gave me the ability, support, help, and good friends and outstanding professors to accomplish this monumental task.

I am very grateful for Dr. Schmidt and Dr. Stauffer who served as my academic advisors. They always facilitated my research and helped me to complete my dissertation during my graduate years in Arizona. Their guidance and consideration were essential to enable me to finish my research successfully. Without their patience, understanding, and encouragement, this long journey might be impossible. In addition, I would like to thank all of my dissertation committee members, Dr. Sullivan and Dr. Tobias, for reviewing my dissertation and providing good advice.

There are many family members and friends who helped me to pursue my higher education. My wife, Jiyoung, supported and prayed for me throughout this journey. My daughters, Joanna (MinJu) and Blessing (MinSeo) were my hope. I am grateful to my parent (Siwook Kim and Jeanhee Chung) as well as parent in law (Yeonheung Jung and Kwija Yoo). I cannot forget the help of Valerie Dopp who is one of my best doctoral friends at ASU. She encouraged me through this research and gave me the best support that she could. She was my best friend as well as my teacher. I would also like to thank my church members, especially William (Yegyu) Choi, Hanna Nam, Vivian Lee, Eunhye Jung, and Kun Moon (Kunsil Sin).

I would like to thank all of my family members, friends, teachers, and co-workers who have offered encouraging words and prayers. Even though this educational process was not easy, I was able to complete my degree with the love of all of them.

TABLE OF CONTENTS

Page

CHAPTER Page

APPENDIX Page

LIST OF TABLES

Table Page

Table Page

Table Page

Table Page

Table Page

LIST OF FIGURES

Figure Page

CHAPTER ONE

OVERVIEW OF THE STUDY

Introduction

Improving the quality of instruction and teaching is one of the challenges of the education profession (Friedrichs, 2001; Hookey, 2002; McNamara, 2010). There is global recognition about the importance of continuing education for teachers, who may also feel the need to develop more effective teaching skills (Hookey, 2002). Professional development (PD) in the form of continuing education for teachers is generally recognized as one of the most significant aspects of professional employment in education (Bowles, 2002).

The term professional development (PD) includes various meanings and is used differently in diverse contexts. The Online Oxford English Dictionary defines PD as "the development of competence or expertise in one's profession; the process of acquiring the skills needed to improve performance in a job." According to Boyarko (2009), PD is defined as "continuing education offered to enhance job related skills" (p. 11). Bernard (2009) described PD as "opportunities for professional growth as a basis for increasing teacher knowledge and changing current teaching practice in order to increase student achievement" (p. 11). Killion divided professional development activities into two types of experiences, formal experiences and informal experiences (Killion, as cited in Hammel, 2007, p. 30). As examples of formal experiences, Killion included conferences, workshops, and graduate coursework and degrees. Killion classified informal learning experiences such as "mentoring, collaboration, active research, portfolios, observing students and educators, supervising student educators and working with university

educators, writing grants, writing curriculum, writing action plans, and presenting sessions and research" (Killion, as cited in Hammel, 2007, p. 30). Fullan (1991) conceived of PD as "the sum total of formal and informal learning experiences throughout one's career from pre-service teacher education to retirement" (p. 326).

Music education researchers use the term PD to refer to various formal and informal frameworks for professional learning (Friedrichs, 2001; Hookey, 2002; Thomas, 2010). In her chapter, "Professional Development" in *The New Handbook of Research in Music Teaching and Learnin*g, Hookey (2002) lists four definitions that may refer to both formal and informal PD: "1) as a process of personal professional change, 2) as the set of activities designed to promote personal professional change, 3) as a lifelong project, and 4) as an overarching framework for professional change" (p. 888). Friedrichs (2001) defines PD as both formal and informal "activities that contribute to the teacher's knowledge and skill beyond those learned or obtained during undergraduate or graduate certification coursework" (p. 13). In his dissertation, Thomas (2010) defined formal PD courses as those "offered for educators to remain current on trends in education and to retain certification" (p. 9).

Bauer (2007) summarized studies examining music teachers' needs for formal and informal PD, and claimed teachers need PD to improve the quality of their professional life. Eros (2012) emphasized the need for PD as a lifelong project. However, other researchers assert that music teachers desire different types of PD based on their setting, career stages, and their individual areas of interest (Bauer, 2007; Bowles, 2002; Friedrichs, 2001; Hammel, 2007; Kim, 2012). Music teachers may desire PD because specific teaching areas to which they are assigned might not have been included in the

college curriculum when they were pursuing their academic degrees. Additional reasons that music teachers participate in PD activities include to improve personal teaching skill, to develop professional knowledge (Bowles, 2002; Friedrichs, 2001), to have informal interactions with peers (Hammel, 2007; Kim, 2012), or to gain pay increases (Bowles, 2002). Researchers have also found that music teachers participate in formal PD because it is a requirement for their own licensure renewal (Bauer, 2007; Bowles, 2002; Deal, 2002; Friedrichs, 2001; Hookey, 2002; Talor, 2011). For example, according to Friedrichs (2001), the state of California requires all teachers to participate in 150 hours of professional growth activities every five years. For obtaining the credit, teachers can participate in conferences, courses, workshops, and graduate coursework and degrees as formal PD.

Researchers have found that some music teachers have an interest in more informal types of PD (Bush, 2007; Conway, 2008; Conway & Christensen, 2006; Kim 2012). Teachers ranked informal PD such as informal discussion with peers as their most preferred PD opportunities (Bush, 2007). Others recovered their confidence through informal PD such as mentoring with more experienced teachers (Conway & Christensen, 2006). Conway (2008) interviewed 19 experienced music teachers. These teachers indicated that informal interaction was the most helpful and valuable PD experience.

Taken together, these researchers suggest that in order to maintain a quality group of teachers, it is necessary for teachers to participate in a systematic process of continuing education that extends beyond their certification program and that both formal and informal PD have the potential to help teachers deal with change and improve their skills.

Some researchers emphasized that informal online learning communities can expand educational activities beyond traditional classrooms (Plant, 2004; Salavuo, 2006; Salavuo, 2008; Waldron, 2012). According to Salavuo (2008), institutional music education has not acknowledged the merit of informally functioning online settings. For example, through informal online communities such as Facebook, people can acquire membership in informal social networking platforms easily (Salavuo, 2006), gain information conveniently, obtain feedback reciprocally, discover like-minded experienced people in an offline music community (Waldron, 2012), and receive encouragement from other members quickly (Salavuo, 2008; Waldron, 2012). However, informal online professional development (OPD) is not always active, meaningful, and suitable for formal learning (Salavuo, 2008). Particularly, in informal OPD rather than formal OPD, it is difficult to identify or evaluate what participants learn (Salavuo, 2006). In addition, individuals commitment or their sense of responsibility to online music communities tends to be weaker than in formal learning communities (Salavuo, 2006). In informal OPD, several concerns exist, such as copyright issues, plagiarism (Salavuo, 2008), or the difficulty or relevance of assessing participants' learning.

Although *informal* OPD, such as interest groups or online communities, may be important sources of OPD, my interest in this study is not in *informal* OPD. The focus of this study is only on *formal* PD courses or classes which may be used for recertification credit.

Types of Formal Professional Development

Two types of formal professional development were relevant to my study. In this section, I will discuss research of formal face-to-face professional development and formal online professional development.

Formal Face-to-Face Professional Development

Traditional formal PD occurs with all participants meeting face-to-face at the same time and in the same place (Thomas, 2010). Some researchers discuss benefits that teachers might gain from formal face-to-face PD experiences. Bauer (2007) states that teachers can have diverse and extensive learning experiences in PD. For example, through attending formally structured workshops, conferences, and clinics, teachers can share teaching materials and methods that are distinct and relevant to their subject area and find new solutions to teaching problems that they encounter. A second benefit of PD from the perspective of teachers is the possibility of implementing new or different learning activities in their real settings (Bauer, 2007; Hammel, 2007). Through participating in discussions of these curricular issues, teachers can learn how to plan and prepare for their curriculum and create new teaching strategies (Bauer, 2007). Third, teachers can plan for instruction and obtain feedback from formal PD instructors who may also serve as role models and mentors (Bauer, 2007; Hammel, 2007; Woo, 2005). Fourth, in PD settings teachers can have opportunities to observe other teachers' teaching (Bauer, 2007). Last, through PD, teachers can learn classroom management skills (Bauer, 2007), earn various kinds of certification (Bauer, 2007), and become more familiar with technology (Bauer, 2007; Friedrichs, 2001).

Researchers who study PD for teachers have found limitations and problems related to formal face-to-face PD models. Some of these problems include limited or irregular opportunities for PD (Bauer, Forsythe, & Kinney, 2009; Bowles, 2002; Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009; Friedrichs, 2001), ineffective quality (Bauer et al., 2009; Dede, Breit, Ketelhut, McCloskey, & Whitehouse, 2005; Dede, Ketelhut, et al., 2009; McNamara, 2010), geographical barriers such as long distances to travel (Bowles, 2002; Dede, Breit, et al., 2005; Dede, Ketelhut, et al., 2009; Friedrichs, 2001; Treacy, Kleiman, & Peterson, 2002), time limitations (Dede, Breit, et al., 2005; Friedrichs, 2001), lack of release time to attend (Bowles, 2002; Dede, Ketelhut, et al., 2009), few substitute teachers available to cover classes in order for teachers to attend (Friedrichs, 2001), and expenses related to PD (Deal, 2002; McNamara, 2010; Treacy et al., 2002). Teachers also describe limited administrative support systems or insufficient ongoing support for PD from school leadership (Dede, Breit, et al., 2005; McNamara, 2010). Despite the many difficulties in PD, many teachers value continued teacher education and include formal face-to-face PD in their long-term career plans.

Formal Online Professional Development

Online professional development (OPD) may be one way to maximize and supplement the inherent weaknesses of traditional face-to-face PD for teachers. Deal (2002) explained a number of benefits in using distance learning such as course availability, affordability, effectiveness, and convenience. OPD may strengthen and supplement the inherent weaknesses of traditional face-to-face PD and provide benefits over those of traditional district-based PD activities. Defining OPD is problematic because different researchers use various descriptions. Some researchers have focused on

formal OPD such as online classes, courses, workshops, or webinars. Talor (2011) used the term OPD to mean formally structured online learning courses that are delivered via a web-based content management system. In her dissertation, Gammill (2005) defined OPD as "[formal] teacher training delivered through a learning management system" (p. 22). Boyarko (2009) described OPD as structured continuing education delivered in an online environment, using the internet as a tool for the delivery of instruction and as a means of communication. Thomas (2010) explained OPD as "professional development courses offered via the internet to address the continuing education of professionals" (p. 23). Fishman, Konstantopoulos, Kubitskey, Vath, Park, Johnson, and Edelson (2013) defined OPD as "teacher learning experiences delivered partially or completely over the internet" (p. 427).

Researchers have identified many weaknesses in formal OPD such as poor quality content (Brown & Green, 2003; Hebert, 2007; McNamara, 2010), unaccredited institutions and/or instructors (Brown & Green, 2003; Hebert, 2007), technology and/or infrastructure problems (Deal, 2002; Thomas, 2010; Treacy et al., 2002), and issues related to intellectual property (Hebert, 2007). In general, formal OPD offers considerable online information to teachers as well as students. Based on the literature, I identified eight primary benefits of formal OPD. First, the number of OPD opportunities reflects the abundant multimedia resources that teachers can use on the web (Bishop, 2006; Fishman et al., 2013; McNamara, 2010; Treacy et al., 2002). By gaining access to and using these plentiful materials, teachers may find and use more resources to meet the needs of various students.

Second, one of the most important benefits of OPD is time saving and flexibility (Bishop, 2006; Deal, 2002; Dede, Breit, et al., 2005; Dede, Ketelhut, et al., 2009; Fishman et al., 2013; McNamara, 2010; Talor, 2011; Thomas; 2010; Treacy et al., 2002; Wu & Hiltz, 2004). Some online learning models give teachers an opportunity to select personally convenient participation times. They can quickly and easily access online learning when they want to join. Also, through OPD, teachers can receive instruction without losing teaching time or facing long travel times.

A third merit of OPD is convenience of location (Bishop, 2006; Brown & Green, 2003; Deal, 2002; Fishman et al., 2013; Talor, 2011; Thomas, 2010; Treacy et al., 2002). Participants can immediately access learning at home, at school, or on vacation. In addition, OPD can be a convenient educational pathway for people with special needs.

Fourth, web-based PD courses can offer teachers self-paced learning (Bishop, 2006; Deal, 2002; Fishman et al., 2013; McNamara, 2010; Thomas, 2010). Learners in some online education models can control their learning pace and work at their own speed (Bishop, 2006). Learners can quickly review or skip information that they already know and take more time when they find new materials of personal interest.

Fifth, learners can review materials more often through online courses (Deal, 2002; McNamara, 2010). While review of class lectures and discussions in face-to-face PD can occur only by reviewing notes made during the class, online learners can go back any time during their online courses to review these interactions more thoroughly. Through this flexibility of delivery, learners may obtain a deeper understanding of new materials.

Sixth, OPD courses or classes can be a less expensive alternative when compared to traditional face-to-face PD ones (Deal, 2002; McNamara, 2010; Treacy et al., 2002). Learners in an OPD course can use as little as one website to access information that they need without paying for a hotel, food, and travel.

Seventh, OPD encourages teachers to use new and relevant technologies in their classroom (Bishop, 2006; Treacy et al., 2002). Dede, Ketelhut, et al. (2009) stated that teachers need to be fluent in new technologies such as online interactive media. Through participating in OPD, teachers can experience the power of technology and improve their use of advanced technology in their classrooms. Similar to teachers in general education, music teachers also feel a need to learn better uses of technology in their classrooms. Technology, including internet resources, is one of music teachers' most commonly requested topics for traditional face-to-face professional development (Bowles, 2002; Bush, 2007; Kim, 2012). According to Kim (2012), topics related to technology were the most popular in-service classes that general music teachers attended in the last year (77%); similarly, technology was also the most desired topic participants selected for workshops (95%). Although researchers have identified benefits of both formal face-to-face PD and formal OPD, my study focuses only on formal OPD. A second focus of this study is interactions among peers who participate in formal OPD.

Interactions in Formal Online Professional Development

In addition to the aforementioned benefits, some formal OPD offers the possibility of *online discussion* and *interaction* among educators in online classes and professional learning communities (Bishop, 2006; Deal, 2002; Dede, Ketelhut, et al., 2009; McNamara, 2010; Muirhead & Juwah, 2004; Sutton, 2001; Treacy et al., 2002;

Woo, 2005; Woo & Reeves, 2007; Wu & Hiltz, 2004; Yousef, 2012). Sutton (2001) stated "the development of distance education technology has made it increasingly possible for learners to interact with one another" (p. 227).

Several researchers point out the importance of various types of interactions in formal online education (Ally, 2008; Anderson, 2003; Chou, 2003; Moore, 1989; Hillman, Willis, & Gunawardena,1994; Swan, 2002; Yousef, 2012). According to Sutton (2001), interactions in computer-mediated communication may be "synchronous (real time)" or "asynchronous (time-shifted)" (p. 228). Both synchronous and asynchronous interactions may occur in formal OPD. Anonymity and/or opportunities for asynchronous collaboration in OPD allow learners and facilitators reflective time to prepare their ideas and responses as well as ample opportunities to discuss and communicate with colleagues through web-based learning. Deal (2002) explained that students who hesitate to join in traditional classroom settings may alleviate their fear through communicating electronically in distance learning (p. 25). According to Yousef (2012) and Sutton (2002), most structured online learning courses focus primarily on learner-instructor and/or learner-content interaction. Several researchers indicate that interaction between peers motivates learners to collaborate and construct knowledge (Anderson, 2003; Bernard, 2009; Conway, 2008; Fung, 2004; Hammel, 2007; Kim, 2012; Moore, 1989; Talor, 2011; Wu & Hilz, 2004; Yousef, 2012). Interaction and collaboration among peers may have an important role leading to deeper understanding of content (Hultgren, 2008; Shale & Garrison, 1990; Vrasidas & Zembylas, 2004; Woo & Reeves, 2007). For example, interactions between college students in formal online learning courses play a significant role in their learning (Fung, 2004; Sanders, 2005; Wu & Hiltz, 2004; Yousef, 2012).

Like college students, teachers may also benefit from interaction and cooperation with other teachers in formally structured OPD (McNamara, 2010; Moore & Barab, 2002). Within teacher PD courses, the interaction among teacher participants as learners can be an effective strategy to facilitate learning. Because of their professional and varied experiences, teachers who participate in formally structured PD or OPD courses already have much pedagogical knowledge and know-how to share, and interaction among teachers facilitates that sharing. Therefore, interactions with other teachers can be an important factor in teachers' life-long learning, and are an important focus in my study.

The Need for the Study

Previous research demonstrates the importance of interactions between teacher colleagues in traditional face-to-face PD as well as OPD courses (Bernard, 2009; Conway, 2008; Hammel, 2007; Kale, 2007; Kim, 2012; Stephens & Hartmann, 2004; Talor, 2011). Hammel (2007) emphasized the importance of interactions between general education teachers in traditional PD activities and suggested further study of interactions among music teachers. Some studies have been conducted to investigate general teachers' experience of interaction with peers in OPD courses, projects, or programs (Kale, 2007; Stephens & Hartmann, 2004; Talor, 2011). These researchers highlighted both the benefits and difficulties of communication and interaction between general teacher participants that underpin successful OPD courses in general education.

A few studies focus on opinions regarding interactions between music teacher participants in traditional face-to-face formal PD (Bernard, 2009; Conway, 2008; Kim, 2012). However, relatively little is known from the literature about music teachers'

experiences of online interaction during formal OPD. Therefore, this study focuses on interactions among music teacher participants as learners within formal OPD courses taken for the purpose of teacher recertification.

Purpose of the Study

The purpose of this study is to investigate the experiences and opinions of Arizona music teachers related to interactions with peers in formal OPD courses approved for recertification of their teacher credential. Results of this descriptive study may help music educators and OPD course developers better understand and develop effective interaction strategies and technologies in online learning environments.

Research Questions

Four primary research questions guide this study. Each primary question with sub questions is listed below.

Research Question 1: Do music teachers in Arizona participate in formal online professional development (OPD) related to recertification of their teacher credential?

1a. What is the status of teachers' access to technology for OPD courses?

1b. If they do, how frequently do teachers participate in OPD courses?

1c. If they do, how effective for their own professional growth do teachers consider OPD courses?

1d. If they do, what motivates teachers to participate in OPD courses?

1e. What kinds of OPD courses in music do music teachers take?

1f. Does participation or non-participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?

1g. Do the reasons that teachers list as their purpose for participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?

1h. What other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) have they found interesting or useful?

Research Question 2: Do music teachers in Arizona who participate in OPD courses interact with their peers during OPD courses?

2a. If they do, how effective do teachers consider online interaction with their peers during OPD courses?

2b. What do they consider beneficial about online interaction with other peers in OPD courses?

2c. Does interaction or non-interaction with peers in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?

Research Question 3: What is the nature of self-reported peer interactions among Arizona music teachers who participate in OPD courses?

3a. What kind of tools for peer interactions do they use in OPD courses?

3b. What kinds of interactions have teachers had with peers in OPD courses?

Research Question 4: What are music teachers' opinions regarding peer interaction in OPD courses?

4a. What tools do they prefer to use for peer interaction during OPD courses?

4b. What factors might prevent them from interacting with peers in OPD courses?

4c. Do opinions of music teachers related to factors that prevent them from interacting with peers vary by age group, years of teaching experience, or self-reported technology proficiency?

Definitions of Terms

The purpose of this study is to investigate the experiences and opinions of Arizona music teachers related to interactions with peers in formal OPD courses taken for the purpose of teacher recertification. For renewal of a teaching certificate, the state of Arizona requires either "the completion of 180 clock hours of professional development activities; or 12 semester hours of education coursework posted on official transcripts; or a combination of the two completed during the valid period of the certificate(s) to be renewed" (http://www.azed.gov/educator-certification/files/2013/10/application-for-renewal-of-certificate.pdf).

Based on the application for renewal of certificate issued by the Arizona Department of Education, the following table includes information related to activities that are considered as professional development in this state.

Table 1

State of Arizona Approved PD Activities

Professional Development Activities:	Documentation Required:
Academic courses related to education or a subject area taught in Arizona public schools.	Official transcripts from an accredited institution. Each semester hour of courses is equivalent to 15 hours of professional development.
District or school-sponsored in-service training specifically designed for professional development.	Written verification from the sponsoring district or school stating the dates of participation and number of clock hours earned.
Professional conferences and workshops related to the profession of teaching or the field of public education.	Conference agenda and a statement or certificate from the sponsoring organization noting clock hours earned in training sessions. Limited to 30 clock hours per year.
Business internship. Internship shall be based on an agreement between a business and a district or school with the stated objective of aligning teaching curriculum with workplace skills.	Written verification by the sponsoring business and district or school stating the dates of participation and number of clock hours earned. limited to 80 clock hours.
Educational research. Research shall be sponsored by a research facility or an accredited institution or funded by a grant	The published report of the research or verification by the sponsoring agency and a statement of the dates of participation and the number of clock hours earned.
Serving in a leadership role of a professional organization related to the profession of teaching or the field of public education	Written verification by the governing body of the professional organization of the dates of service and clock hours earned. Limited to 30 clock hours per year.
Serving on a visitation team for a school accreditation agency.	Written verification from the accreditation agency of the dates of service and clock hours earned. Limited to 60 hours per year.
Completion of the process for certification by the National Board of Professional Teaching Standards.	Written verification from the National Board of Professional Teaching Standards and a statement from the employing district or school verifying the dates and clock hours earned during the certification process.

(This table is quoted directly from the application for renewal of certificate) (http://www.azed.gov/educator-certification/files/2013/10/application-for-renewal-of-certificate.pdf).

For the purpose of this study, the following definitions are used:

Face-to-Face Professional Development: Face-to-face professional development is defined as the in-person activities accepted in order for Arizona teachers to recertify their credentials with the state authority and is limited to formal activity that occurs with all participants and instructors meeting face-to-face at the same time and in the same place.

Online Professional Development: Online professional development is defined as formal professional development activities that are completed entirely through the internet for the purpose of teacher recertification with the state licensing authority.

Interaction: Interaction in this study is defined as the opportunity for teachers to communicate electronically, either synchronously and/or asynchronously with their peers and exchange information through the use of computer-mediated communication within online courses for the purpose of teacher recertification.

Delimitations of the Study

This study was conducted with music teachers in K-12 schools in the state of Arizona and only investigated the experiences and opinions of music teachers related to interaction with peers in formal OPD courses taken for the purpose of teacher recertification. I did not look at interactions in face-to-face PD or in informal OPD. The study was conducted in a single state, Arizona, and the target population for the study was limited to current or in-service music teachers in K-12 schools in the state of Arizona who are members of the Arizona Music Educators Association (AMEA). Therefore, the results of this study may not be generalizable to all music educators.

Organization of the Study

Chapter one included the need for the study, purpose of the study, study questions, definitions of terms, and delimitations of the study. Chapter two presents a review of literature related to various formats for PD, various approaches to PD, interactions in PD, and the importance of interaction in online settings. Chapter three describes the methodology used in this study. Chapter four presents results and analysis. Chapter five includes a summary of the study and discussion, recommendations for practice, and recommendations for research.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction: Professional Development (PD)

Teachers have a key role in student learning outcomes in eduational settings. (Dede, Ketelhut, et al., 2009; Fishman, et al., 2013). In order to improve student achievement and learning outcomes, teachers are required to be "highly qualified" in their subject areas (Fischman et al., 2013). Therefore, professional development, whether traditional face-to-face or online, is an important concern to in-service teachers (Dede, Ketelhut, et al., 2009).

Among research topics in professional development (PD) or online professional development (OPD), much research has been conducted to determine program designs of both PD and OPD (Bauer, 2007; Dede, Ketelhut, et al., 2009). Even though it is not possible to attribute the contribution of a specific PD experience to a teachers' career path, the program delivery method of PD or OPD can be a significant research topic. In their literature review, Dede, Ketelhut, et al. (2009) outlined a research agenda for online teacher professional development. Their overview of forty published articles in the field, based on a previous study conducted by Dede, Breit, et al. (2005) is also a literature review. According to Dede, Ketelhut, et al. (2009), most research related to program design focuses on methods of delivery, pedagogical strategies, or content (p. 11). Through this more recent article, Dede et al. suggested types of knowledge that are missing in the current literature, discussed problems in teacher professional development, and noted the potential benefits of online teacher professional development.

This chapter reviews research examining various presentation formats of professional development (PD), interaction in PD, and the importance of interaction in online settings. Although my study is limited to music educators' experiences with formal OPD courses for recertification, studies of both formal and informal PD inform this dissertation's purpose and methods.

Various Formats for PD, Various Approaches to PD

Many educational researchers focus on the presentation format of the standard PD experience (Bishop, 2006; Boyarko, 2009; Dede, Ketelhut, et al., 2009; Friedrichs, 2001; Hammel, 2007). Professional development can be presented in completely face-to-face form. It can also be presented online in completely asynchronous form, in synchronous form, in telecommunications using audio, video, or digital information, or in hybrid methods which combine two or more methods of presentation. The following review of literature presents research on presentation of face-to-face, hybrid, online PD, and comparisons among these presentation methods.

Face-to-Face Professional Development (PD)

Studies of general education teachers in traditional face-to-face PD have examined the effects of professional development on teaching and learning (Garet, Porter, Desimone, Birman, & Yoon, 2001; Hookey 2002). Within research related to the effectiveness of PD, Garet et al. (2001) wondered what makes PD effective. In order to investigate the relationship between characteristics of PD in the literature, self-reported change in teachers' skills and knowledge, and changes in classroom practice, Garet et al. researched "best practices" in PD and focused on the structural and core features of professional development activities in the literature. They classified three structural

elements for a professional development activity: 1) the activity type (workshop or conference), 2) the duration of the activity (time span and contact hours), and 3) the collective participation of groups of teachers from the same school, grade or subject. They also identified three core features: 1) PD focusing on content, 2) PD promoting active learning, and 3) PD fostering coherence with other learning activities. Garet et al. designed a Teacher Activity Survey based on these structural and core features of PD. The survey, part of the evaluation of the Eisenhower Professional Development Program, was given to a national sample of 1,027 teachers (72% response rate), mainly in mathematics and science. The results from the self-reports of participants indicated that the three structural features (activity type, length of the activity, and type participation) directly influenced the core features (the content, the active learning, and coherence). For example, the longer the PD activity took (duration), the more emphasis the PD developers wanted to place on teachers' content knowledge. Another result showed that the three core features of professional development affected teachers' skills and knowledge. Focusing on the three core features of PD resulted in growth in the teachers' skills and knowledge and change in their classroom practice.

Building on general education literature regarding PD, Hookey (2002) explored some issues related to PD in music education. This chapter used the following headings to review research studies: exploring definitions of PD, research on the PD of music educators within/across organizations, research on the PD of music educators in schools, research on the personal professional lives of music educators, research on professional development requirements for licensure and recertification of in-service music educators, and research on classroom teachers as music educators. However, Hookey said, "This

chapter is limited to research on teachers and teaching, rather than research by teachers or other music educators" (p. 887), and she recommended expanding research on PD for music educators.

Several recent studies have examined perceptions of music teachers who have participated in traditional PD (Bauer, 2007; Bauer et al., 2009; Bush, 2007; Conway, 2008; Conway & Christensen, 2006; Eros, 2012). To investigate music teachers' perceptions of PD, Bauer et al. (2009) developed an online survey using a 4-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree). They recruited volunteer Ohio in-service music teachers (N = 783) as their respondents. They found that the reasons for pursuing a doctorate as PD were to be a better teacher (M = 3.50) and for personal satisfaction (M = 3.80). Reasons for non-degree PD were to be a better teacher (M = 3.81), to become better musicians (M = 3.27), and to renew the teaching license (M = 2.90). Respondents indicated that attending professional music conferences such as Ohio State Conference was the most valuable (M = 3.60) and the most preferred mode of PD (M = 3.72). However, online courses (M = 2.45) or distance learning (M = 1.86) were relatively less desirable PD approaches. The most desired topics of PD varied based on area of specialization. Interestingly, there were significant differences in PD topic preferences between new and more experienced teachers. Newer teachers preferred classroom management (M = 3.37) as a PD topic, while experienced teachers were most interested in music technology (M = 3.16).

Bauer (2007) also studied PD needs of music teachers at varying stages of their careers. He summarized and analyzed research literature regarding music teachers' PD. He classified the literature into three groups: 1) PD preferences and needs, 2)

effectiveness of PD, and 3) PD experiences and practices. Bauer first reviewed three studies related to the PD preferences and needs of experienced music teachers: Bowles (2002), Friedrichs (2001), and Tarnowski and Murphy (2003). Bauer concluded that music teachers' PD preferences and needs were different; these varied based on teachers' specific teaching responsibilities and the area of music in which they taught. Bauer said that these preferences and needs could not be generalized to other populations because the studies' authors selected participants from limited geographic areas such as one or two states. Second, through analyses of five studies related to effectiveness of PD (Dolloff, 1996; Junda, 1994; Bauer & Berg, 2001; Madsen & Hancock, 2002; Bauer, Reese, & McAllister, 2003), Bauer came to the conclusion that long-term PD experiences for music teachers are more beneficial than short-term PD experiences. Some studies emphasized the role of the instructor, such as giving feedback, for increasing the effectiveness of PD. Third, to investigate PD experiences and practices used by music teachers, Bauer reviewed six studies (Price & Orman, 1999, 2001; Killian, Baker, & Johnson, 2006; Bauer, 1999; Baker, 1993; Duling, 1992; Conway, 2008). He suggested that the PD needs of teachers should be examined continuously. Bauer stated, "increased discernment of the PD preferences and needs of experienced music teachers, the PD needs of teachers at different stages of their careers, . . . and the types of professional development appropriate for specific teaching areas and responsibilities must be sought" (p. 20).

Similarly, Bush (2007) investigated preferred types of PD opportunities (e.g., conferences, courses, or workshops) and workshop topics (e.g., technology, curriculum, or assessment) that music teachers consider to be important. As subjects of this study,

108 music teachers completed a researcher-developed survey (return rate = 65%). For six of the eight elements of PD in the survey, there were no significant differences in ranking for the various types of professional development opportunities between subjects in various teaching areas such as band or strings. However, differences in two elements were noteworthy. Bush stated, "General music specialists rated state music educators' annual in-service conferences lower than any other group, and choral teachers ranked discussions with non-music educators higher than the other three groups" (p. 14). Bush suggested these differences may be because general music specialists often participated in workshops designed exclusively for them (like Orff or Kodaly) and choral teachers had much more opportunity to communicate with non-music educators than the other groups. As a result of this study, Bush (2007) found that most music teachers ranked informal discussions with fellow music teachers as the top PD opportunities, followed by summer or weekend courses or workshops. However, based on their areas of specialization, music teachers had different opinions regarding the rankings of the workshop topics. Even though the relative rank of preferences for workshop topics varied by area of music teaching specialization, the top workshop topics which most music teachers preferred were new music or repertoire (M = 4.29), technology (M = 4.03), and student assessment in music (M = 3.87). Bush suggested that researchers learn more about the types of technology workshops that are most useful to music teachers.

Conway invited Stephanie Christensen, a first-year middle school instrumental music teacher, to collaborative with her to investigate Stephanie's perceptions of PD activities (Conway & Christensen, 2006). They utilized narrative inquiry and case study design for their research methodology. The followings data were collected: researcher

observations, interviews with the participant, the participant's research journal, and the participant's written responses regarding professional development readings. Stephanie participated in formal and informal PD, including school district-provided programs, state music organizations' courses, and self-sought opportunities. She indicated that one-shot workshops or short term classes did not fulfill her PD needs. As a first year teacher, Stephanie experienced physical, emotional, and intellectual isolation in her school position. While district workshops focused on student learning, Stephanie expressed a need for PD focused on her needs as a beginning teacher, prompting Conway to observe, "Early professional development may need to help teachers find their sense of belonging in a school" (p. 21). Because of an unsuccessful first adjudicated festival experience, Stephanie put her energy into improving herself for festivals and competitions. She recovered her confidence through informal PD such as mentoring with a more experienced peer.

Eros (2012) investigated the PD experiences, perceptions and needs of second-stage music teachers who had 4 to 10 years of teaching experience. He conducted a qualitative study using a multiple descriptive case study design, selecting three female teachers as his participants through purposeful sampling. To collect data, Eros used an open-ended survey, a journal, three individual interviews, and a focus group interview with all participants. Findings indicated that all participants attended both formal and informal types of PD. Two of the participants experienced a change in their PD needs over the course of their careers. Two of them expressed that conversation with colleagues was important for professional growth, but one participant had negative experiences through interactions with colleagues. As obstacles to PD, two participants were

concerned about the risk of job loss because of time restraints while pursuing their master's degrees. Finally, Eros emphasized the need for both formal and informal PD as a lifelong project.

Some similarities and differences can be found among these various studies related to traditional face-to-face PD. The first similarity is that, even though preference for PD topics depended highly on the specific needs of an individual teacher, music teachers preferred PD opportunities varied based on their areas of music teaching specialization (Bauer et al., 2009; Bauer, 2007; Bush, 2007; Eros, 2012). In addition, music teachers had different preferences of PD topics based on the stages of their careers (Bauer et al., 2009; Bauer, 2007; Conway & Christensen, 2006; Eros, 2012). Finally, some studies suggested that music teachers need more long term opportunities to participate in PD (Bauer, 2007; Conway & Christensen, 2006; Eros, 2012).

Hybrid Professional Development (PD)

Some PD can be considered "blended" or "hybrid." Blended PD courses can be face-to-face sessions with online tools such as online discussion, or online sessions with one or more face-to-face sessions. In this section, I discuss research about general and music teachers' experiences with hybrid PD.

In his article related to general education teachers who participate in hybrid PD, Watson (2006) examined the long term effect of three factors on self-efficacy of in-service teachers: 1) a five-day summer workshop, 2) optional online courses, and 3) four external factors (years of teaching experience, college technology courses, professional development programs, and participation in other similar technology professional development work). Watson reported about the RuralNet Project, which was composed

of both an intensive five-day summer workshop and two supplemental optional online courses, designed to teach K-12 in-service teachers to use the internet for mathematics and science education. The first optional online course emphasized basic internet skills and helped teachers to develop an idea for a unit integrating the internet. The second optional online course emphasized the process of actually planning units using the internet as a tool. The subjects in this study were 389 teachers who all took the five-day workshop. The teachers were surveyed before (n = 155) and seven years after (n = 94) this project. Watson did not indicate the number of participants who took the optional online courses. The results indicated that all three factors, a five-day summer workshop, optional online courses, and the four external factors, affected teacher self-efficacy over the long-term and gave teachers self-confidence about using the internet in their classrooms.

Literature related to music teachers who participate in hybrid PD is very limited. I found only one study focused on music teachers who have participated in hybrid PD (Walls, 2008). In order to evaluate the effect of a graduate music teacher education program through distance learning, Walls (2008) studied in-service music teachers who were enrolled in a music education master's degree program with blended format that took place each summer from 2004-2006. Participants who were in a distant area completed their coursework by viewing streaming video and communicating with their classmates via audio chat or text. They also received instructor feedback through web-based course tools (WebCT). They were also required to attend a midterm seminar on campus. After the course ended, Walls conducted semi-structured telephone interviews with 16 of the 22 graduates (72%) from the summer 2004-2006 program. She also

administered a questionnaire to both 29 of the 46 new students (63%) from May 2005 through July 2006 and 10 of the 15 graduating students (66%) from July 2005 through August 2006. Through analysis of interviews with the participants, the themes that Walls observed were 1) changes in teaching philosophy, 2) changes in teaching practice, 3) personal growth, and 4) satisfaction with the program. First, nine participants indicated there was a change in their philosophy but they did not define details of that change. Second, all participants acknowledged that technology integration had an impact on their classroom practice. Third, although most participants recognized their growth from this program, they had diverse perceptions of the type of personal growth they experienced. Some respondents recognized their own growth in improved research skills, while others focused on their growth in using technology, collaboration, or diversity. Lastly, all participants revealed their satisfaction with the program. Participants indicated that the interaction among music teachers, instructor-student interaction, technology integration, and quality of learning were all important factors that enhanced their program satisfaction.

In summary, not only general education teachers but also music teachers were positively influenced by participating in hybrid PD. Through participating in hybrid PD, teachers expressed satisfaction in the convenience and efficacy of technology integration in their educational settings.

Online Professional Development (OPD)

Through opportunities provided by the internet, teachers can pursue professional development beyond what districts or local schools can offer (Brown & Green, 2003).

McNamara (2010) conducted a review of literature about OPD offerings for teachers in general education. McNamara identified four online models: “1) courses or

certificate programs, 2) professional learning communities, for example, discussion forums or lesson studies in which lesson plans, student work, and videos are discussed, 3) presentations, for example, webcast keynote speeches or videos of presenters speaking to an audience, and 4) tutorials with self-paced step-by-step directions" (p. 11). McNamara stated that literature related to OPD is dominated by studies of online university and college courses (74%) as OPD opportunities (p. 120). In order to identify successful models of effective online professional development, she used a mixed methods research design in her dissertation. First, K-12 teachers from 15 states completed a survey (N = 328, 2% were music teachers) to indicate the characteristics of online professional development experiences that contributed to their classroom practice. Her survey supported previous findings that online professional development programs provided by colleges or universities are the most frequently accessed (52%, n = 171). Online sessions that are recommended by school districts (16%, n = 52) are the next most accessed. The third most popular model is online tutorials (12%, n = 40) that are used for professional growth. Twelve percent (n = 40) indicated that they had taken some other online PD offerings such as webinars. Courses created by school districts (5%, n = 16) or the state (2%, n = 7) were the least utilized (p. 171). The most popular type of tools that teachers used in online professional development was online documents (90%). Participants also indicated the following tools in order of preference: website links (84%), threaded discussions (83%), an assignment submission/feedback location (80%), video (69%), quizzes and/or surveys (65%), and email (62%). Following analysis of the survey results, McNamara invited the survey respondents whose professional development experiences were other than college courses to be interviewed; three people volunteered. McNamara

conducted interviews with them asking questions about their experiences with specific web sites and collecting more particular information related to their online professional development experience. In the interviews, the participants indicated that online professional development improved their technology skills and their knowledge of curriculum. McNamara found that, from her study, it was difficult to make recommendations to educational leaders about high quality professional development. This was because, although survey participants used different web sites, each participant used only one.

In this section I examine research related to McNamara's first two categories of OPD. I begin this discussion of research about OPD with a discussion of synchronous and asynchronous online communication. Researchers have studied general education teachers who participated in formal OPD courses (Boyarko, 2009; Brown & Green, 2003; McNamara, 2010; Treacy, Kleiman, & Peterson, 2002), one study examined a university's online graduate degree program in music education (Hebert, 2007). Three studies investigated informal online music communities of practice (Salavuo, 2006; Salavuo, 2008; Waldron, 2012).

Synchronous and Asynchronous Online Communication. Online learning can be divided into two basic modes, synchronous learning and asynchronous learning (Ashley & Kaplan, 2003; Brown & Green, 2003; Deal, 2002; Hirumi, 2002; Picciano, 2001; Thomas, 2010; Treacy et al., 2002; Woo, 2005; Wu & Hiltz, 2004; Yousef, 2012). In traditional physical settings, synchronous learning is defined as learning that takes place in real time and at a specific place. In contrast, online learning may take place from many different places and at times that learners schedule themselves. Yousef (2012)

defined synchronous as "activities or interactions that occur at the same time" (p. 25), while she defined asynchronous as "activities or interactions that do not occur at the same time" (p, 24).

As part of online learning, both synchronous and asynchronous *interactions* may be included. Synchronous interaction in an online setting happens when the instructor and one or more learners are logged into the online course simultaneously. For example, Learners can experience synchronous interaction with other learners online at the same time using a chat room, Skype, or other forms online meeting spaces. In contrast, asynchronous online interaction occurs when the instructor and the learners are not logged into the course simultaneously. For instance, participants can post their opinions and questions in a discussion board, blog, or wiki whenever they choose within the instructors' set parameters. Thomas (2010) indicated that one of the merits of synchronous learning was to interact with one another in real-time using chat and video-conferencing, while a disadvantage of synchronous learning was time restrictions. If participants were busy or had another commitment, it was difficult for them to interact with peers in real-time. Asynchronous distance education has the merit of flexibility in time and delivery means such as the internet, video, or television. Yet this flexibility could also be a disadvantage, leading to a disconnect between participants.

Formal online courses or online certificate programs. Referring to their experiences with teaching online courses, Brown and Green (2003) explained strengths and weaknesses of online professional development in their article, "Showing up to Class in Pajamas (Or Less): The Fantasies and Realities of On-Line Professional Development Courses for Teachers." They defined "online course" as online professional development

that is delivered using "the Internet as a medium of communication" (p. 149). They suggested two internet-based protocols, e-mail and the World Wide Web, as the most common methods of online instruction. As benefits of online professional development courses for teachers, Brown and Green indicated access to resources, convenient accessibility, possibility of asynchronous interactions with others, time savings, and the possibility of reviewing materials online. As problems of OPD, they indicated fewer opportunities to strengthen ties, little opportunity for an instructor to model classroom teaching, minimal opportunities for teacher participants to demonstrate knowledge, lack of immediate feedback from instructor, unaccredited institutions, and poor quality content. In order to enable meaningful interactions among their participants, Brown and Green recommended that it is important to have a low class size of fifteen to twenty-five students. They also suggested that, in offering online professional development courses, teachers should participate with the class in meaningful interactions, both synchronous and asynchronous.

Treacy et al. (2002) defined online professional development as web-based learning opportunities such as "educational programs, courses, workshops, activities, resources, and online interactions with instructors, mentors, and colleagues" (p. 43). In all these different types of online learning, Treacy et al. suggested that PD teachers need to build communities of collaborative practitioners to support teacher participants' need for growth. In order to explain successful online professional development, Treacy et al. described EdTech Leaders Online, launched in 2000 as a learning community model of online professional development by the Center for Online Professional Education at the U. S. Education Development. In their journal article, they also gave a detailed account of

the benefits and elements of success of OPD programs. Benefits included increased accessibility, the experience of technology, the use of rich multimedia, anytime and anyplace learning, ability to meet special needs, collaborative learning opportunities, implications for classroom practice, and new opportunities for follow-up. For successful OPD programs, they suggested the following elements; 1) develop OPD based on local PD needs and publicize it, 2) connect and/or integrate PD with OPD, 3) build and train OPD specialist team members, 4) provide technology support, and 5) foster interactive online learning communities.

Boyarko (2009) conducted a qualitative research study for her dissertation to explore the online professional development goals of first-year teachers in K-12 education and their OPD instructional design preferences. She had two research questions: 1) What are the teachers' goals for OPD? and 2) What are the elements that should be included in the design of an OPD course for teachers? To collect data, Boyarko investigated one synchronous class meeting, analyzed the online classroom, and examined online course documents. She also interviewed four first-year teachers who participated in the online class. Findings of the study indicated that promoting student engagement was the primary concern of online teachers. The teacher participants also wanted to improve their abilities and knowledge in areas relating to their use of technology. Participants indicated that relevance to the teacher participants' needs and the inclusion of various presentation techniques in online instructional delivery were two elements that should be included in the design of an online course. For future studies, Boyarko recommended that researchers conduct additional studies with experienced

teachers who enroll in online courses, identifying the relationship between individual student engagement rates and the online teacher-participants' ability to use technology.

Like general education programs, music education can benefit from OPD courses. Compared to literature related to general education teachers who participate in OPD courses, relatively little research has been done concerning music teachers who have participated in OPD courses.

The Boston University School of Music launched its online doctoral program in music education in 2005. Hebert (2007), one of faculty members, reported that the program faced some problems in the beginning, but it experienced growth and high retention rates throughout 2006. In his article, Hebert identified five challenges for online music education degree programs and proposed solutions to each of them on the basis of his experience.

The first problem is "prejudice regarding the legitimacy of online degrees" (p. 2). Online programs were regarded as "diploma mills" in which it was easy to earn high grades and graduate quickly. He maintained that if the public begins to witness an undeniable body of mounting evidence that academic quality is found within online graduate programs, prejudice will lessen.

The second challenge in online music teacher education is "coordination between distance education and music departments" (p. 3). Hebert perceived that music professors seem hesitant to forge collaborative relationships with distance education staff members, who may appear to be placed in positions of authority over music professors. As a solution he recommended that thorough planning, clear decision making, and delegation of responsibilities are essential between distance education staff members and

music professors. He also suggested that both frequent interdepartmental meetings and detailed planning sessions are needed.

The third complication was that there were "pressures to maximize profits at the expense of educational quality" (p. 3). According to Hebert, many educational corporations have recently become involved in online programs. He emphasized that the role of students is intensified when the educational quality is marginal. He also said, "One must be confident that conscientious music education professors and students who are wary of the unique challenges of online education will succeed in collectively ensuring high levels of educational quality are maintained" (p. 6).

The fourth challenge was management of adjunct music instructors. Communication seems to be the most fundamental issue for distance learning in areas such as technical problems, disagreement between raters, or lack of timely instructor response. Hebert said, "Online instructors must be provided with clear expectations and ample models of instructional excellence, as well as timely and meaningful feedback on their performance" (p. 6).

The fifth and last dilemma is related to "management of student behavior and provision of student services" (p. 4). This included academic misconduct such as plagiarism. He said online plagiarism can be prevented through many strategies such as search engines and professional plagiarism detection devices (p. 7). He believed that effective systems could be devised and implemented to lessen frequent problems. In conclusion, in addition to the professional responsibilities of distance education staff members, Hebert emphasized the collaboration of four parties for the success of an online

music program: the university administration, professors, students, and professional leaders (such as peer reviewers or accreditation agencies).

Informal online learning community of practice. The development of the Internet and social networking platforms (like Facebook or Youtube) provide pedagogical possibilities for a big change in institutional music education (Salavuo, 2008). These platforms make it possible to expand educational activities beyond traditional classrooms (Plant, 2004; Salavuo, 2006; Salavuo, 2008). Engaging in informal online communities of practice (Plant, 2004; Salavuo, 2006) offers one way learners may obtain useful knowledge and information or develop social relationships with like-minded people. In general, these informal communities may be voluntarily composed of people who have similar interests but are at different levels of expertise (Salavuo, 2006; Salavuo, 2008). Plant (2004) defines an online community as "a collective group of entities, individuals or organizations that come together either temporarily or permanently through an electronic medium to interact in a common problem or interest space" (p. 54). Salavuo (2006) stated that online music learning communities can acquire their membership easily and members' goals and motives for participation tend to be less defined and clear than those of formal professional or institutional communities. However, individual's responsibility or commitment to online music communities as well as the bonds between their members "is usually a lot weaker than in traditional" face-to-face formal music learning communities (p. 255).

According to Salavuo's journal article (2008), the existence and significance of informal learning environments have not been acknowledged and the merit of informally functioning online settings has not been considered in institutional music education.

Although learning management systems allowed the participants to present information and resources in various media formats and to engage in collaborative learning activities beyond class meetings, Salavuo pointed out that they have been designed for text-based interactions and may not be seen as necessary for life-long learners. He recommended that online music education "move from the culture of consumption to participatory learning activities" (p. 123). Instead of learning management systems in formal settings, Salavuo explained that informally functioning communities, such as social networking platforms and online music communities, are growing fast and present opportunities for individuals to share their own music, find others' music, provide and gain feedback, learn reciprocally, or interact with other users. He stated that most adolescents have membership in social networking websites, publish their work online, and use social networking to connect with other people. As a merit of social technologies for music education, Salavuo indicated:

> In music education, making one's musicianship visible in online environments could be a basis for new collaborations and growth as a musician, and a starting point for life-long learning. (2008, p. 131)

However, he noted that social networking platforms or online communities are not always active, meaningful, and suitable for formal learning. In addition, there are still several problems in social networking sites such as the difficulty of assessment of learning, copyright issues, or plagiarism. Nevertheless, Salavuo stated that research in music education should consider the possibilities for reciprocal peer learning outside of formal learning spaces because social technologies provide users the opportunity to construct knowledge in informal as well as formal learning settings.

Music online communities have the potential for participants to share music created by the members with anyone from around the world (Salavuo, 2006). Research by Salavuo (2006) and Waldron (2012) offer examples of studies of music-related online communities of practice for music learners.

In order to investigate the informal music learning and teaching in Banjo Hangout, a specific online music community of practice, Waldron (2012) used a cyber ethnographic narrative field study. As a participant observer with permission from the site owner, she observed participants (N=51,000) (using forum posts, email, and chat room), and gathered written narrative texts during six months. Of 66 respondents who chose to participate in her study, 9 participants were interviewed via Skype, and 17 participants emailed completed open-ended questionnaires that included the interview questions. Although Waldron focused on the Banjo Hangout online community in this article, she also compared their participation in online (Banjo Hangout) and offline communities of practice (various Old Time and Bluegrass groups), based on the participants' narratives. Three themes emerged from the data.

The first theme was music learning in convergent on- and offline communities. Some respondents reported that the online Banjo Hangout community played an important role to discover like-minded musicians or experienced music teachers in an offline community. Waldron insisted, "music learning in one context continually reinforced and complemented learning in the other, resulting in a deeper and richer experience than learning restricted solely to one context" (p. 98-99). Through the online community, novice banjo players could ask specific technique questions, get answers quickly from community members, and discover offline banjo communities.

The second theme was the benefit of the online community and internet resources for isolated musicians. Because of geographical barriers or poor health, some respondents indicated that Internet resources such as YouTube demonstrated how to play the instruments for complete novices, and online communities helped them to connect with other banjo players. However, they indicated that learning via the Internet was limited because they could not have live jam sessions with others.

The third theme, emphasized in some narratives, was the importance of adapting technologies for music learning. Participants repeatedly stated that they could learn to play instruments with the aid of software programs without a teacher. However, participants' narratives noted that they wanted not only to learn how to play music but also to share playing their music with the world in on- and offline communities. In conclusion, Waldron suggested that music educators should consider and examine "music communities of practice that lie outside of our regular scope of school music" (p. 101) to better understand the power of informal music learning in on- and offline communities.

To examine the reasons that the Finnish users participate in an online music community, discover its members' musical backgrounds, and investigate their relation to formal music education, Salavuo (2006) conducted an online survey which was posted on the *mikseri.net* discussion forum. With 233 respondents, Salavuo's results indicated that 51% were under 20 years old and 88% were male. Most respondents were self-taught or community-taught musicians and were inclined to make music by themselves. Among the participants, 94% used the internet daily, 58% used computers to make music, and electronic music was the most popular genre. The results showed that a low number of formally musically educated members actively participated in the discussion forum.

Respondents indicated that the most important reasons for taking part in informal online communities were musical reasons or both musical and social reasons. The most important motivation to visit the web site was to hear what kind of music others were making (M = 1.8), followed by having one's own material listened to by others (M = 1.93), and getting feedback about one's own music (M = 1.99). Although respondents considered chatting about music, bands, or gigs as one reason for participating at online community, Salavuo pointed out that the most important motivation for taking part in the informal *mikseri.net online community* was its music section. He stated as follows;

> . . . the social relations in the online music community are not dense enough for strong interdependence and a real sense of belonging to develop for the majority of the respondents. This study suggests that even geographically and linguistically limited open online communities are not as socially solid as, for example, workplace or school communities. (2006, p. 264)

In sum, according to Waldron (2012), through informal online communities of practice, people who want music learning can gain information, feedback, and encouragement from the members of online communities. She stated that some online community members may integrate both on and offline networks. Salavuo (2006) pointed out that the reason that the Finnish users participated in an online music community was a musical motivation rather than a social one. However, these authors (Salavuo, 2006; Salavuo, 2008; Waldron, 2012) emphasized that music educators should take into account music learning that happens outside the formal music education environment.

According to McNamara (2012), these informal online learning communities also can be considered online professional development. Although such online communities of practice may be important sources of OPD for music teachers, my interest in this study

is not *informal* OPD. The focus of this study is on OPD courses or classes which may be used for recertification credit.

Comparisons between PD and OPD

In this section, I discuss research studies designed to compare the impact of online and face-to-face PD (Fisher, Schumaker, Culbertson, & Deshler, 2010; Fishman et al., 2013; Thomas, 2010).

Fishman et al. (2013) conducted a randomized experimental comparison of 49 high school science teachers learning to implement new curriculum in two PD conditions: OPD or face-to-face PD. They also compared the effectiveness of participation in these two conditions on three types of outcomes: teacher beliefs and knowledge, teachers' classroom practice, and student learning outcomes. Fishman et al. designed the content to be the same across both PD modalities. The online workshop included 25 participants, while the face-to -face PD condition included 24 participants. No significant differences were detected between the groups' learning outcomes. The researchers found that teachers' beliefs about their personal efficacy for teaching environmental science in both conditions were improved. Although these teachers' students also showed significant improvement in their science scores, there was no significant difference between the scores of students of teachers in the online PD course and students of teachers in the face-to-face PD course.

Similar to Fishman et al. (2013), the study of Fisher et al. (2010) did not detect any significant differences in teachers' knowledge and student outcomes between virtual and in-person face-to-face workshops. Fisher et al. conducted two studies. In study I, they observed 59 teachers who enrolled in a graduate-level course that was either a virtual (30

teachers) or a face-to-face workshop (29 teachers) to examine the change in their knowledge of the techniques that were taught in the course and their satisfaction with the workshop. Fisher et al. designed the same content for both virtual and face-to-face workshops. Through the online virtual workshop utilizing a multimedia software program, teachers could see a lesson plan and interact with instructor or peers. The face-to-face workshop had the same elements but did not use the computer-based learning. There was no significant difference in the improvement of teachers' knowledge score between two conditions, and teachers in both workshop groups rated their overall satisfaction similarly.

In order to investigate the satisfaction of students who had instruction provided by both online and face-to-face trained teachers, in study II Fisher et al. selected eight volunteer teachers from the original study and divided these teachers into experimental and control groups. Utilizing a teacher behavior checklist, a student concept acquisition test, and a student satisfaction questionnaire, this study measured the perceptions of the students of these eight teachers, the student learning, and their satisfaction with the instruction they received from these teachers. The second study found no significant difference in scores earned by students ($N = 1371$) who learned from both teacher groups. In this study the two groups of students were similarly satisfied with their teachers, whether the teachers learned online or at face-to-face PD.

In his dissertation, Thomas (2010) investigated teachers' and instructors' opinions regarding the effectiveness of online courses as delivery methods for professional development through a researcher-developed survey. To identify participants for the study, Thomas sent surveys to 50 instructors, 17 responded, six more were eliminated for partial answers, leaving 11 qualified study participants. He also sent

surveys to 410 teachers enrolled in online courses, 60 completed the survey, and 10 more were excluded for partial answers, leaving 50 qualified participants. Thomas' analysis of the survey results indicated that both instructors and online teacher participants had more positive perceptions regarding the effectiveness of online professional development than face-to-face PD (instructors = 63.7% , online participants = 56%). Findings also indicated that both online teacher participants and instructors who have more years of teaching experience preferred to participate in online professional development over traditional professional development. They also tended to have a more positive opinion of the effectiveness of online rather than traditional professional development. However, they indicated that face-to-face PD provided a more effective forum for collaboration than OPD (instructors = 81.8%, online participants = 68%). Both participant groups indicated time flexibility and internet accessibility as benefits of online professional development. The major barriers to online professional development were slow internet (instructors = 90.9%, online participants = 64%) and lack of face-to-face interactions (instructors = 45.5%, online participant = 46%).

In sum, some studies (Fishman et al., 2013; Fisher et al., 2010) found no significant differences between PD and OPD in learning outcomes for both teachers and the students of those teachers. In contrast, Thomas (201) found different strengths in both kinds of PD. He found that two groups of respondents (online instructors and online teacher participants) and found they had a more positive opinion of the effectiveness of online rather than face-to-face PD, while they indicated that face-to-face PD provided a more effective forum for collaboration than OPD.

Research in relation to PD and OPD reviewed in this study does not reflect all PD types. In addition, teachers' perceptions about whether OPD is more or less effective than any other PD can be very subjective because there is a vast range of designs in both PD and OPD modalities (Fisher et al., 2013). Agreement about best practices for the design of both PD and OPD models is difficult to reach for the same reason.

Interactions in PD

Shale and Garrison (1990) stated that "in its most fundamental form education is an interaction among teacher, student, and subject content" (p. 4). Picciano (2001) pointed out, "fundamental to all instruction is the ability to communicate and interact" (p. 69). Woo and Reeves (2007) also stated that "Interaction is an essential ingredient in any learning process" (p. 15). However, a wide variety of course designs exist in educational courses, some with interaction and some without interaction. Some courses do not have interaction between course participants, while other courses have interactions between peers or between instructors and students.

The Oxford English Dictionary defines interaction as "reciprocal action; action or influence of persons or things on each other." Wagner defined interaction as:

> . . . reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another. An instructional interaction is an event that takes place between a learner and the learner's environment. Its purpose is to respond to the learner in a way intended to change his or her behavior toward an educational goal. Instructional interactions serve two purposes: to change learners and to move them toward achieving their goals. (1994, p. 8)

According to Sutton (2001), in formal online learning, the term interaction is often not well-defined and is frequently confused with interactivity. She defined *interactivity* as related to the technology itself, "an inherent feature of the medium, which

allows the users to experience a series of exchanges by means of the technology." She suggested that, "by contrast, *interaction* is defined in terms of a learning process, objective, or outcome" (p. 225, italics added for emphasis). Sutton pointed out that interaction is "the way learners and instructors communicate their own ideas, perspectives, feelings, and knowledge over time and comprehend those of others" (p. 225), and interaction requires at least two actors who mutually influence one another.

Muirhead and Juwah (2004) reviewed literature related to interactivity and interactions in online education. They defined *interaction* as "a dialogue or discourse or event between two or more participants and objects which occurs synchronously and/or asynchronously mediated by response or feedback and interfaced by technology" (p. 13). They suggest that the literature has identified a wide variety of types of interactions that may occur in online education. They used the word *interactivity* as a more general term to describe "the form, function and impact of interactions in teaching and learning" (p. 13).

However, Yousef (2012) utilized the terms interaction and interactivity interchangeably in his dissertation. He singularly defined the term interactivity as "those instances in which learners communicate or collaborate with the instructor or other learners" (p. 25). He did not define interaction but sometimes seemed to substitute it for interactivity.

To avoid ambiguity, my study will use only the term interaction. In this study, interaction is defined as the opportunity for teachers who are taking OPD courses to communicate electronically with their peers in the course and exchange information through the use of computer-mediated communication. Before examining studies of

interactions in online settings, I review studies of interaction between teacher participants in traditional face-to-face PD in the following section.

Interaction between Teacher Participants in Face-to-Face PD

One of the most important benefits of PD and OPD is the possibility of interaction between learner and instructor or among learners. (Bishop, 2006; Deal, 2002; Dede, Ketelhut, et al., 2009; Hammel, 2007, Kim, 2012; McNamara, 2010; Treacy et al., 2002; Woo, 2005; Wu & Hiltz, 2004). Some researchers emphasize the importance of interactions between teacher participants in face-to-face professional development activities (Bernard, 2009; Conway, 2008; Hammel, 2007; Kim, 2012). Research reported in this section relates to interaction between teacher participants in traditional face-to-face PD in general and music education.

Hammel's (2007) literature review shared results of selected studies from general teacher education regarding professional development for educators. She grouped studies as follows: the role of PD in school change and reform, the disconnect between teachers and administrators regarding PD, the need for varying types of PD, analyses of delivery formats for PD, the relationship between collegiality and collaboration among teachers in PD, and best practices in PD. Hammel discussed connections between these general education studies and the experiences of music educators at the end of each section of her paper. In particular, she emphasized the importance for music teachers of communication and long-term collaborations with other educators.

Other studies have focused on opinions regarding interactions specifically between music teacher participants in traditional PD (Bernard, 2009; Conway, 2008; Kim, 2012). In his dissertation, Bernard's (2009) purpose was to determine the PD activities

that practicing elementary music teachers need and desire. He surveyed 479 elementary music teachers in Georgia, North Carolina, and Florida. The results indicated that these music teachers found PD to be meaningful. They believed that content-specific PD (based on the music curriculum and music standards) lead to increased student achievement in music. As one of many findings of this study, the participants viewed sharing best practices informally among music colleagues as an effective means of achieving PD goals. Over 84% of respondents indicated that regularly scheduled long term interactions, such as peer sharing sessions, were valuable to them (p. 123).

Similarly, Conway (2008) investigated the perceptions of experienced music teachers (N = 19, 13 mid-career teachers and 6 veteran teachers in Michigan) regarding PD experiences throughout their careers. This study had two research questions: the perceptions of music teachers about the most and least valuable PD experiences, and changes in their perceptions regarding PD experiences based on the length of time a teacher had been in the field. Conway utilized a phenomenological interview design. She conducted interviews on site or by phone and collected data during three years. Findings suggested music teachers had different professional development needs at different stages in their careers, and that their professional development needs changed over time. However, all experienced music teachers in the study considered informal interactions with other music teachers as the most helpful and valuable professional development experiences. Conway highlighted music teachers' need for interaction with other music teachers in order to share their teaching practice and reflect on that practice.

A more recent study found much the same result concerning the value of PD interactions. The purpose of Kim's study (2012) was to review literature related to

professional development for in-service music teachers in the United States and to survey the perceptions of in-service general music teachers (N = 36) in one district regarding their professional development activities. An online survey instrument explored the following questions. (1) What kinds of PD do teachers attend or would like to attend? (2) What PD topics or offerings are teachers interested in attending? (3) How often do teachers participate in PD? (4) How do teacher participants perceive the effectiveness of PD? (5) What are the reasons that teachers participate in PD? (6) What prevents teachers from participating in PD? Findings (n = 22, return rate=61%) indicated that 21 respondents had an interest in informal collaboration and/or interaction with other teachers to learn new skills. They also reported this was the most utilized PD activity (95%). The most important reasons for joining in PD activities were both job retention (100%) and meeting continuing education requirements every five years (100%). The primary factor that prevented respondents from participating in PD was time limitations (100%).

In summary, not only general education teachers (Hammel, 2007) but also music teachers, such as elementary music teachers (Bernard, 2009), experienced music teachers (Conway, 2008), and in-service general music teachers (Kim, 2012), indicated that interactions between peers were considered to be very important elements in traditional face-to-face professional development. For instance, through interactions with others in a small or large group, learners could pose questions, present their learning dilemmas, solve problems, comment on others' questions, or gain collaborative skills. Learners also could actively construct knowledge through interactions with other learners and instructors. These findings influenced the research questions and survey of this study.

The Importance of Interaction in Online Settings

Many studies have found that interactions have an important role in leading learners to a deeper understanding of knowledge in any learning environment; a traditional classroom-based setting (Bernard, 2009; Bush, 2007; Conway, 2008; Conway & Christensen, 2006; Eros, 2012; Hammel; 2007; Kim, 2012), an online learning setting (Brown & Green, 2003; Fung, 2004; Hirumi, 2002; Hultgren, 2008; McNamara, 2010; Picciano, 2001; Riel & Levin, 1990; Shale & Garrison, 1990; Vrasidas & Zembylas, 2004; Woo, 2005; Woo & Reeves, 2007), or a blended model (Sanders, 2005; Walls, 2008; Wu & Hiltz, 2004). There are, however, differences between interaction in traditional classroom learning environments and interaction in online learning settings. Yousef (2012) pointed out, "The dissimilarities between online courses and traditional classroom courses exist because there is no physical interaction, and this separation can influence learning" (p. 65). The accessibility of technology may allow students in more diverse settings to participate in the same online course (Bush, 2007, Muirhead & Juwah, 2004; Sanders, 2005; Sutton, 2001; Woo & Reeves, 2007), and can provide varied opportunities for communication with participants from diverse backgrounds (Sanders, 2005; Treacy et al., 2002; Wu & Hiltz, 2004; Yousef, 2012). Although there are still concerns about the quality of internet courses (Woo & Reeves, 2007), many studies highlighted that interactions in online settings are more critical than face-to-face interactions in underpinning the learning process and enhancing effective learning (Dede, Ketelhut, et al., 2009; Fung, 2004; Moore, 1989; Swan, 2002).

The following sections present research on meaningful online interaction, tools for online interactions, types of interaction in online settings, and interaction between learners (college students or teacher participants) in online settings.

Meaningful Online Interaction

Various studies show distinct advantages of online learning and many researchers recognize the value of interactions in online settings (Anderson, 2003; Fung, 2004; Muirhead & Juwah, 2004; Sanders, 2005; Shale & Garrison, 1990; Sutton, 2001; Vanderbilt, 2008; Vrasidas & Zembylas, 2004; Woo & Reeves, 2007; Wu & Hiltz, 2004; Yousef, 2012). However, online interactions are not always meaningful for learning. To be considered meaningful, interactions should directly increase the learners' intellectual growth, not just amplify personal interaction as happens with social media (Woo & Reeves, 2007). The following research is related to improving the effectiveness of online interaction among learners (Hirumi, 2002; Hultgren, 2008; Riel & Levin, 1990; Woo, 2005; Woo & Reeves, 2007).

Riel and Levin (1990) first developed a framework for their three studies by conducting a literature review. They adapted and modified the defined "participant structure" first introduced by Philips (1983). Five criteria were used in this network participation framework: 1) organization of the network group, 2) network task organization, 3) response opportunities, 4) response obligations, and 5) evaluation and coordination. Riel and Levin's first requirement for successful networking is a group of people with common interests who are not in the same location and/or together at the same time. It supposes that shared interests will promote successful interactions between peers in online education. The second requirement is a well-specified task to be

accomplished by this group, based on the assumption that online discussion boards will be successful if participants are asked to respond to several specific tasks. If there are no designated network activities for participants in online education, interactions between peers may not take place. The third criterion is issues of access to a reliable computer network. Riel and Levin stated that all participants should have the accessibility and expertise necessary to utilize technical resources or networks in order to contribute to the online discussion board. As the fourth requirement, Riel and Levin asserted that a sense of responsibility to the task and/or the group is an important part of successful networks. For an effective online discussion forum, each participant's sense of responsibility to the group or network is required. Otherwise, interactions may be insufficient or may not take place at all. Riel and Levin's fifth specification is strong leadership and final evaluation of the group task. Without instructors' evaluation on the basis of participants' interactions and strong leadership, interactions may not happen. This means that participants will be more motivated to engage online discussion through the use of external rewards for the interactions (e.g., grades).

After developing the framework based in previous research, Riel and Levin conducted three separate studies to examine features of networking failures and successes. In the first study, Riel and Levin compared two research lab groups drawn from faculty members in the same university to find the critical features that determined the success of electronic communication. Results of the study of faculty members showed that the successful research lab group worked on networked computer terminals with dedicated communication hardware in their offices, had separate work places, used electronic messages daily, and e-mail alerts to remind them when they did not respond to emails.

Conversely, the other research lab group was unsuccessful because they used personal computers, were conveniently on the same floor of a building, and had no pressure to respond to e-mail regularly.

In the second study, Riel and Levin contrasted three teacher networks. The first group in these networks was a research team who studied computers in classrooms. The second group was a Summer Institute group that shared common learning experiences in an intensive online education program. The third network group was a Tele-course that enrolled teachers in an electronic university course for collegiate credit. Results showed that the research team was unsuccessful in networking because they preferred real-time communication rather than asynchronous network interaction. The Summer Institute teachers' electronic network was viewed as not successful because participants did not have common tasks and had no common response obligations. They also had neither a coordinator nor any evaluation. Conversely, the networking of the Tele-course group was successful because a leader facilitated their interactions, the participants shared common activities on the electronic networks, and the participants received a course evaluation, all of which Riel and Levin believed are critical features in successful networks.

In the third study, Riel and Levin compared two student network groups; 1) computer-pals and 2) student news network (a group that published a classroom newspaper). The former group sent letters through the computer to peers in distant places. The latter group created stories for publication in their school newspapers related to information from peers in other locations. Results were mixed. Although both the computer-pals and the news network had a well-specified task and a network coordinator to facilitate the group, the students' news network was successful but the computer-pals

group was unsuccessful. The most important factor was the differences in school and class size in both schools. Matching students one-to-one was problematic because one classroom had many students in their class, while the other class was much smaller. Students in the news network had a well-specified group task, while each student in the computer-pals group had an individual task. Therefore, group communication structure (many to many) in the news network group was more effective than the one-to-one pairing structure in the computer-pals group.

Based on these results, Riel and Levin concluded that successful networking can take place both when a familiar group has an interest in a new task and when a group of strangers are interested in a well-specified task. In addition, the commitment of the facilitator or coordinator is needed for successful group interactions.

In his dissertation, *The Essences of Interaction in Online Education,* Hultgren (2008) investigated the experiences of online interaction described by six doctoral students enrolled in online courses at accredited universities who were living in the southeastern part of the U.S. To understand the learners' perspectives about online interaction, Hultgren used a phenomenological research design, with semi-structured interviews, field notes, and journal entries as data. Four themes emerged regarding the essences of online interaction: students' perceptions of the instructor, students' perceptions of classmates, assumptions about the role of instructors, and assumptions about the role of learners.

For effective online interaction, one aspect was whether or not students perceived the instructor was acting professionally. Participants believed that instructors should be content experts and possess a high level of knowledge. The students also

reported that the instructor's regular presence in the discussion was significant in order for them to engage in meaningful interactions with classmates. Concerning their perceptions of classmates, some participants thought that students learned a great deal from each other in the online interaction. Others viewed interaction with classmates negatively because they thought that their classmates were unskilled and unprofessional. Two participants said that when classmates are similarly motivated and educated in knowledge and skill, online discussion between peers was helpful and important. Some students expressed that the role of instructor-as-facilitator was essential for quality interactions among classmates.

In order to promote student-to-student interaction, this study suggested that an instructor should 1) guide student interactions, 2) interact directly with the class, and 3) provide students with timely feedback. With regard to the role of learners, some participants mentioned the need for students to assume personal responsibility for fostering interaction with peers. Some students mentioned that the opportunity for interaction with classmates was meaningful in their effective online courses, however, this study did not find that the actual interactions with peers were always helpful in the learning process. Whether or not the interaction was experienced positively was mainly based on students' perception of the instructor and their classmates and the roles of the instructor and learners.

In order to investigate learners' perceptions of meaningful interaction in the web-based learning environment, Woo (2005) conducted in-depth qualitative interviews. Three graduate students with online course interaction experience were selected to help understand various perspectives of online interaction experiences and identify strategies

for the design of online interaction activities. Through analysis of the interviews, two major themes appeared; one was the nature of online interaction, the other was strategies for improving the quality of those interactions. To examine the nature of interactions, Woo explained her participants' perceptions of the advantages and disadvantages of online interaction. Findings also indicated that careful planning and appropriate strategies for meaningful online interaction should be identified in web-based learning. Among strategies for the design of meaningful online interaction, participants indicated that they needed the following: the instructor's detailed guidance, technical support, encouragement, experts' participation, collaboration within small groups, and meaningful and relevant topics for discussion. Woo found that the structure of the course also affects the level of interaction among learners. She insisted that it is very important to consider and understand the learners' perspectives in order to design successful web-based learning and meaningful online interaction.

Having an interest in theoretical foundations to determine what meaningful interaction is, Woo and Reeves (2007) re-conceptualized meaningful online interaction in web-based learning through the lens of social constructivist learning theory. In their literature review, they summarized some definitions of interaction and meaningful interaction. They explained that meaningful interaction is related to learning theories such as behaviorist learning theory, media theory, theories of instructional design, cognitive learning theory, and constructivist theory. According to constructivists, interactions can be meaningful when they are designed to enhance meaning-making. Social constructivists emphasize that effective meaning-making and learning takes place through social interactions with adults or peers who have various experiences and

different perspectives in the same culture or context. In this regard, Woo and Reeves explained meaningful interaction in social constructivism:

> While engaging in authentic learning tasks with various people including peers and experts, learners engage in defining the task, generating ideas, sharing resources and perspectives, negotiating, synthesizing individual thoughts with those of others, completing the tasks, and refining them on the basis of further sharing of insights and critiques. When learners are faced with confusion or conflict, they discuss the issues with one another at first and then they try to negotiate internally and socially to solve the problem. (2007, pp. 19-20)

With the development of the internet and computer technology, Woo and Reeves asserted that students are becoming more actively engaged in interaction opportunities because students can use various communication tools and networks in a web-based learning environment to share what they are thinking. For meaningful interactions, Woo and Reeves emphasized that instructors should utilize effective instructional design models and present authentic tasks. Through these genuine tasks, students can interact and communicate with their peers who may have different perspectives. However, for effective interactions in web-based learning, Woo and Reeves also highlighted that using authentic tasks does not guarantee meaningful interaction, because many other factors influence interaction, such as the online learning environment, students' varied interests and motivation, and instructors' different teaching strategies. Last, in order to understand patterns of web-based interaction through careful analysis, Woo and Reeves also discussed interaction analysis models that other researchers have developed.

In spite of a proliferation of e-Learning opportunities, in an essay, Hirumi (2002) insisted that many e-Learning programs depend on teacher-directed instructional methods that only convey content, not meaningful interactions among instructors, content, and students. Hirumi had three fundamental questions in relation to e-Learning programs: 1)

How does e-Learning differ from traditional classroom instruction? 2) What are meaningful e-Learning interactions? and 3) How do educators or online course designers plan and manage meaningful e-Learning interactions? First, she suggested that key interactions in traditional classroom settings take place in real-time through verbal and nonverbal means, while interactions in e-Learning at that time were asynchronous, utilizing technology (telecommunication tools). However, Hirumi asserted that interactions in e-Learning should be well-organized for learners to have meaningful interactions through the use of technology. Second, for meaningful e-Learning interactions, Hirumi indicated that various technologies such as telecommunication tools, as well as the role of instructors, act as important means to facilitate interactions. However, he concluded that meaningful e-Learning interactions depend on "the instructional goals and objectives, the instructional strategy, the teacher's beliefs and/or the number and nature of learners, among other factors" (p. 21). Last, as a foundation for designing and sequencing meaningful e-Learning interactions, Hirumi suggested a five-step iterative process: Step 1: Identify key learning experiences that assist learners in achieving learning goals and objectives (This step may be combined with steps 2 or 3 by experienced designers); Step 2: Select grounded instructional strategies, based in research and established theory, such as inquiry learning, student-centered learning, or problem-based learning; Step 3: Describe how specified instructional strategies will be implemented in each learning event; Step 4: Select the type of interaction that will promote each event; and Step 5: Based on the selected interaction, choose the appropriate telecommunication tools to enable each learning event to achieve the learning goals. In conclusion, Hirumi asserted that well-defined instructional design processes help

educators create effective e-Learning programs and promote meaningful interactions. In addition, Hirumi concluded that in e-Learning environments an instructor who can facilitate key interactions is essential for students to experience meaningful interactions. The following review of literature shows research on tools for online interaction.

Tools for Online Interaction

Electronic communication tools are needed in order to enhance online interactions, and different tools as well as online course format continually evolve. The following studies related to technology-mediated interactions are representative of the research available at the time of this study. In the early 1990s, researchers focused on electronic message systems. "The most common form of interaction on electronic networks is the exchange of electronic messages" (Riel & Levin, 1990, p. 145). They found that, through various electronic message systems, not only students but also teachers could experience different kinds of interactions such as one-to-one, one-to-many, and many-to-many group dialogues. These messages form a written record of the communication that can be stored and retrieved for all users in the electronic network.

As one of the early online designers who promoted interaction, Sutton (2001) explained various types of media that are often used in distance education. She defined computer-mediated communication (CMC) as "a system for information flow that enables learning participants to communicate and interact with one another over time" (p. 228). Examples include "e-mail, newsgroups, listservs, online chats, bulletin boards, asynchronous discussion, computer conferencing, and streaming video and audio" (p. 228). Sutton proposed three characteristics of CMC: 1) CMC can be used in both synchronous and asynchronous situations; 2) CMC can provide opportunities for open

interaction between all participants; and 3) CMC can be adapted to individual learning needs.

Ashley and Kaplan (2003) discussed synchronous and asynchronous communication tools in *Executive Update Online*. First, they explained that synchronous tools are used for communication that takes place when learners are online at the same time but in remote different places. The merit of synchronous tools is that learners can communicate with other people instantly. The weakness of synchronous tools is that learners are required to participate at the same time to communicate with others. According to Ashley and Kaplan, synchronous tools are inclined to be expensive and require crucial bandwidth to be useful. They presented the table below to show examples of synchronous tools with their merits and weaknesses.

Table 2

Synchronous Tools and Their Merits and Weaknesses

Tool	Useful for	Drawbacks
Audio conferencing	Discussions and dialogue	Cost, especially when international participation is involved
Web conferencing	Sharing presentations and information	Cost, bandwidth; may also require audio conferencing to be useful
Video conferencing	In-depth discussions with higher-touch interactions	Cost, limited availability of video conferencing systems
Chat	Information sharing of low-complexity issues	Usually requires typing, "lower touch" experience
Instant messaging	Ad hoc quick communications	All users must use compatible system, usually best for 1:1 interactions
White boarding	Co-development of ideas	Cost, bandwidth; may also require audio conferencing to be useful
Application sharing	Co-development of documents	Cost, bandwidth; may also require audio conferencing to be useful

(This table is quoted directly from Ashley and Kaplan's [2003] article)
http://www.asaecenter.org/Resources/articledetail.cfm?itemnumber=13572

Ashley and Kaplan defined asynchronous tools as communication that takes place over a period of time when learners are engaged at different times and in different places. The advantage of asynchronous tools is that learners can communicate with other people from all around the world while participating on their own schedule at a convenient time. The drawback of asynchronous learning is that learners may take longer to arrive at decisions or conclusions. The following Table 3, by Ashley and Kaplan, shows examples of asynchronous tools as well as their merits and weaknesses.

Table 3

Asynchronous Tools and Their Merits and Weaknesses

Tool	Useful for	Drawbacks
Discussion boards	Dialogue that takes place over a period of time	May take longer to arrive at decisions or conclusions
Web logs (Blogs)	Sharing ideas and comments	May take longer to arrive at decisions or conclusions
Messaging (e-mail)	One-to-one or one-to-many communications	May be misused as a "collaboration tool" and become overwhelming
Streaming audio	Communicating or teaching	Static and typically does not provide option to answer questions or expand on ideas
Streaming video	Communicating or teaching	Static and typically does not provide option to answer questions or expand on ideas
Narrated slideshows	Communicating or teaching	Static and typically does not provide option to answer questions or expand on ideas
"Learning objects" (web-based training)	Teaching and training	Typically does not provide option to answer questions or expand on ideas in detail
Document libraries	Managing resources	Version control can be an issue unless check-in/check-out functionality is enabled
Databases	Managing information and knowledge	Requires clear definition and skillful administration
Web books	Teaching and training	Not dynamic and may lose interest of users
Surveys and polls	Capturing information and trends	Requires clear definition and ongoing coordination
Shared Calendars	Coordinating activities	System compatibility
Web site links	Providing resources and references	May become outdated and "broken"

(This table is quoted directly from Ashley and Kaplan's [2003] article)

Stephens and Hartmann (2004) studied an online discussion forum about teaching mathematics with technology. They encouraged secondary mathematics teachers to use a real-time chat room with messages temporarily archived, and also an asynchronous online discussion board. However, while the participants preferred the

direct interaction of the chat room, the online discussion board was not successful due to participants' time constraints.

Contrary to Stephens and Hartmann (2004), in Wang and Green's (2006) online graduate course, online interaction through a discussion board was successful. To demonstrate the experiences of the authors regarding online interaction among students and between students and the instructor, Wang and Green discussed the communication tools that their students utilized through a WebCT course management system: chat room, email, and discussion board. Using the chat room as a synchronous communication tool was not as successful because it was not easy for students to coordinate their times to exchange personal ideas about their online group project. The instructors used the email system in WebCT throughout the semester but the students used it only at the beginning. As part of their grade, students were required to contribute to online discussion for their online group project within the course. Utilizing the discussion board, six participating graduate students were required to do the following: 1) post their thoughts to the weekly discussion questions from the instructor and to the other class members' individual or group projects, 2) critique their fellow group members' post, and 3) revise their project based on feedback from the instructor and their group members. As a result, the authors indicated that all students were satisfied with their asynchronous interactions through discussion board. Although they did not feel comfortable evaluating their peers' work, most students indicated that peer critiques made them rethink their own paper. Wang and Green concluded that their students preferred asynchronous communication tools (discussion board) to synchronous tools (chat room) because of flexibility in scheduling.

Talor (2011) carried out a qualitative case study related to an online professional development course offered via Blackboard in order to examine characteristics of effective online professional development. The online learning environment in his study provided eight K-12 educators with the opportunity to interact with peers through blogs, email, and asynchronous discussion boards. Among these tools for interacting with peers, Talor examined two course tools in great depth. The first was a synchronous course tool, Wimba Live Classroom. Through this tool, course participants could interact with one another in real-time with voice features and synchronous chat features. The second tool he used was an asynchronous tool, a discussion forum. Teacher participants could post or upload their responses to interact with peers by using these collaborative online tools. Talor found that teacher participants participated successfully in interaction using discussion forum (rather than Wimba Live Classroom) because the instructor made these interactions mandatory.

Diverse forms of interactive technology tools have become more developed and more widely implemented in online courses over the past 20 years. Although researchers' designs varied, most interactive tools such as discussion boards, email, and chat rooms allowed learners to actively engage with other learners to share their knowledge and opinions.

Types of Interaction in Online Settings

Many researchers have identified various types of interactions and stated their importance in online education (Ally, 2008; Anderson, 2003; Chou, 2003; Hillman et al., 1994; Moore, 1989; Muirhead & Juwah, 2004; Swan, 2002). In his article, *Editorial: Three types of interaction*, Moore (1989) classified three types of interaction in distance

education and labeled them as 1) learner-content interaction, 2) learner-instructor interaction, and 3) learner-learner interaction. The first interaction is between learner and content or subject of study. In distance education, content refers to written materials or electronic resources. Moore described this type of interaction as a one-way interaction, an internal conversation with content that takes place in students' own minds when they encounter new information. Second, learner-instructor interaction appears between the learner and the professional teacher as expert. After delivering the presentation, some of the most important roles of the instructor are to help learners solve their problems and to answer their questions about the presentation as a counselor, supporter, and facilitator. According to Moore, a professional instructor can stimulate and enhance the learners' interest, facilitate the learners' application of their learning, and provide effective support through this interaction. Moore's third type of interaction, learner-learner interaction, is found between one learner and other learners in the same course. Moore described interaction among members in distance education as a valuable resource and essential to learning because fellow learners can provide counsel or support for each other. Many distance education programs create obstacles because they commit to only one type of interaction. In contrast, Moore emphasized the importance of using all three kinds of interactions in distance education.

Based on Moore's study, Swan (2002) further refined the three kinds of interactions affecting the success of formal online learning: 1) interaction with content, 2) interaction with instructors, 3) interaction among students. Swan explained the first interaction, "interacting with content," as the learners' ability to manipulate and synthesize all content information through the online course. She described the second

interaction, “interacting with the instructor,” as the learners' ability to communicate with the instructor through email, discussion boards, and synchronous chats. Swan explained “interacting among students” as the ability of learners to interact with other classmates through both synchronous and asynchronous course discussions.

Although Moore (1989) and Swan (2002) discussed three types of interaction: learner-content, learner-instructor, and learner-learner, Hillman et al. (1994) identified a fourth type of interaction, learner-interface interactivity, to emphasize the communication that takes place between the learner and technology. In this opinion essay, Hillman et al. defined learner-interface interaction as “a process of manipulating tools to accomplish a task” (p. 34). They emphasized that this interaction is unique in distance education, because students must use technology to interact with the content and the instructor. Hillman et al. also believed that interactions between learner-instructor and learner-learner provide opportunities for an educational transaction. However, in order to effectively interact with the content, instructor, and other learners, they claimed that the interactions that occur between the learner and the interface should be utilized and understood by all users. In conclusion, Hillman et al. suggested that learners must become accustomed to using the delivery system, such as devices or technologies, for effective interaction with content, instructor, and other learners.

In her literature review on the concept of interactivity, Chou (2003) reviewed literature “from the perspectives of communication, CAI [computer assisted instruction], and distance education” (p. 266). She also included literature that examined interactive functions embedded within web-based learning systems. Based on her literature review, she proposed a list of 36 interactive functions that could be present in web-based learning

systems. She used the four types of interaction as described by Hillman et al. (1994) to categorize these 36 functions. She asked two panels of experts (instructional designers and web programmers) to evaluate the 36 functions in order to determine the essential characteristics of ideal interactive web-based learning systems. The instructional designers rated 18 of the 36 interactive functions as "must have," 14 as "should have," and 4 as "nice to have." They did not rate any "OK if missing." The web programmers reported 11 of the 36 interactive functions as "easy" to add to a learning system, 18 as "not difficult," 6 as "difficult," and 1 as "very difficult" to add. Chou suggested that her list of interactive functions could assist in designing web-based instructional systems that offer students a high degree of interaction, and could also help assess the level of interactivity in existing online learning systems. She recommended that further research "focus on the relationship between technical interactivity and cognitive interactions among learners" (p. 275), and also examine user perceptions of these different types of interactions.

In contrast, Sutton (2001) identified five types of interaction in distance education. The first four are the same as those identified by Hillman et al. Sutton's fifth interaction, vicarious interaction, takes place "when an otherwise passive student actively observes, absorbs, and processes the ongoing interactions between other students and between other students and their instructor" (p. 232). Sutton identified four types of interactors: 1) direct interactors (who interact with others), 2) vicarious interactors (who actively observe and cognitively process the interactions of others), 3) actors (who provide unilateral input despite comments of others), and 4) nonactors (who do not join in the communication). In general, when students tend to be shy, hesitant, or passive in

face-to-face communication, their interactions may not be active and may not enhance the quality of their learning experience. However, Sutton insisted that these vicarious interactions, as well as direct ones, can enhance the learning process and achieve learning benefits for these students.

Ally (2008) discussed the foundation of different educational theories (behaviorist, cognitivist, constructivist, and connectivist theories) for developing learning materials for online learning. He proposed a model for developing online instruction based on each of these theories. In order for learners to achieve their learning goals in online lessons, Ally suggested that online courses should include various authentic activities, including learner interactions, as learning components. Learning activities that he suggested were reading textual materials, listening to audio materials, viewing video materials, conducting research on the internet, preparing a learning journal, adjusting their learning methods, generating a lesson summary, and exercising real-life applications. Ally discussed five types of interaction in his article. Although the first four interactions are the same as those identified by Hillman et al., Ally added a fifth type of interaction, learner-to-context. He suggested that "learner-context interaction allows learners to develop personal knowledge and construct personal meaning from the information" (p. 33) and to apply the information in real life.

Based on Moore's (1989) three types of interactions, Anderson (2003) itemized six types of interactions in his chapter in the *Handbook of Distance Education*. Three of these are the same as Moore's: 1) student-student, 2) student-teacher, 3) student-content. Anderson added three more types of interactions: 4) teacher-content, 5) teacher-teacher, and 6) content-content. In teacher-content interaction, Anderson stated that teachers can

play a important role in the instructional design process by using delivery systems such as WebCT or Blackboard. Even though teachers can create their own online content without the help of graphic designers, he stated that administration and management concerns are still needed because of teachers' workload. In teacher-teacher interaction, Anderson stated that teachers can obtain important assistance and pedagogical challenges from other colleague. Through this interaction, learning communities can be formed. Through content-content interaction, learners can get additional learning resources that other intelligent agents collect and load in internet search engines.

Muirhead and Juwah (2004) conducted a review of recent literature to research interactivity in college and university computer-mediated education. Like Anderson (2003), they categorized six types of interactions as follows: 1) student-student, 2) student-teacher, 3) student-content, 4) student-interface, 5) teacher-teacher, and 6) content-content. Although Muirhead and Juwah did not provide specific descriptions for these interactions, they concluded that no single interaction type is superior to the others, and that all six types of interactions have their own roles in the educational process.

Interaction between Learners in Online Settings

Learner to learner interaction in online learning settings is an indispensable component in order for participants to share their overall experiences and professional knowledge with other learners (Fung, 2004; Moore, 1989; Sanders, 2005; Talor, 2011; Wu & Hiltz, 2004; Yousef, 2012). According to Moore (1989), "learner-learner interaction among members of a class or other group is sometimes an extremely valuable resource for learning, and is sometimes even essential" (p. 4). Learners generally tend to look forward to responses from their peers because they want to hear what peers think

about their ideas (Anderson, 2003). In his dissertation, Yousef (2012) stated, "In order for an online learning environment to be effective, there must be a high level of learner-learner interactivity in a communicative and collaborative sense." (p. 7).

In this study, I have an interest in the interactions between learners in online education because music educators can learn not only from course instructors but also from peers (Anderson, 2003; Bernard, 2009; Conway, 2008; Fung, 2004; Hammel, 2007; Kim, 2012; Moore, 1989; Talor, 2011; Wu & Hilz, 2004; Yousef, 2012). In the following section, I review studies of interaction between learners (college students or teacher participants) in online educational settings.

Interaction between college students in online settings. Researchers have found that interaction between peers motivates learners to collaborate and construct knowledge (Anderson, 2003; Bernard, 2009; Conway, 2008; Fung, 2004; Hammel, 2007; Kim, 2012; Talor, 2011; Wu & Hilz, 2004; Yousef, 2012). Studies focused on college students have indicated that interactions with others in their online learning environment play a significant role in their learning (Fung, 2004; Sander, 2005; Wu & Hiltz, 2004; Yousef, 2012). The following literature examined learner to learner online interactions in both blended or online educational settings dealing with college students.

When considering the features of online interactions, it is important to clearly identify design characteristics of PD opportunities (Fisher et al., 2013). Wu and Hiltz (2004) studied whether the use of asynchronous online discussion as part of traditional face-to-face classes affected the perceptions of student learning. They surveyed 116 students (non-music students) in blended mode courses with online discussion, two undergraduate courses (N = 73) and one graduate course (N = 43). In this study, the three

independent variables were 1) number of distance learning courses taken, 2) gender, and 3) the instructor role. To investigate relationships among variables, descriptive statistics and correlation analysis were used. The results showed that students' perceived learning was improved through online discussions. Wu and Hiltz stated,

> Over half of the students felt that they learned a great deal from their peers through online discussions. Fifty-seven percent of the students thought online discussion increased their learning quality. Over 78% of students thought online discussion was a great chance to share opinions among peers and instructor. (2004, p. 144)

There were no differences between female and male students in perceptions of learning, and approximately 68% of the students indicated that the instructor played an essential role to motivate effective online discussion. However, Wu and Hiltz found no statistical significance between the number of distance learning courses taken previously and the perceptions of learning from online discussion in the classes in the study. In open-ended questions to improve the online discussion process, students suggested that they needed more user-friendly interfaces as well as more guided and structured online discussion. They also recommended that instructors add more interesting discussion topics, and join in student-to-student online discussion forums.

The graduate course that Sanders (2005) researched was composed of both face-to-face and online communication. Four research questions guided the study: 1) What is the nature of the virtual interactions? 2) What is the impact of communication tools used? 3) What is the impact of interaction to shape student perspective? and 4) What is the role of interactions to support the development of community? Sanders surveyed students who enrolled in several sections of a graduate course focused on information technology issues. To analyze the interaction that was conducted via an online discussion board, 37

of the 61 graduate students were selected as his participants. Although there were some negative opinions, results indicated that virtual interactions were more comfortable for most students than face-to-face interactions because they provided more time to think, plan, and respond to questions. Another benefit to online discussion was that everyone in the large class could participate. In a face-to-face large class, there might not be time for everyone to offer their opinions. Regarding the asynchronous discussion board, students indicated that it was a useful and helpful communication tool because it provided opportunities for all students to know each other, to ask questions, and to share ideas and personal experiences. However, some students wanted realistic opportunities to have personal connections with other peers and did not want to wait for a reply to a question or comment in the discussion board. In the discussion board, some questions were left without comments or interactions. Another problem had to do with technical issues such as the absence of audio or video for interaction or a poor internet connection. For the third research question, Sander reported that interactions with other students were effective. Through interactions between learners, students could confirm what they knew and validate that they were not alone in their concerns. Last, most students agreed that they felt a sense of community in the course as a result of plentiful online interactions with other students. Data revealed that a community of students in the course could be formed when students actively interact with other students through the discussion board.

In contrast, one study in completely online courses found interactions online less valuable. Fung (2004) reported two studies related to graduate music students' online communication in three online courses of the Open University of Hong Kong's Master of Education program during a three-year-long research project. In the first study, as a

course coordinator, Fung included an analysis of music students' (N = 60) messages posted on the discussion board of one of three courses in order to identify interaction patterns. Only 30% of students (n = 18) posted messages and more than half of them (n = 11) posted only one cursory message (such as simple greetings or questions about the course content). Analysis of the messages showed that interaction had rarely occurred in discussion board and interaction patterns were monotonous.

The second study was a survey with twenty structured questions created to explore the reasons for 212 music graduate students' low level of participation in online discussion. With a return rate of 39.2% (n = 83), students in this study gave several reasons for their limited participation in online discussion. Most students felt a lack of time to interact with peers and preferred to spend time reading the course materials rather than spend time on online discussion. Some students' level of participation was affected by their peers; lack of active participation from others affected students' own involvement in online discussion. Fung reported music graduate students' collaborative learning through online discussion was not successful in distance learning courses.

Yousef's (2012) survey contrasted the opinions of various student age groups. To characterize the generational differences and preferences between online students from both Generation X and Millennials, Yousef examined specific factors that affected decisions to enroll in online classes and the level of interaction for these groups within an online course. The author surveyed 97 online non-music undergraduates enrolled in a degree-granting online program and received 88 responses (91%). The students completed an online survey. Results reflected generational differences in online learning, finding that Millennial online students (those born between 1980 and 2001) were satisfied

with the level of interaction with the instructor (a mean score of 4.33) and other peers (4.44) but were less satisfied with the speed of online education feedback (4.20). While Generation X (those born between 1965 and 1979) students preferred choosing what they wanted to learn as the best benefit of online learning (4.43). Although these learners expressed the need for more interaction with teachers and other students, they found it challenging to share, communicate, and collaborate in online education (4.14).

In sum, Wu and Hiltz (2004) reported that asynchronous online discussions between college students in blended mode courses were successful and beneficial. Moreover, Sanders (2005) found that, although college students had some problems with interactions, overall interactions between peers were beneficial in hybrid courses. On the contrary, Fung (2004) reported that interactions between music graduate students in online setting were not successful and were somewhat monotonous. Moreover, the results of Yousef's dissertation (2012) indicated that opinions about interactions with peers were different between two generations in online classes: Generation X considered the communication and collaboration with other students to be the biggest challenge, whereas Millennial generation students were satisfied with online interactions between peers. These mixed results could be attributed to individual factors in the design of the studies.

Interaction between teacher participants in online settings. Like the college students above, teachers also have an interest in interaction and cooperation with other teachers (McNamara, 2010). Based on the findings of her dissertation, McNamara (2010) noted, "Teachers thrive on the interaction and sharing of ideas between colleagues in job-alike situations" (p. 149). Previous research identified the importance of interactions between teacher colleagues in traditional face-to-face professional development (Bernard,

2009; Conway, 2008; Hammel, 2007; Kim, 2012). However, only a few studies have been conducted to investigate teachers' experiences of interaction in both hybrid and online PD (Kale, 2007; Macharaschwili & Devetski, 2012; Stephens & Hartmann, 2004; Talor, 2011).

Macharaschwili and Devetski (2012) studied a professional development course for teachers of English Language Learners (ELLs), which used the Sheltered Instruction Observation Protocol (SIOP) Model and the Modular Design for English Language Learners (MODELL) instruction program. According to Macharaschwili and Devetski, the purpose of SIOP model was to promote high quality instruction for English learners in content area teaching and the MODELL instruction program was developed to examine the impact of professional development offerings for ELLs. They used mixed methodology to research the impact of the program on the teachers' content knowledge and classroom practice. Participants of this study were six pre-service teachers, ten in-service teachers, and one paraprofessional. They all 17 participants joined in a blended learning model, using both face-to-face instruction and opportunities for online forum discussions. To assess the effectiveness of the instructions, Macharaschwili and Devetski collected pre and post surveys, interviews with participants, anecdotal records, and analysis of online forum posts and reflections from participation in the course. Findings indicated that participants' knowledge about English Learner instruction increased. However, most participants indicated a lack of technology skills, resulting in a lack of participation in the online discussion. They expressed a desire to have technology training or comprehensive online course software training in order to fully participate in online interaction.

Stephens and Hartmann (2004) noticed that an online discussion forum for secondary mathematics teachers in the context of teacher professional development was unsuccessful. They studied two separate groups (cohort 1, $n = 17$; cohort 2, $n = 11$), regarding teaching mathematics with technology during two consecutive years (2000-2002). Despite the instructors encouraging the participants to stay connected with other participants through use of the online discussion board, all of the postings consisted of individual comments in response to specific requests by the instructors, rather than interaction among participants. Through the survey, participants noted time constraints and preferences for direct engagement as the main reasons for their minimal interaction in the online discussion forum. As another reason, participants also found it difficult to communicate effectively online; for example, one participant commented that it was "hard to 'communicate details and subtleties of a lesson or activity' online" (p. 66).

In contrast to Stephens and Hartmann's research related to interaction between teacher participants in hybrid PD, Talor (2011) found success in interactions in an online-only course when the instructor required intercommunication between class participants. In his dissertation, Talor carried out a qualitative case study related to an online professional development course offered via Blackboard in order to examine characteristics of effective online professional development. His participants were eight K-12 educators from southwestern Pennsylvania enrolled in an online class that utilized Blackboard. Talor used four methods of data collection: 1) artifact analysis of asynchronous discussion board posts, 2) direct observation of one synchronous online class session, 3) interviews with participants, and 4) researcher's field notes via a journal. The online learning environment in his study provided teacher participants with the

opportunity to interact with peers through blogs, email, and asynchronous discussion boards. Teacher participants could post or upload their responses to interact with peers by using these collaborative online tools. Because of the lack of spontaneity in interactivity between learner-learner and learner-instructor, he indicated that the asynchronous discussion board gave limited data (p. 121).

Talor's participants utilized Wimba Live Classroom as a synchronous course tool to communicate with each other and the instructor. Through this tool, course participants could interact with one another in real-time with voice features and synchronous chat features. Researcher interviews were conducted either by telephone or through the Wimba Live Classroom tool. Talor created field notes by observing the online interactions between learners, and reflecting on his study in a personal journal. Talor found that the teachers' reasons for enrolling in an OPD courses were teacher certification requirements, interest/relevance, and convenience (time). Talor's participants reported perceived characteristics of effective OPD courses to be instructional design, interactivity, and collaboration. All teacher participants contributed to discussions, but only when the instructor required these interactions with peers. In order to receive full credit, all participants were required to interact and collaborate with each other. For example, the instructor asked the learners to post one original message about nine discussion board assignments, and then respond to at least two of their peer's posts to the discussion board. Because of this requirement, 100% of the participants (N = 8) reported interacting with their peers. However, fewer interactions occurred spontaneously; for example, 38% (n = 3) of participants telephoned each other, and 25%

(n = 2) used instant messaging. Talor did not assess the content or quality of teacher participants' interactions.

In a dissertation, Kale's (2007) studied a forum that was part of an ongoing teacher professional development program, Persistent Issues in History (PIH), during the 2004-2005 academic year. Four history (social studies) teachers (two mentor teachers, two mentee teachers) and four staff members (two faculty members, two graduate assistants) used an online forum to discuss their lesson planning and lesson implementation in problem based historical learning approaches. The program staff provided assistance to four history teachers. Kale (2007) focused on three purposes: 1) to investigate the types and the amount of assistance provided from staff members or mentor teachers to enhance teachers' pedagogical knowledge in online settings, 2) to identify teachers' cognitive thinking levels reflected in their message content in the online forum, and 3) to identify the overall online communication patterns observed in the online discussions. In this study, Kale used an evaluative case design, collecting online messages (N = 719) and conducting semi-structured interviews with participants. To analyze the data, he employed content analysis, social network analysis, and themes analysis.

From content analysis, Kale identified eighteen types of assistance and then classified them into five main categories; informative (using direct instruction, 44%), reflective (fostering discourse, 21%), administrative (giving technical support, 17%), affective (sharing excitement, 9%), and directive (directing focus, 8%). The two mentee teachers frequently received informative (44%) and reflective (21%) assistance from staff members or mentor teachers.

As a framework for examining teachers' thinking levels, Kale classified data into six codes based on Bloom's taxonomy: knowledge (48%), comprehension (19%), application (5%), analysis (2%), synthesis (0.5%), and evaluation (0.25%). Kale added a 7th category for comments not related to teaching practices (25%). He suggested that the forum messages primarily reflected lower-level or superficial thinking. To analyze online communication patterns, social network analysis (density, centrality, and centralization) and interview data were used. Kale found that only a limited number of participants posted messages to one another in online forum, and participants tended to interact more with faculty than with each other. Therefore, the online communications seemed to be monotonous and ineffective.

In brief, based on Talor's dissertation (2011), interactions between teacher participants in OPD activities were positive and successful because all participants were required to interact with each other. On the other hand, Kale (2007), Stephens and Hartmann (2004), and Macharaschwili and Devetski (2012) indicated teachers' interactions in OPD or in hybrid PD were superficial and ineffective, primarily because of participants' technology inexperience, time constraints, preferences for direct engagement, and preferences for interactions with the instructor.

When the results of these research studies regarding the interaction between teacher participants in OPD or hybrid PD are compared with that of face-to-face PD, the findings differ. It seems that teachers had positive opinions regarding synchronous interactions between each other in face-to-face PD (Bernard, 2009; Conway, 2008; Hammel, 2007; Kim, 2012). In contrast, teachers had negative opinions about synchronous or asynchronous interactions between peers in both OPD and hybrid PD

(Kale, 2007; Macharaschwili & Devetski, 2012; Stephens & Hartmann, 2004), except teachers who were required to interact with peers in an online course (Talor, 2011). These teachers often had positive experiences with online interactions.

Chapter Summary

I summarize the findings from the research presented above, discussing common problems with interactions in online learning, and the recommended strategies that promote meaningful online interaction. Woo and Reeves (2007) stated:

> Of course, every interaction in a Web-based learning environment does not have an influence on increased learning. Idle chatting, online surfing, or mindlessly clicking Web pages is unlikely to lead to substantive learning even though learners are interacting with other objects. (2007, p. 16)

Researchers have identified problems that sometimes occur with interactions between learners in online settings (Deal, 2002; Fung, 2004; Kale, 2007; Stephens & Hartmann, 2004; Yousef, 2012). One problem is low participation in interactions between learners in online education (Fung, 2004; Kale, 2007; Stephens & Hartmann, 2004). Students' involvement in online discussion was affected by the lack of active participation from other peers (Kale, 2007; Stephens & Hartmann, 2004) or the lack of time to interact with peers (Fung, 2004). A second problem with interaction between learners is that, when online classes are lecture-based, the top-down approach can hinder the opportunity for interaction between learners in online education (Fung, 2004). Another problem with interaction between learners is the possibility of "the delay in communication resulting in lesser quality interaction that is impersonal and dehumanizing due to lack of spontaneity" (Yousef, 2012, p. 35). In addition, some learners in an online setting might find difficulty using technology (Yousef, 2012). As Deal (2002) pointed out, "Courses that have significant instructional components that include audio and video may prove to be very

frustrating to students with dial-up connections and probably will result in poor success or satisfaction with the course" (p. 24).

I found six commonalities in this literature that may help instructors to plan and manage meaningful online interactions. First, learners with similar interests and skills may have more meaningful online interaction (Hultgren, 2008; Riel &Levin, 1990; Woo & Reeves, 2007). According to Hultgren (2008), if learners have similar skill and knowledge, online interaction between peers will be more successful. Second, a sense of responsibility to task and/or the group is an essential part of successful interaction with peers (Hultgren, 2008; Riel &Levin, 1990). Lack of active participation from others may also affect students' own involvement in online discussion (Fung, 2004). Third, the instructor's role in facilitating online interaction activities is important to the learners' successful interactions (Hirumi, 2002; Hultgren, 2008; Woo, 2005; Wu & Hiltz, 2004). Fourth, learners need well-structured online tasks (Hirumi, 2002; Riel &Levin, 1990; Stephens & Hartmann, 2004) for meaningful interactions as well as meaningful and authentic activities (Woo, 2005, Woo & Reeves, 2007). To facilitate effective online interaction, a fifth similar finding among these studies is that external pressures such as evaluation or grading by the instructor may motivate learners to participate in online interaction (Fung, 2004; Riel & Levin, 1990; Stephens & Hartmann, 2004; Talor, 2011). Finally, learners who are familiar with the technology can more actively engage in interaction opportunities (Riel & Levin, 1990; Woo & Reeves, 2007).

The literature reviewed in this chapter suggests that a body of research has examined general education teacher participants' need for and perceptions of interactions between peers in both hybrid and online PD (Kale, 2007; Macharaschwili & Devetski,

2012; Stephens & Hartmann, 2004; Talor, 2011). However, no studies were found about music teachers' experience of online interaction in hybrid or OPD. Therefore, this study will specifically focus on interactions of music teacher participants within formal online professional development courses.

CHAPTER THREE

METHODOLOGY

Introduction

The purpose of this study was to investigate the experiences and opinions of Arizona music teachers related to interactions with peers in formal OPD courses approved for recertification of their teacher credential. In order to gather diverse opinions and perspectives, a survey instrument and quantitative research methods were employed. In *Questionnaire research: A practical guide,* Patten (2001) states the advantages of using questionnaires in research: 1) a questionnaire is an efficient and inexpensive tool for collecting data; 2) questionnaires can be easy to tabulate or score; and 3) anonymity of participation may be useful for collecting information. In this study, data were collected through a researcher-designed questionnaire. This chapter includes descriptions of a pilot test, the research instrument, participants, administration of the instrument, research questions, variables, and preliminary information about the data analysis and hypotheses.

Pilot Test

In general, researchers conduct pilot tests to obtain preliminary information about how a new research instrument or procedure works (Creswell, 2013; Patten, 2009). According to Creswell (2013), pilot testing "helps determine that the individuals in the sample are capable of completing the survey and that they can understand the questions" (p. 390). He defines pilot test as "a procedure in which a researcher makes changes in an instrument based on feedback from a small number of individuals who complete and

evaluate the instrument" (p. 390). Patten (2009) suggests 10 to 100 samples are adequate for a pilot study (p. 57).

Twenty-two music graduate students were recruited for a pilot test of the design of the survey used as a tool for this study. The students had been music teachers or were music teachers at the time of the pilot test. All 22 participants completed paper copies of the survey and gave feedback about question wording and format. After a review of the pilot test responses, I made changes to adjust the format and the wording of some questions. For example, words that were vague or imprecise were changed to prevent participants from being confused, consistent response categories replaced unbalanced response options, some duplicate questions were deleted, and new questions were added because they could provide valuable information.

Patten (2009) emphasizes that a survey instrument should be checked for content validity by examining the appropriateness of the questions therein. Creswell (2013) defines content validity as confirming whether the content of the questions from the instrument relate to what the question is intended to measure. For this reason, he stated that researchers should seek opinions from experts to determine whether the questions are valid. To assure content validity (Creswell, 2013; Patten, 2009), the survey was also reviewed by two music university faculty members as content experts.

Finally, the survey instrument was entered into Zipsurvey. The Zipsurvey form of the instrument was pretested eight times by the researcher and another doctoral student to check for any problems in format of questions or presentation of responses. In one trial, even though the survey was completed, no responses appeared in Zipsurvey. In another

instance, responses were recorded and could be viewed, but the first column in Zipsurvey registered “False” for no response. Adjustments were made for these problems.

Description of the Research Instrument

The researcher-constructed instrument for this study is a survey composed of twenty-six questions designed to gather information related to the research questions of this study. The survey includes different types of questions that allowed music teacher participants to rate their experiences and opinions related to interaction with peers in OPD courses (Appendix A). A description of the instrument follows.

The first question asks whether or not respondents participated in OPD in general. If they select no, they continue to questions 21-26, which list other kinds of informal online teacher groups or informal online professional activities (Question 21), collect demographic information (Q 22 to 26) and conclude the survey.

If participants respond yes to the first question, they continue with questions 2 to 7, which gather data about internet and technology use (Qs 2 and 3), frequency of participation in OPD courses (Q4), reasons for participation in OPD (Qs 5 and 6), and the effectiveness of the OPD experience (Q7).

Question 8 asks whether or not respondents have experienced interaction with peers in OPD courses. If they choose no, they go to question 16, which asks whether they have participated in music-specific OPD courses. If they choose yes to question 8 (interaction with other participants), participants answer questions 9 to 15, which have to do with interaction tools (Q 9), the nature of their interactions (Q10), kinds of interactions (Q11), the effectiveness of interactions (Q12), the benefits of interaction (Q13), and

preference for interaction tools (Q14). They then answer an optional open question (Q15) about any other tools they prefer to use for peer interactions.

Question 16 asks whether teachers participated in music-specific OPD courses. If participants select yes, they go to question 17, which is an optional open question asking about kinds of music OPD they experienced and asks them to list web addresses or types of courses. If they choose no to question 16, the question 17 is skipped.

Question 18 asks what might prevent or discourage participants from interacting with peers in OPD courses. Questions 19 to 20 are optional open-ended questions regarding music teachers' ideas about interacting with peers in OPD courses.

The last part of the survey asks about other kinds of informal online teacher groups or informal online professional activities (not necessarily approved for recertification hours) in which teachers may have participated (Q 21) and collects demographic information about gender, current teaching area, age group, years of teaching experience, and current level of technology proficiency (Q 22 to 26). The demographic information requested on the survey does not ask participants' names or any information by which they can be identified. In order to make the purpose of this study clear, participants found the following message on every page of the Zipsurvey:

> The following questions refer only to your participation in online professional development (OPD) related to recertification of your teacher credential, such as an online course, class, workshop, or webinar.

In order to measure opinions about the purpose for participation in formal OPD courses and factors that prevent music teachers from interacting with peers in OPD courses, a 5-point Likert-type scale ranging from 1 for "Strongly Disagree" to 5 for "Strongly Agree" was used as a response mode for questions 5 and 8. To test the internal

consistency and reliability of these two survey questions, Cronbach's alpha was used. According to Huck (2012), Cronbach's alpha (α) is versatile "because it can be used with instruments made up of items that can be scored with three or more possible values" (p. 74). According to the institute for digital research and education at UCLA, "a reliability coefficient of .70 or higher is considered 'acceptable' in most social science research situations" (http://www.ats.ucla.edu/stat/spss/faq/alpha.html). The alpha level for these two questions were both acceptable ($\alpha = .692$ & $\alpha = .814$).

Participants

According to Creswell (2013), "Survey research designs are procedures in quantitative research in which investigators administer a survey to a sample or to the entire population of people to describe the attitudes, opinions, behaviors, or characteristics of the population" (p. 376). Creswell identified the differences among the following three terms: the population, the target population or sampling frame, and the sample. He defined *population* as "a group of individuals who possesses one characteristic that distinguishes them from other groups" (p. 381). Because it may not be easy for researchers to obtain the list of an entire population, researchers sometimes study "the list or record of individuals in a population" that they can collect easily. Creswell regards this as *target population*. The target population enables the researchers to collect the data from anyone who can be recruited to join in a study. Last, he explains *sample* as the group of participants selected from the target population.

The target population for this study was current or in-service music teachers in K-12 schools in the state of Arizona who are members of the Arizona Music Educators Association. A directory of music educators in the state of Arizona was obtained from the

executive director of the AMEA in the Fall 2014. The AMEA membership directory listed 791 music educators. The target population for this study included only AMEA members who currently teach in K-12 schools. From the initial AMEA list, I deleted 81 retired members because they no longer need to renew their certification. Second, 68 music teachers were eliminated because they indicated that they did not teach music in preschool, elementary, middle, or senior high schools in 2014-2015. Third, 34 people were removed for the following reasons: university/college educators (11 people), collegiate members (14), people who work for non-profit organizations (2), people who work in private studios (2), and district music education coordinators (3). Last, two duplicated data records were removed. Table 4 shows numbers and reasons for elimination from the original members in the 2014 AMEA directory for purpose of this study.

Table 4

Numbers and Reasons for Elimination of Potential Survey Participants

Reasons for elimination	Numbers
Retired members	81
People who indicated that they are not K-12 school music teachers	68
University/College educators	11
Collegiate members	14
People who work for non-profit organizations (Chorus or Orchestra)	4
People who work in private studios	2
District music education coordinators	3
Duplicated data	2
Total	185

The 2014 directory did not provide school information for 221 music educators. A check of names and emails in both the 2011 e-Directory list and the 2014 updated directory indicated that these 221 people were likely K-12 music educators. They were included in the list of participants for this study. Email information for two music

educators was not provided in the updated directory. Email addresses for these two participants were obtained from the 2011 list. Therefore, 606 music teachers of 791 music educators in the directory were eligible to participate in the study and comprised the target population.

Administration of the Instrument

Creswell (2013) stated that survey studies describe trends in the data rather than explain cause and effect. Although there are disadvantages to using web-based survey studies, such as low response rate, nonrandom sampling, technological issues, and internet junk mail filter problems, online surveys have advantages such as gathering extensive data quickly, effectively, and economically. For these reasons, a web-based survey was used for this study.

The survey instrument for this study was hosted on ZipSurvey. All responses to the survey were stored on the ZipSurvey website, and only the researcher could access responses of the participants. The only accessible information for the researcher was the final responses, with personal identifying information removed, stored in ZipSurvey.

The first invitation to participate in the survey (Appendix B) was sent via email to currently employed K-12 music teachers (N = 606) listed in the directories of music teachers in the state of Arizona. The 2014 updated directory provided only one email for each music educator. I added additional emails (n = 207) from those listed in the 2011 AMEA e-Directory. The email invitation to participate included a hyperlink to the online survey instrument (see Appendix B). If music teachers chose to open the link, the first page of the survey provided the rationale for the study and an informed consent statement (Appendix C). The survey, recruitment script, and informed consent form for this study

were approved by the Institutional Review Board Committee of Arizona State University (Appendix D).

Many schools have firewalls that may prevent music teachers from learning about or accessing the survey. To attempt to reach all recipients, I emailed the invitation to both home and school email addresses (N = 813) if recipients had two listed. First, I distributed the invitation through my personal email (www.daum.net), on 21 October 2014. In the email invitation for recruitment, I asked the recipients to delete the duplicate survey if they received two emails. After the first distribution, 88 emails were returned as undeliverable. One music teacher responded that she was retired. Of the 123 recipients who opened the survey, 21 did not participate in this survey, and 102 participated in the survey (91 completed survey thoroughly and 11 completed it partially). Therefore, the first email yielded an 18% response rate.

After the initial mailing to encourage participation in the survey, the first follow-up message was sent one week later to the individuals through Zipusurvey, on 28 October 2014:

> Thank you to the music teachers who have already completed the survey about online professional development. To obtain the best results, we need a few more people to participate. Please take a few minutes to complete the survey. You will need 10 to 15 minutes. Thank you! If you do not wish to receive further emails on this topic, please email hkim191@asu.edu and your name will be removed from the study list.

Following the text above, potential respondents received the same invitations to participate and hyperlink to the online survey (see Appendix B). No emails were returned as undeliverable. Following the first reminder, a total of 164 recipients responded to the request to participate. Although 198 recipients (75 more than the first 123) opened the

survey, 164 participated in the survey (144 completed survey thoroughly and 20 completed it partially). Therefore, the response rate was 28% after the first reminder.

In order to improve the potential response rate, a second follow-up message was sent to the individuals through a second personal email (www. gmail.com) rather than through Zipsurvey on 4 November 2014. This email reminder was sent in batches of 15 addresses at a time, to minimize the chances that the emails would be blocked by a junk mail filter:

> Thank you to the music teachers who have already completed the survey about online professional development. Because of email filters, you may not have had access to my survey. This is the second reminder. To obtain the best results, we need a few more people to participate. Please take a few minutes to complete the linked survey. You will need 10 to 15 minutes. Thank you! If you do not wish to receive further emails on this topic, please email hkim191@asu.edu and your name will be removed from the study list.

Following the text above, potential respondents received the same invitations to participate and hyperlink to the online survey (see Appendix B). After the second reminder distribution, 74 emails were undeliverable and returned. These returned emails were not different from those of the first distribution. However, three recipients responded that they are not teaching in Arizona any longer. Those recipients' data were removed from the master list. Following the second reminder, a total of 243 recipients had opened the survey, and 205 participated in the survey (184 completed survey thoroughly and 21 completed it partially). Therefore, the response rate following the second reminder was 36%.

According to Creswell (2013), "many survey studies in leading educational journals report a response rate of 50% or better" (p. 390). For acceptable response rates, Babbie suggests the following guideline:

> A response rate of at least 50 percent is generally considered adequate for analysis and reporting. A response rate of at least 60 percent is considered good, and a response rate of 70 percent or more is very good. (1990, p. 182)

Because 50% was not achieved, a third reminder was sent to the individuals through a third personal email (www. naver.com) rather than through Zipsurvey on 12 November 2014:

> Thank you to the music teachers who have already completed my survey about online professional development. Because of email filters, you may not have had access to my survey. This is the LAST reminder. I need a few more people to participate in my study to obtain the best information. Please take 10 to 15 minutes to fill out the survey. Thank you!

Following the text above, potential respondents received the same invitations to participate and hyperlink to the online survey (see Appendix B). Ninety emails were undeliverable and returned; these returned emails were almost the same as those of the first distribution. After the third reminder 334 of 606 music teachers had viewed this survey, yielding a 42% response rate.

Internet junk mail filters may have been problematic in reaching potential respondents. Therefore, I resent the final reminder to the individuals through a different fourth personal email (www. asu.edu) on 19 November 2014. This email reminder was sent in batches of 15 addressed to the same district email or internet server at a time.

> Thank you to ALL music teachers who have already completed my survey about online professional development. If you have not participated in online professional development, it will take 3 minutes to complete this survey. If you have participated in online professional development, it will take 10 to 15 minutes to complete. I really need a few more people to participate in my study to obtain the best information. PLEASE take a few minutes to fill out the survey. The link to the survey is http://www.zipsurvey.com/LaunchSurvey.aspx?suid=73412&key=70858704 More information is below. Thank you.

Following the text above, potential respondents received the same invitations to participate and hyperlink to the online survey (see Appendix B).

After closing the Zipsurvey on 26 November 2014 the returns were as follows: Through all survey distributions, 99 emails were undeliverable and returned. Fifty eight of these 99 returned emails were for music teachers who had a second email that was not returned. Those 58 respondents remained eligible. Seventeen music teachers listed just one email that was returned perhaps because of firewalls on school district servers. However, I verified that these 17 email addresses matched those listed on their school websites. They also remained eligible for this study. Three people had two email addresses that were both returned but one of those email addresses matched the listings on their school websites. They also remained eligible. However, 18 music teachers were eliminated from the population of this study because their emails were all returned and their names were not found on their school websites or any other Arizona school website. Finally, one person responded that she was retired, and three music teachers reported that they were not Arizona music teachers any longer; these four teachers were also eliminated. Of 606 music teachers in the original target population, I eliminated 22 as ineligible, and 584 respondents remained eligible for this study.

In sum, after five attempts at distribution of the online survey, a total of 279 respondents completed to the survey (48% overall response rate). Of those respondents, 248 completed the survey thoroughly and 31 participants completed it partially. Figure 1 shows the procedure for determining eligible participants and the response rate for this study. Because some potential respondents had two email addresses and because multiple attempts were made to improve the response rate by using the strategies described above,

it is possible that one or more participants may have completed the survey more than one time, even though the recruitment letter included the following statement in bold face and underlined: “If you received two emails, please delete one of them, and respond once to the survey” (see Appendix B).

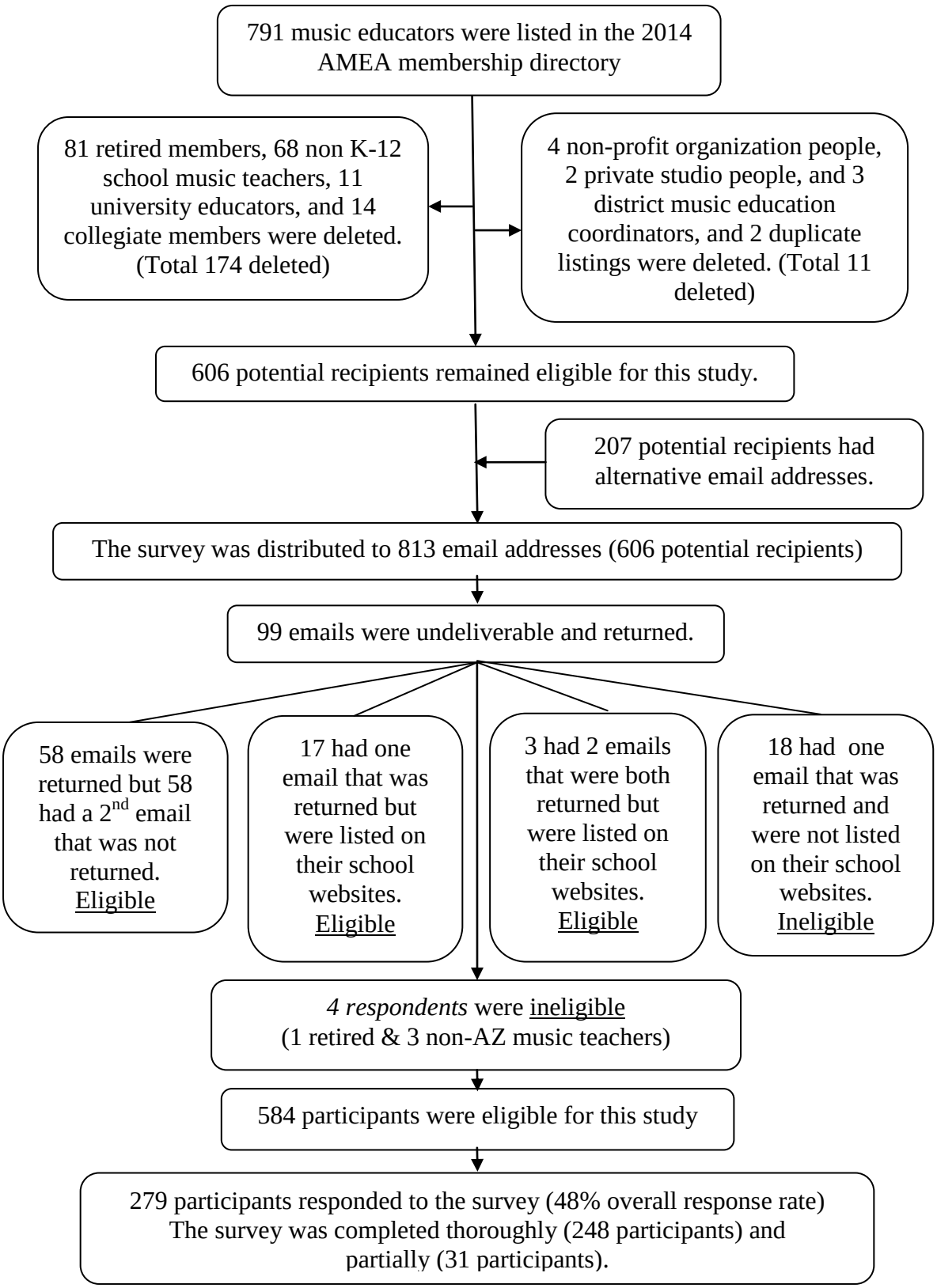

Figure 1
The procedure for determining eligible participants and the response rate for the survey

Research Questions

Four primary research questions guided this study. The research questions along with sub questions are listed below. The numbers of the survey questions (SQs) related to each research question are shown after each question.

Research Question 1: Do music teachers in Arizona participate in formal online professional development (OPD) related to recertification of their teacher credential? (SQs 1, 16)

1a. What is the status of teachers' access to technology for OPD courses? (SQs 2, 3)

1b. If they do, how frequently do teachers participate in OPD courses? (SQ 4)

1c. If they do, how effective for their own professional growth do teachers consider OPD courses? (SQ 7)

1d. If they do, what motivates teachers to participate in OPD courses? (SQs 5, 6)

1e. What kinds of OPD courses in music do music teachers take? (SQ 17)

1f. Does participation or non-participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 1, 24, 25, & 26)

1g. Do the reasons that teachers list as their purpose for participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 5, 24, 25, & 26)

1h. What other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) have they found interesting or useful? (SQ 21)

Research Question 2: Do music teachers in Arizona who participate in OPD courses interact with their peers during OPD? (SQ 8)

2a. If they do, how effective do teachers consider online interaction with their peers during OPD courses? (SQ 12)

2b. What do they consider beneficial about online interaction with other peers in OPD courses? (SQ 13)

2c. Does interaction or non-interaction with peers in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 8, 24, 25, & 26)

Research Question 3: What is the nature of self-reported peer interactions among Arizona music teachers who participate in OPD courses? (SQ 10)

3a. What kind of tools for peer interactions do they use in OPD courses? (SQ 9)

3b. What kinds of interactions have teachers had with peers in OPD courses? (SQ 11)

Research Question 4: What are music teachers' opinions regarding peer interaction in OPD courses? (SQ 20)

4a. What tools do they prefer to use for peer interaction during OPD courses? (SQ 14, 15)

4b. What factors might prevent them from interacting with peers in OPD courses? (SQs 18, 19)

4c. Do opinions of music teachers related to factors that prevent them from interacting with peers vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 18, 24, 25, & 26)

Although survey questions 22 (gender) and 23 (teaching area) are not directly related to the research questions, these demographic data were deemed interesting as a means of describing the target population. Table 5 shows the relationship between research questions and survey questions.

Table 5

Research Questions and Correlated Survey Questions

Research Question No.	Research questions	Survey Question No.
Research Question 1	Do music teachers in Arizona participate in formal online professional development (OPD) related to recertification of their teacher credential?	1, 16
1a.	What is the status of teachers' access to technology for OPD courses?	2, 3
1b.	If they do, how frequently do teachers participate in OPD courses?	4
1c.	If they do, how effective for their own professional growth do teachers consider OPD courses?	7
1d.	If they do, what motivates teachers to participate in OPD courses?	5, 6
1e.	What kinds of OPD courses in music do music teachers take?	17
1f.	Does participation or non-participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?	1, 24, 25, & 26
1g.	Do the reasons that teachers list as their purpose for participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?	5, 24, 25, & 26
1h.	What other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) have they found interesting or useful?	21
Research Question 2	Do music teachers in Arizona who participate in OPD courses interact with their peers during OPD courses?	8
2a.	If they do, how effective do teachers consider online interaction with their peers during OPD courses?	12

(Table 5 continued on next page)

(Table 5 continued)

2b.	What do they consider beneficial about online interaction with other peers in OPD courses?	13
2c.	Does interaction or non-interaction with peers in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?	8, 24, 25, & 26
Research Question 3	What is the nature of self-reported peer interactions among Arizona music teachers who participate in OPD courses?	10
3a.	What kind of tools for peer interactions do they use in OPD courses?	9
3b.	What kinds of interactions have teachers had with peers in OPD courses?	11
Research Question 4	What are music teachers' opinions regarding peer interaction in OPD courses?	20
4a.	What tools do they prefer to use for peer interaction during OPD courses?	14, 15
4b.	What factors might prevent them from interacting with peers in OPD courses?	18, 19
4c.	Do opinions of music teachers related to factors that prevent them from interacting with peers vary by age group, years of teaching experience, or self-reported technology proficiency?	18, 24, 25, & 26

Data for research question 1 and eight sub questions were collected using survey questions 1, 2, 3, 4, 5, 6, 7, 16, 17, and 21 on the survey. Data for research question 2 and three sub questions were collected using survey questions 8, 12, and 13. Data for research question 3 and two sub questions were collected using survey questions 9, 10, and 11. Data for research question 4 and three sub questions were collected using survey questions 14, 15, 18, 19, and 20. Demographic data were collected using survey questions 22, 23, 24, 25, and 26.

Variables

Moore (1989) suggests that "the circumstances of the learners and their age, experience, and level of learner autonomy" are important to consider in interactive learning environments (p. 5). These factors may be important to teachers' OPD

interactions. Therefore, the three independent variables in this study are age group, years of teaching experience, and self-reported technology proficiency. Teachers self-reported age and years of teaching experience by filling in a blank. The variable of age was then grouped into four levels for analysis: 21 - 30 years old, 31 - 40 years old, 41 - 50 years old, and more than 51 years old. The variable of years of teaching experience was grouped into three levels: 1-10 years, 11-20 years, and more than 21 years. Teachers self-reported technology proficiency by selecting a single response from four possibilities: none, beginner, intermediate, and proficient. For analysis, this was then grouped into two levels: proficient, or intermediate/beginner.

The dependent variables are the participants' responses to questions about their experiences in OPD courses, their opinions of OPD, and their interactions with peers in OPD courses. According to dictionary.com, opinion may be described as a personal belief, judgment, or attitude. Experience can be defined as the process of personally observing or encountering an event. The following table shows survey questions by variable category.

Table 6

Categories of Participants' Responses

Opinions (11): potential dependent variables	5, 6, 7, 12, 13, 14, 15, 18, 19, 20, and 21
Experiences (10): potential dependent variables	1, 2, 3, 4, 8, 9, 10, 11, 16, and 17
Demographic information and independent variables (5)	22, 23, 24, 25, and 26

Table 7 shows survey questions, levels of measurement, question types for Zipsurvey, and type of data gathered by the question (experience, opinion, or demographic).

Table 7

Survey Questions, Levels of Measurement, Question Types for Zipsurvey, and Types of Data

Survey Questions	Levels of Measurement	Question types for Zipsurvey	Types of Data
1. Have you ever participated in formal online professional development (OPD) related to recertification of your teacher credential, for example, an online course, class, workshop, or webinar?	Nominal-Categorical	Single Choice Radio Buttons and using Branch Button	experience
2. Where do you have access to the internet for OPD? (check all that apply)	Nominal-Categorical	Multiple Choice Check Box	experience
3. What technologies do you use for OPD? (check all that apply)	Nominal-Categorical	Multiple Choice Check Box	experience
4. Approximately how frequently have you participated in OPD activities? (Count each workshop, webinar, or entire online course as one activity.)	Ratio-Continuous	Single Choice Radio Buttons	experience
5. Please indicate the reasons you decided to participate in OPD programs by marking the applicable box for each item.	Interval-Continuous	Matrix Radio Buttons (rating scale)	opinion
6. (Optional) Please list any other reasons you decided to participate in OPD programs.	Open ended	Open Ended Text Area	opinion
7. In general, how effective was OPD for your own learning?	Interval-Continuous	Single Choice Radio Buttons	opinion
8. Sometimes OPD includes interactions between people taking the course through discussion boards, email, or online chats that are part of the course. Have you ever interacted with other participants during OPD?	Nominal-Categorical	Single Choice Radio Buttons and using Branch Button	experience
9. What kind of tools for peer interactions have you experienced in OPD? (check all that apply)	Nominal-Categorical	Multiple Choice Check Box	experience

(Table 7 continued on next page)

(Table 7 continued)

10. Overall, the interaction with peers in OPD that I have experienced was_____.	Nominal-Categorical	Single Choice Radio Buttons	experience
11. What kind of interactions have you had with peers in OPD? (check all that apply)	Nominal-Categorical	Multiple Choice Check Box	experience
12. Overall, how effective was the online interaction with peers during OPD for your own learning?	Interval-Continuous	Single Choice Radio Buttons	opinion
13. What benefits did you gain from interactions with other participants in OPD? (check all that apply)	Nominal-Categorical	Multiple Choice Check Box	opinion
14. Please choose the top three tools you would prefer to use for peer interactions as part of future OPD programs. (Check ONLY three)	Open ended	Open Ended Text Area	opinion
15. (Optional) Please list any other tools you prefer to use for peer interactions as part of future OPD programs.	Open ended	Open Ended Text Area	opinion
16. Have you ever participated in OPD programs related to music?	Nominal-Categorical	Single Choice Radio Buttons and using Branch Button	experience
17. (Optional) In what kind of music OPD programs did you participate? (e.g., NAfME webinar). If possible, please list Web address (URL) for OPD experience or title of the course.	Open ended	Open Ended Text Area	experience
18. Here are reasons you might decide not to interact with peers. Please indicate the degree to which these factors might prevent you from interacting with peers in an OPD course.	Interval-Continuous	Matrix Radio Buttons (rating scale)	opinion
19. (Optional) Please list any other factors that prevent you from interacting with peers in OPD programs.	Open ended	Open Ended Text Area	opinion
20. (Optional) List any ideas to help music teachers interact with peers in OPD programs?	Open ended	Open Ended Text Area	opinion
21. Please list other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) that you have found interesting or useful (e.g., Facebook teacher group)	Open ended	Open Ended Text Area	opinion

(Table 7 continued on next page)

(Table 7 continued)

22. What is your gender?	Nominal-Categorical	Single Choice Radio Buttons	demographic
23. What is your current teaching area? (check all that apply)	Nominal-Categorical	Multiple Choice Check Box	demographic
24. What is your age? (_____years old)	Open ended	Open Ended Text Area	demographic
25. Counting this year, how long have you been teaching music in a school setting? (_____year(s))	Open ended	Open Ended Text Area	demographic
26. In your opinion, what is your current level of technology proficiency?	Nominal-Categorical	Single Choice Radio Buttons	demographic

Analysis and Hypotheses

In order to describe the results of a single variable or survey question, descriptive statistics are used, while inferential statistics are used to compare two or more groups of independent variables in terms of the dependent variable (Creswell, 2013). In inferential statistics, hypotheses can be tested to make predictions or to draw inferences comparing variables from samples when the entire population is not available. Before testing hypotheses, the researcher should select an alpha (level of significance), *p*-value, and confidence interval. Huck (2012) states that the most frequently selected the level of significance is .05 (p. 147). Therefore, an alpha level of .05 was used for statistical significance in this study. A 95% confidence level was chosen for this study. Huck defined confidence intervals as "simply a finite interval of score values on the dependent variable" (p. 121). According to Creswell (2013), "A confidence interval or interval estimate is the range of upper and lower statistical values that is consistent with observed data and is likely to contain the actual population mean" (p. 187). The response rate of 48% for this study yields a confidence interval of 4.24, slightly higher than the desired. Because of size and cost, most researchers tend to study with target population or sample, not with whole population. There might be some differences between target population and whole population. Based on choosing confidence interval, researchers determine the range of upper and lower statistical values. In this study, through using a confidence interval of 4 and 48% response rate, I can guarantee that if I conduct the survey to the entire population, between 44% (47-4) and 52% (47+4) would respond the survey.

The raw data gathered from the instrument using ZipSurvey were coded using Excel. Microsoft Excel was used to eliminate incomplete survey data when appropriate

and to convert the data from text to numerical form when appropriate. All open-ended responses were loaded into Excel spreadsheets for analysis. All numerical data were then analyzed using Statistical Package for the Social Sciences 18 (SPSS 18).

The analysis plan for the data included reports of response rates, measures of central tendency (Mean), and variability (Variance and Standard Deviation) for continuous data, and reports of frequencies and percentages for categorical data.

Several hypotheses were posited for this study. Patten (2009) stated that "The usual test of the null hypothesis for differences between frequencies is chi-square" (p. 111). Voelker, Orton, and Adams (2001) also indicated that "The chi-square test can be used to evaluate a relationship between two nominal or ordinal variables" (p. 110). In this study, chi-square and three-way analysis of variance (ANOVA) were used to analyze some data related to hypotheses presented below. Data from open-ended questions (# 6, 14, 15, 17, 19, 20 & 21) were compiled and analyzed. Table 8 shows procedures for analysis of the data, including hypotheses.

Table 8

Data Analysis and Proposed Hypotheses (Research Questions= RQs, Survey Questions=SQs)

RQs	Contents of Research questions	Analysis or Hypothesis	SQs
Research Question 1	Do music teachers in Arizona participate in formal online professional development (OPD)) related to recertification of their teacher credential?	Descriptive Statistics: Frequency (f) & Percentage (%)	1& 16
1a.	What is the status of teachers' access to technology for OPD courses?	Descriptive Statistics: f & %	2& 3
1b.	If they do, how frequently do teachers participate in OPD courses?	Descriptive Statistics: f & %	4
1c.	If they do, how effective for their own professional growth do teachers consider OPD courses?	Descriptive Statistics: f & %	7
1d.	If they do, what motivates teachers to participate in OPD courses?	Descriptive Statistics: Mean (M), Standard Deviation (SD) & List	5& 6
1e.	What kinds of OPD courses in music do music teachers take?	List	17
1f.	Does participation or non-participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?	H_o1a. There will be no significant difference in percentage (proportion) of music teachers who participate in OPD courses by age group.	1 & 24
		H_o1b. There will be no significant difference in percentage (proportion) of music teachers who participate in OPD courses by years of teaching experience.	1 & 25
		H_o1c. There will be no significant difference in percentage (proportion) of music teachers who participate in OPD courses by level of self-reported technology proficiency.	1 & 26

(Table 8 continued on next page)

(Table 8 continued)

1g.	Do the reasons that teachers list as their purpose for participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?	H_o2a. There will be no significant difference in opinions of music teachers related to the purpose for participation in OPD courses by age group.	5 & 24
		H_o2b. There will be no significant difference in opinions of music teachers related to the purpose for participation in OPD courses by years of teaching experience.	5 & 25
		H_o2c.There will be no significant difference in opinions of music teachers related to the purpose for participation in OPD courses by level of self-reported technology proficiency.	5 & 26
		H_o2d. There will be no significant interactions among age group, years of teaching experience, and level of self-reported technology proficiency.	5, 24, 25, & 26
1h.	What other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) have they found interesting or useful?	List	21
Research Question 2	Do music teachers in Arizona who participate in OPD courses interact with their peers during OPD courses?	Descriptive Statistics: f & %	8
2a.	If they do, how effective do teachers consider online interaction with their peers during OPD courses?	Descriptive Statistics: f & %	12
2b.	What do they consider beneficial about online interaction with other peers in OPD courses?	Descriptive Statistics: f & %	13

(Table 8 continued on next page)

(Table 8 continued)

2c.	Does interaction or non-interaction with peers in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency?	H_o3a. There will be no significant difference in percentage (proportion) of music teachers who report interactions with peers in OPD courses by age group.	8 & 24
		H_o3b. There will be no significant difference in percentage (proportion) of music teachers who report interactions with peers in OPD courses by years of teaching experience.	8 & 25
		H_o3c. There will be no significant difference in percentage (proportion) of music teachers who report interactions with peers in OPD courses by level of self-reported technology proficiency.	8 & 26
Research Question 3	What is the nature of music teacher peer interactions among Arizona music teachers who participate in OPD courses?	Descriptive Statistics: f & %	10
3a.	What kind of tools for peer interactions do music teachers use in OPD courses?	Descriptive Statistics: f & %	9
3b.	What kinds of interactions have teachers had with peers in OPD courses?	Descriptive Statistics: f & %	11
Research Question 4	What are music teachers' opinions regarding peer interaction in OPD courses?	List	20
4a.	What tools do they prefer to use for peer interaction during OPD courses?	Descriptive Statistics: f, %, & List	14 & 15
4b.	What factors might prevent them from interacting with peers in OPD courses?	Descriptive Statistics: M, SD, & List	18 & 19

(Table 8 continued on next page)

(Table 8 continued)

4c.	Do opinions of music teachers related to factors that prevent them from interacting with peers vary by age group, years of teaching experience, or self-reported technology proficiency?	H_o4a. There will be no significant difference in opinions of music teachers related to factors that prevent them from interacting with peers in OPD courses by age group.	18 & 24
		H_o4b. There will be no significant difference in opinions of music teachers related to factors that prevent them from interacting with peers in OPD courses by years of teaching experience.	18 & 25
		H_o4c. There will be no significant difference in opinions of music teachers related to factors that prevent them from interacting with peers in OPD courses by level of self-reported technology proficiency.	18 & 26
		H_o4d. There will be no significant interactions among age group, years of teaching experience, and level of self-reported technology proficiency.	18, 24, 25, & 26

CHAPTER FOUR

RESULTS

The purpose of this study is to investigate the experiences and opinions of Arizona music teachers related to interactions with peers in formal OPD courses associated with recertification of their teacher credential. In this chapter, results of information collected via an online survey instrument are presented. Each research question is addressed using data derived from the survey and results of the analysis of data. A summary of the response rate is presented first, followed by demographic data, and then findings for each research question.

Response Rate

In order to investigate the perspectives of music teachers about interactions with peers in formal OPD courses taken for the purpose of teacher recertification, I sent an online survey to K-12 music teachers (N = 606) listed in the 2014 AMEA directory. Even though some of these music teachers may not have had experience in formal OPD, all were potential participants for this study. Of 606 initial respondents, 584 participants remained eligible for this study (see Chapter 3 for specific disqualifying reasons). After five attempts at distribution of the online survey using different kinds of email groupings and formats, a total of 279 music teachers responded to the survey, yielding a response rate of 48%. Of those respondents, 248 completed the survey thoroughly, and 31 participants completed it partially. Even though administrations of the survey did not yield a 50% response rate (Babbie, 1990), and the confidence interval was 4.24 instead of 4, the analysis of this data can still provide valuable information.

Demographic Information and Analysis

Demographic data about participants (n = 279) were collected using five survey questions about gender, current teaching area, age group, number of years of teaching, and current level of technology proficiency (survey questions 22 to 26). The instrument was designed to collect demographic data about all respondents, whether or not they participated in OPD courses. In order to describe the characteristics of teachers who responded to the survey, frequencies and percentages were calculated and appear in Tables 9, 10, 11, 12 and 13.

Regarding the gender of participants, Table 9 shows that 55% (n = 154) of the respondents were female and 33% (n = 92) were male. Twelve percent (n = 33) did not indicate their gender. Even if all of the "No response" teachers were male, the results indicate that there are more female music teachers than male music teachers among these participants.

Table 9

Gender of music teachers

Gender	Frequency	Percentage
Female	154	55%
Male	92	33%
No response	33	12%
Total	279	100%

Respondents were asked to indicate teaching area in a multiple choice item. The respondents could choose multiple answers to this question. Of 279 music teachers, 248 participants made 443 responses (Table 10). One hundred twenty-one respondents indicated that they are teaching band (43%), followed by choral music (n = 104, 37%), general music (n = 92, 33%), and then strings (n = 79, 28%). Seventeen percent (n = 47) indicated that they are teaching music in a different area ("Other" option). Thirty-one music teachers (11%) did not indicate their current teaching area.

A line by line analysis of Zipsurvey data and a further test of the instrument revealed an anomaly: When respondents chose "Other," the survey instrument provided a blank for teachers to specify what "Other" meant. If a teacher chose "Other" and did not fill the blank, then "Other" was not recorded as a response because the response was not recorded in Zipsurvey. It is possible that more teachers than the 17% may have checked "Other" but their response may not have been recorded because they did not fill the blank. Similarly, if a teacher's only response was "Other" and they did not fill the blank, then "No response" appears in the Zipsurvey data. Therefore, Table 10 shows that at least 17% of respondents indicated "Other," and, at most, 11% of respondents did not provide teaching area data.

Table 10

Current Teaching Area of Music Teachers (*n* = 279)

Current teaching area	Frequency	Percentage
Band	121	43%
Choral	104	37%
General music	92	33%
Strings	79	28%
Other	47	17%
No response	31	11%
Total response	443	

The responses for each individual teacher were further examined for combinations. Table 11 shows that 15% (*n* = 38) of the respondents indicated that they are teaching band only, followed by strings only (13%), and choral only (12%). Six percent of these 248 participants (*n* = 15) are teaching general music only, and one percent (*n* = 2) are teaching in a different area ("Other" only option). The data about teaching area show that 47% (*n* = 116) of the 248 music teachers are teaching in only one subject. Of the 248 respondents, 53% (*n* = 132) are teaching in multiple areas. Of these multiple subject teachers, 32% (*n* = 80) are teaching in two areas, 17% (*n* = 44) in three areas, and 3.5% (*n* = 7) are currently teaching in four areas. One

person (0.5%) indicated that he or she is teaching all areas of music. Another way to interpret Table 11 is that 40% of participants reported teaching only one type of ensemble (Band, Strings, Choral) while 60% of participants taught more than one type of music course/ensemble or only general music (6%).

Table 11

Specific Teaching Areas of Music Teachers

Teaching areas	Frequency	Percentage
Band (B) only	38	15%
Strings (S) only	32	13%
Choral (C) only	29	12%
C & G	24	10%
B & S	18	7%
General music (G) only	15	6%
B, C, & G	14	5%
B & G	13	5%
C & O	7	3%
B & O	6	2%
B, O, & S	6	2%
B, C, & O	6	2%
B, G, & S	4	2%
B, G, & O	4	2%
B, C, G & O	4	2%
G & S	3	1%
C & S	3	1%
C, G, & O	3	1%
B, C, & S	3	1%
Other (O) only	2	1%
G & O	2	1%
B & C	2	1%
O & S	2	1%
C, O, & S	2	1%
B, C, G& S	2	1%
C, G, & S	1	0.5%
G, O & S	1	0.5%
B, C, O & S	1	0.5%
B, C, G, O & S	1	0.5%
Total responses	248	100%

Among the 47 respondents (17%) who indicated “Other” in Table 10, some provided multiple responses in the blank, for a total of 65 specific teaching assignments (Table 12). Among these 47 respondents, guitar, piano, or drums were

listed most frequently as teaching areas. Subjects not directly related to music such as algebra, art, and drama were listed infrequently. Considered together, these data (Tables 10, 11, 12) show that many music teachers in 2014 AMEA membership database who responded to this survey have multiple teaching responsibilities in their current employment.

Table 12

Other Teaching Areas of Music Teachers (*n* = 47)

Other teaching areas	Frequency	Percentage
Guitar	18	38%
Piano or keyboard	10	21%
Percussion or drums	7	15%
Music theory	5	11%
Jazz	4	9%
Music technology	2	4%
Mariachi	2	4%
Recorder	2	4%
Handbells	2	4%
Orchestra	1	2%
Music history	1	2%
Music appreciation	1	2%
Composition	1	2%
District band specialist	1	2%
Music theatre	1	2%
Private studio	1	2%
Art	1	2%
Performing arts	1	2%
Drama	1	2%
Algebra	1	2%
New teacher mentor	1	2%
Substitute teaching	1	2%
Total responses	65	

The survey included an open-ended question to obtain the age of participants (*n* = 279). The participants (*n* = 228) who responded to this question included music teachers from a wide range of ages (low = 22; high = 68). The results of this question were categorized into five age groups: 21-30 years old, 31-40 years old, 41-50 years old, 51-60 years old, and more than 61 years old. Table 13 shows the age groups of respondents. Among these participants, the age groups of 31-40 and 51-60 years

showed the largest response rate (23%). Only 3% (*n* = 9) of respondents were more than 61 years old. Some respondents (18%, *n* = 51) did not provide their age information. The average age of the respondents who provided age information was approximately 42 years.

Table 13

Age Group of Music Teachers

Age group	Frequency	Percentage
21-30 years	49	18%
31-40 years	64	23%
41-50 years	41	15%
51-60 years	65	23%
More than 61 years	9	3%
No response	51	18%
Total	279	100%

Another open-ended question asked about participants' total years of teaching experience. As shown in Table 14, 40% (*n* = 110) of 279 music teachers have been teaching music between 1 and 10 years. Only 1% (*n* = 3) have taught music more than 41 years. Eleven percent (*n* = 31) did not indicate their years of teaching experience. The average number of years of teaching experience among respondents who provided this information was approximately 15 years.

Table 14

Music Teachers' Total Years of Teaching Experience

Years of teaching experience	Frequency	Percentage
1-10 years	110	40%
11-20 years	75	27%
21-30 years	45	16%
31-40 years	15	5%
More than 41 years	3	1%
No response	31	11%
Total	279	100%

Participants (*n* = 279) were asked to rate their current level of technology proficiency. Table 15 shows that most participants (84%) rated themselves as either

proficient (*n* = 121) or intermediate (*n* = 114) users of technology. Only 13 respondents (5%) selected "Beginner" as their current level of technology proficiency. No participants selected "None" as their current level of technology proficiency. Thirty-one participants (11%) did not disclose their current level of technology proficiency.

Table 15

Music Teachers' Current Level of Technology Proficiency

Self-reported technology proficiency	Frequency	Percentage
Proficient	121	43%
Intermediate	114	41%
Beginner	13	5%
None	0	0%
No response	31	11%
Total	279	100%

Research Questions and the Results

Four primary research questions guided this study. Data from the survey questions and analyses of data are presented below for each research question and sub questions.

Research Question 1: Do music teachers in Arizona participate in formal online professional development (OPD) related to recertification of their teacher credential? (Survey Questions 1, 16)

The data from survey question 1 show that 48% (*n* = 133) of the 279 respondents indicated that they participated in formal OPD (for example, an online course, class, workshop, or webinar) related to recertification of their teacher credentials, and 52% (*n* =146) did not participate in OPD courses for recertification. Table 16 shows the frequency and percentage of music teachers responding to this survey who have participated in formal OPD courses. Less than 50% of music teachers in this study have participated in OPD courses.

Table 16

Quantity of Music Teachers who Participated in OPD Courses

Participation in OPD	Frequency	Percentage
Yes	133	48%
No	146	52%
Total	279	100%

The 133 music teachers who reported participating in OPD courses were asked whether they had taken any music-specific OPD courses (SQ 16). Table 17 shows the frequency and percentage of respondents who indicated that they have participated in music-specific OPD courses. Of 133 music teachers who participated in OPD courses, 27% (n = 36) indicated that they had participated in music-specific OPD courses, while 64% (n = 85) had not participated in OPD courses related to music. Twelve music teachers (9%) did not respond to this question. Of the total number of the respondents in this study (n = 279), only 36 music teachers (13%) have participated in music-specific OPD courses.

Table 17

Participation in OPD Courses in Music

Participating in music OPD courses	Frequency	Percentage
Yes	36	27%
No	85	64%
No response	12	9%
Total	133	100%

1a. What is the status of teachers' access to technology for OPD courses? (SQs 2, 3)

Questions 2 and 3 in the survey were related to the status of teachers' access to technology for OPD courses, and both were multiple choice questions. Question 2 asked where (in what locations) teachers accessed the internet for OPD courses; respondents could choose multiple locations. Of 133 teachers who participated in formal OPD, Table 18 shows that the majority indicated that they accessed the

internet for OPD courses at home (*n* = 118, 89%) and/or at school (*n* = 117, 88%). Nine of the participants (7%) did not respond to this question.

Table 18

Primary Location in Which Music Teachers Access the Internet for OPD Courses (*n* = 133)

Place that teachers accessed the internet	Frequency	Percentage
Home	118	89%
School	117	88%
Other	13	10%
No response	9	7%
Total responses	257	

Thirteen music teachers (10%) of the 133 respondents selected "Other" in response to the location question and provided additional data in open-ended format about where they accessed the internet for OPD courses. Their responses are summarized in Table 19. The places that these teachers listed most frequently were mobile devices (38%) and/or coffee shops (38%).

Table 19

Other Locations Music Teachers Access the Internet for OPD Courses (*n* = 13)

"Other" places	Frequency	Percentage
Mobile	5	38%
Coffee shop	5	38%
Anywhere with wifi	3	23%
Library	2	15%
Bookstore	1	8%
Apartment complex	1	8%
Hotel	1	8%
Friend's house	1	8%
Total responses	19	

Another question (SQ3) asked teachers to indicate the devices they used to access OPD courses. Teachers could choose multiple responses. Table 20 shows that 80% (*n* = 106) of respondents use laptop computers for OPD courses and 65% (*n* = 87)

use desktop computers. Tablet computers (*n* = 34, 26%) and smart phones (*n* = 25, 29%) were selected less frequently. No one chose "Other." Seven percent (*n* = 9) of the respondents did not answer this question. Overall, more than 65% respondents reported that they used either notebooks or desktop computers for OPD courses.

Table 20

Technology that Music Teachers Use for OPD Courses (*n* = 133)

Technology type	Frequency	Percentage
Laptop, e.g. Notebook	106	80%
Desktop (Not portable)	87	65%
Tablet computer, e.g. iPad	34	26%
Smart phone, e.g. iPhone	25	19%
Other	0	0%
No response	9	7%
Total responses	261	

1b. If music teachers participate in formal OPD, how frequently do they participate in OPD courses? (SQ 4)

As noted in Table 16 above, 133 music teachers indicated that they participated in formal OPD courses such as workshops, webinars, or online courses. Respondents were asked to indicate how frequently they had participated in OPD courses. Among the participants (*n* = 124) who responded to this question, more than half (52%, *n* = 70) have taken three or more OPD courses. Nine (7%) of the participants did not answer this question (Table 21). Of the total number of the respondents in this study (*n* = 279), only 48 music teachers (17%) participated in OPD courses more than five times.

Table 21

Frequency of Music Teachers' Participation in OPD Courses

Frequency of participation	Frequency	Percentage
Once	29	22%
Twice	25	19%
Three times	14	10%
Four times	8	6%
More than five times	48	36%
No response	9	7%
Total	133	100%

1c. If music teachers participate in formal OPD, how effective for their own professional growth do they consider OPD courses? (SQ 7)

The respondents (n = 133) who had experienced formal OPD courses were asked to rate the effectiveness of OPD courses that they have taken. As shown in Table 22, 71% (n = 95) of the respondents evaluated their OPD experience as effective (n = 47, 35%) or somewhat effective (n = 48, 36%). Nineteen music teachers (14% of those who took OPD courses) considered OPD courses very effective for their own learning. Only 10 music teacher participants (8%) indicated that OPD courses were not at all effective for their own learning. Nine music teachers (7%) did not respond to this question. Overall, approximately 85% (n = 114) of the 133 music teachers considered OPD courses at least somewhat effective.

Table 22

Effectiveness of Music Teachers' OPD Experience

Effectiveness of the OPD experience	Frequency	Percentage
Very effective	19	14%
Effective	47	35%
Somewhat effective	48	36%
Not at all effective	10	8%
No response	9	7%
Total	133	100%

1d. If music teachers participate in formal OPD, what motivates them to participate in OPD courses? (SQs 5, 6)

Survey question 5 included nine items focused on the participants' reasons for taking OPD courses. They responded to these nine statements using a 5-point Likert-type scale coded as follows: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree. Of the 133 respondents who reported participating in OPD courses, 124 (93%) completed this question. Means and standard deviations for each statement appear in Table 23. To test the internal consistency and reliability of the survey question, Cronbach's alpha (α) was computed using Statistical Package for the Social Sciences 18 (SPSS 18). The Cronbach's alpha measure of internal consistency reliability was $\alpha = .692$, which is acceptable reliability.

The reason for participation in OPD courses rated most strongly by respondents was "Location: convenience" ($M = 4.36$); in other words, 91% ($n = 112$) of the 133 respondents indicated that they agree or strongly agree that "Location: convenience" was the most highly rated reason they chose to participate in OPD courses (Table 23). The second most strongly rated reason for participation in OPD courses was "Time: saving and flexibility" ($M = 4.15$); 82% ($n = 101$) of the respondents rated "Time: saving and flexibility" as agree or strongly agree. "Self-paced learning" was the next most highly rated reason ($M = 3.60$). "The possibility of online discussion with others" was the least strongly rated reason ($M = 2.85$) that music teachers decided to participate in OPD courses. Nine (7%) of the 133 participants did not answer this question.

Table 23

Primary Reasons that Music Teachers Participate in OPD Courses (*n* = 124)

(SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree; SD=Strongly Disagree)

Reasons for participation in OPD courses	SA&A	N	D&SD	M	SD
Location: convenience	112 (91%)	9 (7%)	3 (2%)	4.36	.820
Time: saving and flexibility	101 (82%)	16 (13%)	7 (5%)	4.15	.937
Self-paced learning	75 (60%)	29 (23%)	20 (16%)	3.64	1.136
Less expensive alternative	71 (57%)	33 (27%)	20 (16%)	3.60	1.202
Mandatory for job	69 (55%)	21 (17%)	34 (27%)	3.48	1.388
Only option for certain PD activity	66 (54%)	31 (25%)	27 (22%)	3.46	1.212
Lots of information available online	58 (47%)	44 (35%)	22 (18%)	3.36	1.039
Possibility of reviewing materials online	56 (45%)	47 (38%)	21 (17%)	3.36	1.015
Possibility of online discussion with others	30 (25%)	54 (44%)	40 (32%)	2.85	1.041

Survey question 6 asked respondents to list any other reasons they might decide to participate in OPD courses. Of the 133 respondents who reported participating in OPD courses, 20 teachers (15%) responded. Eighteen provided reasons and two reported “none” as other reasons. Responses are listed in Table 24. Next to each response is a category related to the statements of Table 23. Some responses that participants indicated fit into these categories, while others (italicized in Table 24) did not fit into any of the categories of Table 23. These additional categories for participation in OPD some respondents listed personal learning style, online preference, interesting topic, personal goal, getting a degree, cost savings, and availability.

Table 24

Statements of Other Reasons that Music Teachers Decided to Participate in OPD Courses

Responses	Category
Many of the OPD programs I have been a part of have been mandatory training. This includes a wide variety of training exercises from my district (OSHA, sexual harassment, etc).	Mandatory
Self scheduling	Time
It was the only place I could get the classes I needed for a certain certification.	Mandatory; Only option
I didn't have to take off from work.	Time
I need recertification hours and there is not much PD offered for Music Teachers in Tucson.	Mandatory; Only option
It was part of the course. Several days were in class and the rest of the time was online.	Mandatory
I wanted to learn more.	*Personal goal*
I find online classes work better for my style of learning. I'm quiet and prefer to have time to digest material before I respond in a class setting. I prefer the online learning environment.	*Personal learning style; Online preference*
Recertification	Mandatory
Kindermusick certification that also counted as PD. Rio Salado classes to further my professional goals for ESL (now ELL) and technology in the classroom.	*Personal goal*
Topic was interesting and timely for my position and the school where I teach.	*Interesting topic*
Fun…like learning about and with technology.	*Interesting topic*
To pursue my Masters.	*Getting a degree*
I can save money with gas. The certain classes I need are only available online from my relatively remote location.	Location; Only option; *Cost savings*
We have several required trainings online for my school district.	Mandatory
Addressed a specific area of interest.	*Interesting topic*
I earned the tuition waiver from the sponsoring university by supervising a student teacher from there.	*Availability*
Well, first and foremost, of course, I did it to learn. To gain knowledge.	*Personal goal*
None	None
None	None

1e. What kinds of OPD courses related to music do music teachers take? (SQ 17)

As Table 17 shows, of 133 music teachers who participated in OPD courses, only 36 (27%) of the respondents indicated that they had participated in music-

specific OPD courses. These respondents (*n* = 36) were asked to list web addresses (URLs) or titles of the OPD music courses in which they participated. Twenty-three of the 36 respondents listed web addresses or titles of courses. Among these 23 respondents, one did not remember the title of the course, and some respondents listed several music OPD courses. Some respondents provided information that did not appear to be related to a course. Almost half (*n* = 11, 49%) of the 23 respondents listed that they participated in online music classes such as music theory, music history, or music methods courses provided by community colleges or universities. Some respondents listed National Association for Music Education (NAfME) webinars (*n* = 4, 18%) and online music degree programs (*n* = 3, 13%). Table 25 shows course titles, web addresses, and other information provided by the respondents. Some respondents reported accessing articles or online forums, which may or may not be part of formal OPD courses as defined in this document.

Table 25

Types of Music OPD Courses for Teachers

Course titles, web addresses, or other information	Frequency	Percentage
Online music classes such as music theory, music history, music recording, music technology, or music methods (from MCC, Pima Community College, or ASU Polytech)	11	49%
NAfME Webinars (from soundtree archives)	4	18%
Online music degree programs (Boston Uni. or Berklee College)	3	13%
Kindermusik (http://www.kindermusik.com/)	1	4%
Commoncoreink-5music (http://commoncoreink5music.com/)	1	4%
Fun Music Company (http://funmusicco.com/)	1	4%
Don't remember, but one of the mandatory PDs	1	4%
Articles (NAfME or ACDA) or Forum (ACDA or ChoralNet)	1	4%
Total	23	100%

1f. Does participation or non-participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 1, 24, 25, & 26)

In order to examine differences in percentage (proportion) of music teachers who participated in OPD courses or did not participate in OPD courses by gender, age group, years of teaching experience, and self-reported level of technology, chi-square tests were used.

H_o1a. There will be no significant difference in percentage (proportion) of music teachers who participate or do not participate in OPD courses by age group. Table 26 shows frequencies and percentages of teachers who participated or did not participate in OPD by age group. "No response" data (n = 51) were eliminated. The age groups 51-60 years and more than 61 years (Table 13) were combined for the chi-square test (Table 26). The results of the chi-square test show that there is no association between age group and participation in OPD courses at the .05 significance level (X^2 = 1.424, df = 3, p = .700).

Table 26

Age Group of Music Teachers and Participation in OPD Courses

	Participation in OPD	No participation in OPD	Total
21-30 years	22 (9.6%)	27 (11.8%)	49 (21.5%)
31-40 years	32 (14.0%)	32 (14.0%)	64 (28.1%)
41-50 years	16 (7.0%)	25 (11.0%)	41 (18.0%)
More than 51 years	36 (15.8%)	38 (16.7%)	74 (32.5%)
Total	106 (46.5%)	122 (53.5%)	228 (100.0%)

H_o1b. There will be no significant difference in percentage (proportion) of music teachers who participate or do not participate in OPD courses by years of teaching experience. Table 27 shows total years of teaching experience for respondents who participated in OPD courses and those who did not participate in

OPD courses. "No response" data (n = 51) were eliminated. Three levels of years of teaching experience (21-30 years, 31-40 years, and more than 41 years) shown in Table 14 were combined into one level (more than 21 years) for the chi-square test (Table 27). The chi-square test shows that there is no association between years of teaching experience and participation in OPD courses at the .05 significance level (X^2 = 1.228, df = 2, p = .541).

Table 27

Music Teachers' Total Years of Teaching Experience and Participation in OPD Courses

	Participation in OPD	No participation in OPD	Total
1-10 years	55 (22.2%)	55 (22.2%)	110 (44.4%)
11-20 years	32 (12.9%)	43 (17.3%)	75 (30.2%)
More than 21 years	32 (12.9%)	31 (12.5%)	63 (25.4%)
Total	119 (48.0%)	129 (52.0%)	248 (100.0%)

H_o1c. There will be no significant difference in percentage (proportion) of music teachers who participate or do not participate in OPD courses by level of self-reported technology proficiency. Table 28 shows frequencies and percentages of music teachers who participated or did not participate in OPD courses by current level of technology proficiency. "No response" data (n = 31) were eliminated. Current levels of technology "intermediate" and "beginner" (Table 15) were combined for the chi-square test (Table 28). Interestingly, the chi-square test shows a statistically significant association between current level of technology and participation in OPD courses at the .05 level (X^2 = 10.826, df = 1, p = .001). Music teachers who self-report intermediate or beginning levels of technology proficiency may be less likely to take OPD courses.

Table 28

Music Teachers' Current Level of Technology and Participation in OPD Courses

	Participation in OPD	No participation in OPD	Total
Proficient	71 (28.6%)	50 (20.2%)	121 (48.8%)
Intermediate/Beginner	48 (19.4%)	79 (31.9%)	127 (51.2%)
Total	119 (48.0%)	129 (52.0%)	248 (100.0%)

Although gender is not an independent variable for other questions in this study, Table 29 shows gender data for respondents who participated in OPD courses and those who did not participate in OPD courses. "No response" data (n = 33) were eliminated. A chi-square test was conducted to check for an association between gender and participation. The results of the chi-square test show that there is no association between gender and participation in OPD courses at the .05 significance level (X^2 = .053, df = 1, p = .819).

Table 29

Gender of Music Teachers and Participation in OPD Courses

	Participation in OPD	No participation in OPD	Total
Female	73 (29.7%)	81 (32.9%)	154 (62.6%)
Male	45 (18.3%)	47 (19.1%)	92 (37.4%)
Total	118 (48.0%)	128 (52.0%)	246 (100.0%)

In sum, when music teachers who have participated in OPD courses are compared with those who did not participate in OPD courses, there are no associations by gender, age group, and years of teaching experience. However, there is a statistically significant association in self-reported technology proficiency and participation in OPD courses. Teachers who consider themselves more technologically proficient may be more likely to participate in OPD courses.

1g. Do the reasons that teachers list as their purpose for participation in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 5, 24, 25, & 26)

As reported earlier, survey question 5 included nine statements to which teachers responded using a 5-point Likert-type scale. Table 30 shows each statement related to the reasons teachers participate in OPD courses.

Table 30

Nine Statements Related to Reasons Teachers Participate in OPD Courses

	Statement
5.1	Lots of information available online
5.2	Time: saving and flexibility
5.3	Location: convenience
5.4	Less expensive alternative
5.5	Self-paced learning
5.6	Possibility of reviewing materials online
5.7	Possibility of online discussion with others
5.8	Only option for certain professional development activities
5.9	Mandatory for my job

A three-way ANOVA was conducted for each statement related to reasons teachers participate in OPD courses. The sub hypotheses for each ANOVA are:

H_o2a. There will be no significant difference in opinions of music teachers related to the purpose for participation in OPD courses by age group.

H_o2b. There will be no significant difference in opinions of music teachers related to the purpose for participation in OPD courses by years of teaching experience.

H_o2c.There will be no significant difference in opinions of music teachers related to the purpose for participation in OPD courses by level of self-reported technology proficiency.

H_o2d. There will be no significant interactions among age group, years of teaching experience, and level of self-reported technology proficiency.

The three independent variables in this study are age group (four levels), years of teaching experience (three levels), and self-reported technology proficiency (two levels). Only complete cases (n = 106) were considered and utilized to test these hypotheses. Each of the nine statements is included as a subheading below.

Statement 5.1. Lots of information available online. To test hypotheses for the statement 5.1, a three-way ANOVA was conducted. As shown In Table 31, the three-way ANOVA showed no significant differences in the statement 5.1 for the three main effects and four interactions.

Table 31

ANOVA Summary Table for Statement 5.1. Lots of Information Available Online (SS = Sum of Squares, df = Degrees of freedom, MS = Mean Square)

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	8.068	3	2.689	2.432	.070
Years of teaching experience (B)	1.168	2	.584	.528	.592
Technology proficiency (C)	.516	1	.516	.467	.496
A X B	2.922	3	.974	.881	.454
A X C	4.704	3	1.568	1.418	.243
B X C	.706.889	2	.353	.319	.727
A X B X C	98.420	2	.444	.402	.670
Error	1331.000	89	1.106		
Total	115.142	106			

Statement 5.2. Time: saving and flexibility. To test hypotheses for the statement 5.2, a three-way ANOVA was conducted. As shown In Table 32, the three-way ANOVA showed no significant differences in the statement 5.2 for the three main effects and four interactions.

Table 32

ANOVA Summary Table for Statement 5.2. Time: Saving and Flexibility

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	1.062	3	.354	.388	.762
Years of teaching experience (B)	.738	2	.369	.405	.668
Technology proficiency (C)	1.046	1	1.046	1.147	.287
A X B	1.632	3	.544	.597	.619
A X C	1.965	3	.655	.718	.544
B X C	4.285	2	2.142	2.350	.101
A X B X C	.021	2	.010	.011	.989
Error	81.147	89	.912		
Total	1970.000	106			

Statement 5.3. Location: convenience. To test hypotheses for the statement 5.3, a three-way ANOVA was conducted. As shown In Table 33, the three-way ANOVA showed no significant differences in the statement 5.3 for the three main effects and four interactions.

Table 33

ANOVA Summary Table for Statement 5.3. Location: Convenience

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	.252	3	.084	.110	.954
Years of teaching experience (B)	.026	2	.013	.017	.983
Technology proficiency (C)	2.062	1	2.062	2.713	.103
A X B	2.319	3	.773	1.017	.389
A X C	1.226	3	.409	.538	.658
B X C	1.050	2	.525	.690	.504
A X B X C	.229	2	.114	.150	.861
Error	67.657	89	.760		
Total	2115.000	106			

Statement 5.4. Less expensive alternative. To test hypotheses for the statement 5.4, a three-way ANOVA was conducted. As shown In Table 34, the three-way ANOVA showed no significant differences in the statement 5.4 for the three main effects.

Table 34

ANOVA Summary Table for Statement 5.4. Less Expensive Alternative

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	4.416	3	1.472	1.179	.322
Years of teaching experience (B)	5.516	2	2.758	2.209	.116
Technology proficiency (C)	.718	1	.718	.575	.450
A X B	7.408	3	2.469	1.978	.123
A X C	3.578	3	1.193	.955	.417
B X C	1.172	2	.586	.469	.627
A X B X C	5.122	2	2.561	2.052	.135
Error	111.101	89	1.248		
Total	1544.000	106			

Statement 5.5. Self-paced learning. To test hypotheses for the statement 5.5, a three-way ANOVA was conducted. No significant differences were found for the three main effects. Among four interactions, a significant difference was found in the two-way interaction between age group and years of teaching experience at the .05 level (Table 35). Most researchers use a Bonferroni adjustment procedure in order not to have inflated Type I error rate. The Bonferroni post hoc multiple comparison of means revealed no significant differences for the two-way interaction. A two-way ANOVA of age group and years of teaching experience showed no significant interaction.

Table 35

ANOVA Summary Table for Statement 5.5. Self-Paced Learning

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	2.783	3	.928	.075	.552
Years of teaching experience (B)	1.044	2	.522	.397	.674
Technology proficiency (C)	1.717	1	1.717	1.305	.256
A X B	11.326	3	3.775	2.869	.041
A X C	2.644	3	.881	.670	.573
B X C	2.091	2	1.046	.795	.455
A X B X C	.190	2	.095	.072	.930
Error	117.110	89	1.316		
Total	1572.000	106			

Statement 5.6. Possibility of reviewing materials online. The three-way ANOVA for statement 5.6 showed a significant difference for the main effect of age group at the .05 level (Table 36). The other two main effects and four interactions were not significant. The age group main effect was made up of four levels. Post hoc comparison among the age group means were made by using the Bonferroni procedure with a significance level of. 05. The Bonferroni post hoc test revealed significant mean differences (p = .023) between the 31-40 age group (m = 3.06) and the over 51 age group (m = 3.78).

Table 36

ANOVA Summary Table for Statement 5.6. Possibility of Reviewing Materials Online

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	8.670	3	2.890	2.930	.038
Years of teaching experience (B)	5.195	2	2.597	2.633	.077
Technology proficiency (C)	.474	1	.474	.480	.490
A X B	2.039	3	.680	.689	.561
A X C	2.374	3	.791	.802	.496
B X C	1.178	2	.589	.597	.553
A X B X C	.142	2	.071	.072	.931
Error	87.794	89	.986		
Total	1327.000	106			

Statement 5.7. Possibility of online discussion with others. The three-way ANOVA for statement 5.7 showed significance for the main effect of age group at the .05 level of significance (Table 37). The other two main effects and four interactions were not significant. The age group main effect was made up of four levels. Post hoc comparison among the age group means were made by using the Bonferroni procedure with a significance level of. 05. The Bonferroni post hoc test revealed significant mean differences (p = .042) between the 31-40 age group (m = 2.44) and the over 51 age group (m = 3.08).

Table 37

ANOVA Summary Table for Statement 5.7. Possibility of Online Discussion with Others

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	9.791	3	3.264	3.530	.018
Years of teaching experience (B)	2.835	2	1.417	1.533	.222
Technology proficiency (C)	.518	1	.518	.560	.456
A X B	.4295	3	1.432	1.548	.208
A X C	6.101	3	2.034	2.199	.094
B X C	1.579	2	.790	.854	.429
A X B X C	1.969	2	.984	1.065	.349
Error	82.292	89	.925		
Total	924.000	106			

Statement 5.8. Only option for certain professional development activities. To test hypotheses for statement 5.8, a three-way ANOVA was conducted. No significant differences were found for the three main effects. Among four interactions, a significant difference was found in the triple interaction among age group, years of teaching experience, and self-reported technology proficiency at the .05 level (Table 38). The Bonferroni post hoc multiple comparison of means revealed no significant differences for the three-way interaction. Two-way ANOVAs for all other interactions were also not significant.

Table 38

ANOVA summary table for statement 5.8. Only Option for Certain Professional Development Activities

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	.549	3	.183	.147	.931
Years of teaching experience (B)	.295	2	.147	.119	.888
Technology proficiency (C)	1.356	1	1.356	1.092	.299
A X B	7.542	3	2.514	2.025	.116
A X C	7.404	3	2.468	1.988	.122
B X C	.707	2	.354	.285	.753
A X B X C	8.859	2	4.429	3.568	.032
Error	110.493	89	1.241		
Total	1425.000	106			

Statement 5.9. Mandatory for my job. To test hypotheses for the statement 5.9, a three-way ANOVA was conducted. No significant differences were found for the three main effects. Among the four interactions, a significant difference was found in the two-way interaction between age group and years of teaching experience at the .05 level (Table 39). The Bonferroni post hoc multiple comparison of means revealed no significant differences for the two-way interaction. A two-way ANOVA of age group and years of teaching experience showed no significant interaction.

Table 39

ANOVA Summary Table for Statement 5.9. Mandatory for My Job

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	5.629	3	1.876	1.002	.396
Years of teaching experience (B)	.188	2	.094	.050	.951
Technology proficiency (C)	1.748	1	1.748	.934	.337
A X B	15.670	3	5.223	2.790	.045
A X C	8.641	3	2.880	1.539	.210
B X C	6.385	2	3.193	1.705	.188
A X B X C	3.060	2	1.530	.817	.445
Error	166.603	89	1.872		
Total	1450.000	106			

Analysis of music teachers' opinions related to the purpose for participation by three independent variables using three-way ANOVAs showed significant differences in initial analysis but no significant difference in Bonferroni post hoc tests for the following statements: Self-paced learning, Only option for certain professional development activities, and Mandatory for my job. Similar analysis showed significant differences between the 31-40 and the over 51 age groups for: Possibility of reviewing materials online and Possibility of online discussion with others.

1h. What other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) have participants found interesting or useful? (SQ 21)

All teachers who responded to this study (n = 279) were asked to list other kinds of useful online teacher groups or interesting online professional activities they access that are not related to recertification hours. Of 279 potential respondents, 153 teachers (55%) answered this question, and some participants provided multiple answers, for a total of 259 responses (Table 40). Ninety-nine (65%) of 153 respondents listed Facebook groups as online teacher forums not associated with recertification hours. Forty-two respondents (27%) reported that they used music teacher group websites such as those supported by the Arizona Music Educators Association (AMEA), National Association for Music Education (NAfME), or American Choral Directors Association (ACDA). Twenty-nine (19%) listed general websites such as Google or Public television websites, and 18 (12%) listed online music websites such as Banddirector.com or violinist.com. Ten music teachers indicated that they accessed blogs (7%). Some respondents listed other kinds of online resources such as email, twitter, Google docs, and Youtube. A few teachers mentioned offline resources. A complete list can be found in Appendix E.

Table 40

Other Informal Online Teacher Groups or Informal Online Professional Activities (n = 153)

Activities (not necessarily approved for recertification hours)	Frequency	Percentage
Facebook groups	99	65%
Music teacher group websites	42	27%
General websites	29	19%
Online music websites	18	12%
Blogs	10	7%
Online education (webinars, seminars, mentoring)	8	5%
Online sources (articles, e-books)	6	4%
Email	5	3%
Online group (forum)	5	3%
Twitter	4	3%
Google docs	4	3%
YouTube	4	3%
Listserv	3	2%
LinkedIn	2	1%
Chat room	2	1%
Wiki	1	1%
Dropbox	1	1%
Skype	1	1%
Offline education	7	5%
Offline group	5	3%
Offline materials	3	2%
Total responses	259	

Research Question 2: Do music teachers in Arizona who participate in OPD courses interact with their peers during OPD? (SQ 8)

One of the purposes of the study is to investigate the experiences of music teachers related to interactions with peers in formal OPD courses. Survey question 8, which was available to the 133 respondents who indicated that they have participated in OPD, asked these music teachers to indicate whether they interacted with peers in OPD courses. Sixty-three percent (n = 84) of the respondents indicated that they interacted with other participants during OPD courses, while 30 percent of respondents (n = 40) did not have experiences of interacting with other participants in OPD courses. Seven percent (n = 9) did not answer this question. Table 41 shows the

frequency and percentage of responses. Nearly two-thirds (*n* = 84) of the 133 respondents reported that they interacted with others in OPD courses. Of a total number of the respondents in this study (*n* = 279), 30% (*n* = 84) have interacted with peers in OPD courses.

Table 41

Frequency of Music Teachers' Experiences to Interact with Peers During OPD Courses

Experiences to interact with other participants	Frequency	Percentage
Yes	84	63%
No	40	30%
No response	9	7%
Total	133	100%

2a. If music teachers interact with other participants during OPD courses, how effective do they consider online interaction with their peers during OPD courses? (SQ 12)

As noted in Table 41 above, 84 (63%) of 133 music teachers who have taken OPD courses indicated that they interacted with peers during OPD courses. When the respondents (*n* = 84) were asked whether or not online interaction with their peers during OPD was effective for their own learning (SQ12), thirty-nine (46%) of 84 respondents indicated that these interactions with their peers were somewhat effective. Twenty-three respondents (27%) considered these interactions with peers effective. Only six respondents (7%) indicated that their online interactions with peers were very effective for their own learning, and sixteen percent (*n* = 13) considered peer interactions "not at all effective" (Table 42). Overall, 80% of music teachers who responded to this question considered online interaction with their peers during OPD courses somewhat effective, effective, or very effective. Three music teachers (4%) did not respond to this question.

Table 42

Effectiveness of Music Teachers' Interactions with Peers During OPD Courses

Effectiveness of interactions	Frequency	Percentage
Very effective	6	7%
Effective	23	27%
Somewhat effective	39	46%
Not at all effective	13	16%
No response	3	4%
Total	84	100%

2b. What do music teachers consider beneficial about online interaction with other peers in OPD courses? (SQ 13)

In order to understand teachers' perceptions of the benefits gained from interactions with other participants in OPD courses, survey question 13 offered respondents multiple statements of potential benefits. Respondents could choose multiple answers. Among the 84 respondents who indicated that they interacted with other participants in OPD courses, 64% (*n* = 54) of the teachers considered "sharing materials, ideas, or opinions" as a benefit of peer interaction (Table 43). The second most frequently selected benefit was "acquiring information and experiences from other peers" (*n* = 43, 51%), followed by validating personal views (*n* = 38, 45%), networking (*n* = 25, 30%), and problem solving (*n* = 23, 27%). Eighteen percent (*n* = 15) of the respondents indicated "no benefits" gained from interactions with other participants in OPD. Three music teachers (4%) did not respond to this question. No one selected "Other."

Table 43

Frequency of Benefits Gained from Interactions with Other Participants in OPD Courses (n = 84)

Benefits of interactions with peers in OPD courses	Frequency	Percentage
Sharing materials, ideas, or opinions	54	64%
Acquiring information & experiences from other peers	43	51%
Validating personal views	38	45%
Networking (social interaction)	25	30%
Problem solving	23	27%
No benefits	15	18%
Other	0	0%
No response	3	4%
Total responses	198	

2c. Does interaction or non-interaction with peers in OPD courses vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 8, 24, 25, & 26)

H_o3a. There will be no significant difference in percentage (proportion) of music teachers who report interactions or non-interactions with peers in OPD courses by age group. In order to test the null hypothesis 3a, the chi-square test was utilized. Table 44 shows frequencies and percentages of teachers who interacted or did not interact with peers in OPD courses by age group. "No response" data (n = 29) were eliminated. The chi-square test shows no association between age group and interaction or non-interaction with peers in OPD courses at the .05 significance level (X^2 = 4.857, df = 3, p = .183).

Table 44

Age Group of Music Teachers and Interaction with Peers in OPD Courses

	Interaction with peers in OPD	No interaction with peers in OPD	Total
21-30 years	14 (13.5%)	8 (7.7%)	22 (21.2%)
31-40 years	20 (19.2%)	12 (11.5%)	32 (30.8%)
41-50 years	14 (13.5%)	2 (1.9%)	16 (15.4%)
More than 51 years	19 (18.3%)	15 (14.4%)	34 (32.7%)
Total	67 (64.4%)	37 (35.6%)	104 (100.0%)

H_o3b. There will be no significant difference in percentage (proportion) of music teachers who report interactions or non-interactions with peers in OPD courses by years of teaching experience. In order to test null hypothesis 3b, a chi-square test was performed. Table 45 shows frequencies and percentages of teachers who interacted or did not interact with peers in OPD by years of teaching experience. "No response" data (n = 14) were eliminated. The chi-square test shows no association between years of teaching experience and interaction or non-interaction with peers in OPD courses at the .05 significance level (X^2 = .405, df = 2, p = .817).

Table 45

Music Teachers' Total Years of Teaching Experience and Interaction with Peers in OPD Courses

	Interaction with peers in OPD	No interaction with peers in OPD	Total
1-10 years	38 (31.9%)	17 (14.3%)	55 (46.2%)
11-20 years	21 (17.6%)	11 (9.2%)	32 (26.9%)
More than 21 years	20 (16.8%)	12 (10.1%)	32 (26.9%)
Total	79 (66.4%)	40 (33.6%)	119 (100.0%)

H_o3c. There will be no significant difference in percentage (proportion) of music teachers who report interactions or non-interactions with peers in OPD courses by level of self-reported technology proficiency. Table 46 shows frequencies and percentages of music teachers who participated or did not participate in OPD

courses by current level of technology. Hypothesis 3c was tested using a chi-square test. "No response" data (n = 14) were eliminated. The chi-square test shows that there is no association between years of teaching experience and interactions or non-interactions with peers in OPD courses at the .05 significance level (X^2 = 2.338, df = 1, p = .126).

Table 46

Music Teachers' Current Level of Technology and Interaction with Peers in OPD Courses

	Interaction with peers in OPD	No interaction with peers in OPD	Total
Proficient	51 (42.9%)	20 (16.8%)	71 (59.7%)
Intermediate/Beginner	28 (23.5%)	20 (16.8%)	48 (40.3%)
Total	79 (66.4%)	40 (33.6%)	119 (100.0%)

Although gender is not an independent variable for other questions in this study, Table 47 shows gender data for respondents who interact and those who did not interact with peers in OPD courses. "No response" data (n = 15) were eliminated. A chi-square test was conducted to check for an association between gender and interaction with peers in OPD courses. The results of the chi-square test show that there is no association between gender and interaction or non-interaction with peers in OPD courses at the .05 significance level (X^2 = 1.209, df = 1, p = .272).

Table 47

Gender of Music Teachers and Interaction with Peers in OPD Courses

	Interaction with peers in OPD	No interaction with peers in OPD	Total
Female	51 (43.2%)	22 (18.6%)	73 (61.9%)
Male	27 (22.9%)	18 (15.3%)	45 (38.1%)
Total	78 (66.1%)	40 (33.9%)	118 (100.0%)

In sum, when music teachers who have interacted or who have not interacted with peers in OPD courses are compared, there are no associations by gender, age

group, years of teaching experience, and self-reported technology proficiency. It should be noted that those who reported "no interaction" may not have had the opportunity to interact because interaction may not have been included and/or required in the OPD courses they took.

Research Question 3: What is the nature of self-reported peer interactions among Arizona music teachers who participate in OPD courses? (SQ 10)

Respondents (n = 84) who indicated that they interacted with other participants in OPD courses were asked about the nature of their interactions (SQ 10). The majority (n = 78, 92%) reported that interactions with peers in OPD courses were either mandatory (59%) or both mandatory and elective (33%) (Table 48). Only 3 respondents (4%) indicated that interaction with peers in OPD courses was elective or optional. Overall, most of the participants (n = 78, 92%) indicated that they participated in interactions with peers in OPD courses because interaction was required. Three music teachers (4%) did not respond to this question.

Table 48

The Nature of Teacher Interaction with Peers in OPD Courses

Nature of peer interactions in OPD courses	Frequency	Percentage
Mandatory (required)	50	59%
Elective (optional)	3	4%
Both (I experienced some of each)	28	33%
No response	3	4%
Total	84	100%

3a. What kind of tools for peer interactions do music teachers use in OPD courses? (SQ 9)

Respondents (n = 84) who indicated that they interacted with other participants in OPD courses were asked to indicate the kind of tools they used for peer interactions in OPD courses (SQ 9). Respondents could choose multiple items in a

check box format. As shown in Table 49, the majority (*n* = 79, 98%) of the respondents indicated that they used discussion boards as tools for peer interactions in OPD courses. Over half of the respondents selected e-mail (*n* = 46, 57%), followed by live chat room (*n* = 22, 27%), and video chat room outside the course platform (*n* = 13, 16%). Relatively few indicated that they experienced online interaction via microphone only (*n* = 11, 14%), or via microphone and webcam in the course platform (*n* = 11, 14%). The one respondent (1%) who chose "Other" listed telephone. Three of the 84 music teachers (4%) did not respond to this question.

Table 49

Frequency of Tools Used for Peer Interactions in OPD Courses (*n* = 84)

Tools used for peer interactions in OPD	Frequency	Percentage
Discussion board (Internet forum)	79	94%
E-mail	46	57%
Live chat room	22	27%
Using video chat room outside the course platform	13	16%
Using microphone only	11	14%
Using microphone and webcam in the course platform	11	14%
Other	1	1%
No response	3	4%
Total responses	183	

3b. What kinds of interactions have music teachers had with peers in OPD courses? (SQ 11)

The 84 respondents who indicated that they had interacted with peers in OPD courses were asked to indicate the kind of interaction in a multiple choice format (SQ 11). The most frequently selected response (*n* = 41, 51%) was "I posted a single message, someone responded, someone else added to that response, and so on" (Table 50). The second most frequently selected kind of interaction was "I posted a single message and two or more people responded" (*n* = 36, 44%), followed by "I posted a single message and two or more people responded, and then even more people added

their responses" (*n* = 35, 43%). These kinds of interactions imply one-way communication and were the most frequently selected responses. About one-third of the teachers indicated that they received no response (*n* = 27, 33%) or only one response (*n* = 29, 36%) to their posts. About a third of the respondents had online conversations (multiple exchanges) through email, chat, or other texts with multiple people (*n* = 31, 38%) or with one person (*n* = 24, 30%). Only 12% (*n* = 10) of the respondents indicated that their peer interaction was "online conversations (multiple exchanges) via camera or webcam face to face with one person." Sixteen percent (*n* = 13) experienced online conversations (multiple exchanges) via camera or webcam face to face with multiple people. Three music teachers (4%) did not respond to this question.

Table 50

Types of Peer Interactions in OPD Courses (*n* = 81)

Kinds of interactions with peers in OPD	Frequency	Percentage
I posted a single message, someone responded, someone else added to that response, and so on.	41	51%
I posted a single message and two or more people responded.	36	44%
I posted a single message and two or more people responded, and then even more people added their responses.	35	43%
I had online conversations (multiple exchanges) through email, chat, or other texts with multiple people.	31	38%
I posted a single message but only one person responded.	29	36%
I posted a single message but received no response.	27	33%
I had online conversations (multiple exchanges) through email, chat, or other texts with one person.	24	30%
I had online conversations (multiple exchanges) via camera or webcam face to face with multiple people.	13	16%
I had online conversations (multiple exchanges) via camera or webcam face to face with one person.	10	12%
Total responses	183	

Research Question 4: What are music teachers' opinions regarding peer interaction in OPD courses? (SQ 20)

All respondents (n = 133) who reported participating in OPD courses were asked to list any ideas to help music teachers interact with peers in OPD courses through an open-ended question (SQ 20). Twenty-two teachers responded but did not always provide answers about interactions with peers in OPD courses. In Table 51 italicized categories were directly related to the question and non-italicized type shows responses that may not be directly related to the original question. Four music teachers recommended specific topics to help music teachers interact with peers in OPD courses. Two respondents suggested informal interaction forums such as Facebook. Other ideas to promote peer interaction included well-structured tasks, accountability, and small group interaction. Table 51 shows the 22 responses.

Table 51

Teacher Ideas to Encourage Online Interactions with Peers in OPD Courses (n = 22)

Responses	Category
Facebook	*Use Facebook*
I don't know: On facebook, I currently chat with an organization of music teachers and whenever someone asks a question you get lots of answers or suggestions back. Also, people post pictures of their classroom setups or activities. Something like that would be neat	*Use Facebook*
Give time during PLC – Give time during off campus music meetings to learn and collaborate. Make sure all music/arts teachers are trained in the technology.	*Give time and make sure all users are trained in the technology (Technology issue)*
Skype or some type of video connection? It is hard because so much of what we do is performance based. How do you demonstrate or share that online?	*Use Skype or some type of video connection (Technology issue)*
Well-structured tasks to be accomplished during the discussions and accountability for the quality of the discussion would be a strong motivator for quality interactions.	*Make well-structured tasks and encourage accountability*

(Table 51 continued on next page)

(Table 51 continued)

Small group interaction around project-based learning using collaboration tools has worked best for me in online courses. In my large classes that were on camera and live with satellite locations made for more tense moments. It's difficult to know when to speak, and it was difficult to participate. The smaller group interactions were much more effective.	*Make small group interaction rather than large classes that are on camera*
Forums related to: marching band instruction, music theory, festival level compositions	*Need specific topics*
Ideas about any type of musical question. Reviews of music charts.	*Need specific topics*
Exchange of "immediate use" information – repertoire, techniques, upcoming events	*Need specific topics*
Creative discussions about music, creating music, and sharing music in/out of class	*Need specific topics*
Live whenever possible!	Preference for face-to-face interaction or live online interaction
I guess I would rather take a class in person and have a "real" interaction with another person.	Preference for face-to-face interaction
I want more OPD programs available, in fact we need them to keep up with licensure.	Need more OPD courses
I haven't seen too many opportunities for this type of OPD for music teachers, so providing opportunities would be a start.	Need more OPD courses
I would simply love to know where there are affordable OPD classes that can be used for re-certification.	Need more OPD courses
I don't have any right now. However, as an aside, I will say that if an online music masters program had been available in 2008, I probably would have taken it. In 2013 I gave up on that option after multiple, multiple searches via the internet. Now I am pursuing a reading endorsement master's degree. Opportunities to teach music at the elementary level are limited where I live. In a sense I gave up a dream in exchange for the practicality of teaching music so I could get a job in the elementary level with a general education class. It's kind of sad, but I need a job that pays better than substituting.	Need more OPD courses
I wish we would do more. Learning together is much more effective.	Prefer learning together
Look into popular online communities (gaming is a big one, but there are frequently used forums for just about any activity you can think of) and emulate.	Look into popular online communities
Help make the course interesting.	Make the course interesting
I bring my music teaching experiences to the OPD even though the courses I have taken have nothing to do with music.	Use teaching experiences to the OPD

(Table 51 continued on next page)

(Table 51 continued)

I don't have enough expertise or experience to add to the body of knowledge in OPD.	No experience
Actually ID who is music (like in an SEI study).	More personal

4a. What tools do music teachers prefer to use for peer interaction during OPD courses? (SQ 14,15)

The respondents (*n* = 84) who indicated that they had interacted with peers in OPD courses were asked to indicate what tools they would prefer to use for peer interactions as part of future OPD courses (SQ 14). Even though respondents were asked to check only three of 7 choices offered in the multiple choice format, some chose more or fewer than three. As shown in Table 52, 82% (*n* = 69) of the respondents indicated that they would prefer to use discussion boards for peer interactions as part of future OPD courses. In other words, discussion board was the most frequently selected response when teachers were asked what format they preferred. Sixty-seven percent (*n* = 56) selected e-mail, followed by live chat room (*n* = 36, 43%), and video chat room outside the course platform (*n* = 21, 25%). Relatively few indicated that they prefer online interaction via microphone only (*n* = 12, 14%), or online interaction via microphone and webcam in the course platform (*n* = 12, 14%). No one chose "Other." Three music teachers (4%) did not respond to this question.

Table 52

Tools Music Teachers would Prefer to Use for Peer Interactions in Future OPD Courses (*n* = 84)

Tools for peer interactions in OPD	Frequency	Percentage
Discussion board (Internet forum)	69	82%
E-mail	56	67%
Live chat room	36	43%
Using video chat room outside the course platform	21	25%
Using microphone only	12	14%
Using microphone and webcam in the course platform	12	14%
Other	0	0%
No response	3	4%
Total responses	206	

In an open-ended question (SQ 15), the respondents (*n* = 84) who indicated that they interacted with peers in OPD courses were asked to list any other tools they would prefer to use for peer interactions as part of future OPD course. Only five participants responded to this question (Table 53). Two respondents listed tools outside the course platform such as Facebook, Google Docs, or wiki pages. One respondent indicated that using either video or chat rooms was less convenient because of scheduling a time, and the same individual indicated a strong discomfort with appearing on camera.

Table 53

Other Tools Music Teachers Prefer to Use for Peer Interactions in Future OPD Courses (*n* = 5)

Responses	Category
Facebook group	Facebook (Informal interaction)
Project collaboration tools such as Google Docs, wiki pages and sites, web sites, mind mapping, etc.	Google Docs (Informal interaction)
Tablet computer	Tablet computer
I would not like video or chat rooms. May lose convenience factor and may lose convenience factor as you would have to schedule a time. I also do not feel comfortable on camera.	No preference on video or chat rooms
I don't have any at this time.	No other tools listed

4b. What factors might prevent teachers from interacting with peers in OPD courses? (SQs 18, 19)

Survey question 18 contained 12 items focused on the reasons music teachers might decide *not* to interact with peers in an OPD course. Participants responded to these statements using a 5-point Likert-type scale coded as follows: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree. Most (*n* = 119, 89%) of the 133 respondents who reported participating in OPD courses completed this question; 14 music teachers (11%) did not answer this question. To test the internal consistency and reliability of the survey questions, Cronbach's alpha was computed and found to be .814 which is acceptable reliability.

Table 54 shows both means and standard deviations for each statement by the 119 respondents. The statement most strongly rated for not interacting with peers in OPD courses was "Poor quality content of interactions" (*M* = 3.57); seventy-two (61%) of the 133 respondents indicated that they strongly agreed or agreed that poor quality or superficial message content was a reason they might decide not to interact with peers in OPD courses. The second most strongly rated statement was "Other

learners' low participation in interactions" (M = 3.44); 55% (n = 66) of the respondents rated peers' low participation in interactions as strongly agree or agree. "Lack of a well-specified task" was the next most highly rated statement (M = 3.12), followed by "Lack of instructor's facilitation for interaction" (M = 3.11), "No required or evaluated online discussion" (M = 3.04), and "Lecture-based OPD" (M = 3.02). Other reasons for not interacting with peers, such as "Too much waiting time" (M = 2.94), "No interest in interacting with peers" (M = 2.81), "Technical problems" (M = 2.75), and "Delayed communication" (M = 2.73), were less strongly rated. "I am hesitant to interact with peers online" (M = 2.55) and "I am not accustomed to the technology" (M = 1.92) were rated as strongly disagree or disagree by teachers in this study.

Table 54

Negative Factors that Influence Music Teachers Not to Interact with Peers in OPD Courses (*n* = 119)

(SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree; SD=Strongly Disagree)

Reasons that music teachers did not interact with peers in OPD courses	SA&A	N	D&SD	M	SD
Poor quality content of interactions (superficial level message content)	72 (61%)	29 (24%)	18 (15%)	3.57	1.022
Other learners' low participation in interactions	66 (55%)	35 (29%)	18 (15%)	3.44	1.014
Lack of a well-specified task to be accomplished with interaction	53 (45%)	30 (25%)	36 (30%)	3.12	1.236
Lack of instructor's facilitation for interaction with peers	50 (42%)	35 (29%)	34 (29%)	3.11	1.156
Online discussion is not required or evaluated by instructor.	49 (42%)	33 (28%)	37 (31%)	3.04	1.167
OPD is lecture-based.	39 (33%)	46 (39%)	34 (28%)	3.02	1.049
Online interaction takes too much time	46 (39%)	28 (24%)	45 (38%)	2.94	1.195
I am not interested in interacting with peers online.	32 (27%)	35 (29%)	52 (43%)	2.81	1.188
Lack of technical support	28 (23%)	43 (37%)	48 (40%)	2.75	1.067
I do not like to wait for a response.	28 (23%)	40 (34%)	51 (43%)	2.73	1.110
I am hesitant to interact with peers online.	22 (19%)	29 (24%)	68 (57%)	2.55	1.103
I am not accustomed to the technology.	12 (10%)	16 (13%)	91 (76%)	1.92	.979

In an open-ended question (SQ 19), the respondents (n = 133) who reported participating in OPD courses were asked to list any other factors that might prevent music teachers from interacting with peers in OPD courses. As Table 55 shows, 21 respondents listed reasons they might decide not to interact with peers in OPD courses. Italicized categories were responses directly related to the question. Five of the respondents indicated that interacting with peers in OPD courses would not occur if the topic was not interesting, or was too limited, political, or difficult. Four respondents claimed that they had ineffective experiences in required online interactions. Another respondent stated that they did not have enough knowledge about the topic for interactions with peers. Two music teachers claimed that online interaction was not included in their OPD courses or that they did not have a platform for interactions in their OPD courses. Respondents listed other reasons for not interacting, such as scheduling, preference for face-to-face interaction, or not required. Two respondents provided information that did not appear to be related to this question.

Table 55

Other Factors that Might Prevent Music Teachers from Interacting with Peers in OPD Courses (n = 21)

Responses	Category
I wasn't interested enough in the subject area to have a desire to spark an online conversation. When required to interact online, I did so only to fulfill the requirement and did not read any responses to my post. This made it a useless activity. I want to interact when I have real life questions or problems to solve.	*No interest in topic*
Disinterested in the material.	*No interest in topic*

(Table 55 continued on next page)

(Table 55 continued)

Actual performance assignments are difficult to complete and/or evaluate (i.e. conducting a rehearsal or concert; adjudicating vocal performance versus attending the recital) digitally rather than live observation.	*Topic of interest incompatible with online format*
Subject related material is limited to mostly general topics.	*Limited topics*
Educational issues are often political. The PC police are quick to judge should a peer share an option that's not socially accepted.	*Political topic*
The one experience was not satisfying. I did not learn anything; it was a mandatory exercise to get a good grade in the class.	*Mandatory but ineffective experience*
In my experience, online interaction has been in the form of discussion boards in which we have to answer mandatory questions and then are required to respond to other students' posts. The interactions are forced and are usually not beneficial. If teachers were able to hold discussions of their choosing about topics that were relevant to them, these interactions could have the potential to be much more beneficial.	*Mandatory; no beneficial experience*
Everyone required to write stuff. No one actually wants to do it.	*Mandatory; no interest in interaction*
None of the OPD programs I have used include online discussions … however, being a young teacher, I grew up on discussion boards and forums. I still use them today. As a teenager, many of these were about video games and other hobbies, but now I continue to use those outlets when troubleshooting. Why is my computer shutting down after I install a new graphics card? Check a forum. What alto sax should I buy with my limited budget? Send emails to peers and check online reviews. Just today I posted a picture on Facebook of a half strung vibraphone and got support from peers and advice for how to make the process be more efficient. I love the concept and use it frequently in my personal life … its execution at the district level is quite limited.	*Not useful except for immediate problem solving*
Have not done it enough to have firm answers	*No knowledge*
Peers may not have enough background to contribute to a higher level discussion. If one is highly versed in Orff and Kodaly and the other teacher is not familiar with them	*Peers' different knowledge levels*
Sometimes the commentator just runs out of time to respond to me, or other participants monopolize the chat…	*No response; monopolization*
The lack of face to face discussion makes real time discourse impossible, so there is a lack of the real flow that makes a "conversation" and makes it very one-sided.	*No flow to conversation*

(Table 55 continued on next page)

(Table 55 continued)

This has NOT been a required part of my OPD	*Interaction not included in OPD*
The online PD I have participated in has not had a platform to support interaction with peers	*No platform for interaction in OPD*
Anything that must be "live" or simultaneous, can be too difficult to schedule	*Scheduling*
I would rather go to a class at a set time than try and figure it out at home. Honestly, it takes less time overall. I would only take an online PD class if there were no other option.	*Preference for face-to-face interaction*
I feel like I'm successful in a class when I can have time to digest material and provide thoughtful contributions. I do not prefer large-class, live interactions where I'm graded on how many times I participate. I feel like I don't really provide a strong contribution and it makes for a more anxious and tense course.	*Personal preference*
Wasn't necessary for my success in the course	*Not required*
As an aside, I thought that OPD would be less rigorous than brick and mortar options. My experience now with the online master's degree program has show the opposite to be the case. The level of interactions for 6 classes on the forum and the idea exchanges are much more time-consuming and have a much greater depth than sharing in the classroom could ever have. Conversations can be continued in the forum a lot longer and deeper than they ever could be in the classroom. I feel I am learning much much more than I ever could in the classroom. I can also cut and paste and paraphrase my classmates comments into Microsoft Word so I can remember information much better than fleeting conversations and note-taking would allow in a physical classroom. In one sense it saves time, because I can organize as I type instead of taking notes home from a physical class, retyping them, and spending a huge amount of time reorganizing them for easy retrieval when I teach. I now have over 90 pages of organized notes that have been alphabetized for easy retrieval. When I do lesson plans and teach, I'll be able to access then promptly! I don't think I would have ever done that with six brick and mortar classes!	Response not related to question
I don't have any.	No preventing factors

4c. Do opinions of music teachers related to factors that prevent them from interacting with peers vary by age group, years of teaching experience, or self-reported technology proficiency? (SQs 18, 24, 25, & 26)

As reported earlier, survey question 18 included twelve statements to which teachers responded using a 5-point Likert-type scale. Table 56 shows each statement related to factors that prevent teachers from interacting with peers in OPD courses.

Table 56

Twelve Statements Related to Negative Factors that Influence Teachers Not to Interact with Peers in OPD Courses

	Statement
18.1	Poor quality content of interactions (superficial level message content)
18.2	Other learners' low participation in interactions
18.3	I am not interested in interacting with peers online.
18.4	I am hesitant to interact with peers online.
18.5	I am not accustomed to the technology.
18.6	Lack of a well-specified task to be accomplished with interaction
18.7	Lack of instructor's facilitation for interaction with peers
18.8	OPD is lecture-based.
18.9	Lack of technical support
18.10	Online discussion is not required or evaluated by instructor.
18.11	I do not like to wait for a response.
18.12	Online interaction takes too much time

A three-way ANOVA was conducted for each statement related to negative factors that may influence teachers not to interact with peers in OPD courses. The sub hypotheses for each ANOVA are:

H_o4a. There will be no significant difference in opinions of music teachers related to factors that prevent them from interacting with peers in OPD courses by age group.

H_o4b. There will be no significant difference in opinions of music teachers related to factors that prevent them from interacting with peers in OPD courses by years of teaching experience.

H_o4c. There will be no significant difference in opinions of music teachers related to factors that prevent them from interacting with peers in OPD courses by level of self-reported technology proficiency.

H_o4d. There will be no significant interactions among age group, years of teaching experience, and level of self-reported technology proficiency.

The three independent variables in this study are age group (four levels), years of teaching experience (three levels), and self-reported technology proficiency (two levels). Only complete cases (n = 106) were considered and utilized to test these hypotheses.

Statement 18.1. Poor quality content of interactions (superficial level message content). To test hypotheses for the statement 18.1, a three-way ANOVA was conducted. As shown In Table 57, the three-way ANOVA showed no significant differences in the statement 18.1 for the three main effects and four interactions.

Table 57

ANOVA Summary Table for Statement 18.1. Poor Quality Content of Interactions (Superficial Level Message Content)

Source	*SS*	*df*	*MS*	*F*	*P*
Age group (A)	2.109	3	.703	.680	.567
Years of teaching experience (B)	5.908	2	2.954	2.856	.063
Technology proficiency (C)	.718	1	.718	.695	.407
A X B	1.517	3	.506	.489	.691
A X C	2.611	3	.870	.841	.475
B X C	1.411	2	.706	.682	.508
A X B X C	1.553	2	.776	.751	.475
Error	92.060	89	1.034		
Total	1465.000	106			

Statement 18.2. Other learners' low participation in interactions. The three-way ANOVA for statement 18.2 showed significance for the main effect of years of teaching experience at the .05 level of significance (Table 58). The other two main effects and four interactions were not significant. The years of teaching experience main effect was made up of three levels. Post hoc comparison among the years of teaching experience means were made by using the Bonferroni procedure with a significant level of. 05. The Bonferroni post hoc test revealed a significant mean difference (p = .045) between 1-10 years (m = 3.35) and 11-20 years (m = 3.90), and a significant mean difference (p = .002) between 11-20 years (m = 3.90) and over 21 years (m = 3.42).

Table 58

ANOVA Summary Table for Statement 18.2. Other Learners' Low Participation in Interactions

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	3.628	3	1.209	1.360	.260
Years of teaching experience (B)	11.122	2	5.561	6.254	.003
Technology proficiency (C)	.108	1	.108	.122	.728
A X B	2.730	3	.910	1.023	.386
A X C	6.305	3	2.102	2.364	.076
B X C	8.125	2	4.062	4.569	.013
A X B X C	2.417	2	1.208	1.359	.262
Error	79.133	89	.889		
Total	1340.000	106			

Statement 18.3. I am not interested in interacting with peers online. Regarding to statement 18.3, two main effects, years of teaching experience and self-reported technology proficiency, were significant at the .05 level (Table 59). The age group main effect and four interactions were not significant. No post hoc test for self-reported technology proficiency was conducted because this main effect was composed of just two levels (m = 3.07, intermediate/beginner; m = 2.72, proficient). According to Huck (2012),

"If the *F*-test for one of the factors turns out to be significant and if there are only two levels associated with that factor, no post hoc test is applied" (p. 293). However, the years of teaching experience main effect was composed of three levels, so a post hoc investigation was conducted. Interestingly, the Bonferroni post hoc test revealed no significant mean differences by years of teaching experience.

Table 59

ANOVA Summary Table for Statement 18.3. I am Not Interested in Interacting with Peers Online

Source	*SS*	*df*	*MS*	*F*	*P*
Age group (A)	10.382	3	3.461	2.469	.067
Years of teaching experience (B)	11.726	2	5.863	4.184	.018
Technology proficiency (C)	5.802	1	5.802	4.141	.045
A X B	3.632	3	1.211	.864	.463
A X C	.385	3	.128	.092	.964
B X C	1.822	2	.911	.650	.525
A X B X C	.219	2	.109	.078	.925
Error	124.721	89	1.401		
Total	1020.000	106			

Statement 18.4. I am hesitant to interact with peers online. To test hypotheses for the statement 18.4, a three-way ANOVA was conducted. As shown In Table 60, the three-way ANOVA showed no significant differences in the statement 18.4 for the three main effects and four interactions.

Table 60

ANOVA Summary Table for Statement 18.4. I am Hesitant to Interact with Peers Online

Source	*SS*	*df*	*MS*	*F*	*P*
Age group (A)	3.414	3	1.138	.883	.453
Years of teaching experience (B)	4.055	2	2.027	1.572	.213
Technology proficiency (C)	2.265	1	2.265	1.757	.188
A X B	.852	3	.284	.220	.882
A X C	1.503	3	.501	.389	.762
B X C	3.867	2	1.933	1.499	.229
A X B X C	.264	2	.132	.102	.903
Error	114.759	89	1.289		
Total	831.000	106			

Statement 18.5. I am not accustomed to the technology. The three-way ANOVA for statement 5.6 showed a significant difference for the main effect of self-reported technology proficiency at the .05 level (Table 61). The other two main effects and four interactions were not significant. Even though the third main effect *F* turns out to be significant ($p = .003$), there is no need for a post hoc investigation because this factor was made up of just two levels ($m = 2.40$, intermediate/beginner; $m = 1.56$, proficient).

Table 61

ANOVA Summary Table for Statement 18.5. I am Not Accustomed to the Technology

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	3.222	3	1.074	1.547	.208
Years of teaching experience (B)	1.517	2	.758	1.092	.340
Technology proficiency (C)	6.716	1	6.716	9.671	.003
A X B	2.060	3	.687	.989	.402
A X C	2.576	3	.859	1.236	.301
B X C	3.390	2	1.695	2.441	.093
A X B X C	.449	2	.225	.323	.724
Error	61.814	89	.694		
Total	493.000	106			

Statement 18.6. Lack of a well-specified task to be accomplished with interaction. To test hypotheses for the statement 18.6, a three-way ANOVA was conducted. As

shown In Table 62, the three-way ANOVA showed no significant differences in the statement 18.6 for the three main effects and four interactions.

Table 62

ANOVA Summary Table for Statement 18.6. Lack of a Well-Specified Task to be Accomplished with Interaction

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	7.448	3	2.483	1.691	.175
Years of teaching experience (B)	7.487	2	3.743	2.549	.084
Technology proficiency (C)	2.492	1	2.492	1.697	.196
A X B	1.068	3	.356	.242	.867
A X C	11.328	3	3.776	2.571	.059
B X C	5.712	2	2.856	1.945	.149
A X B X C	1.660	2	.830	.565	.570
Error	130.700	89	1.469		
Total	1169.000	106			

Statement 18.7. Lack of instructor's facilitation for interaction with peers.

Regarding statement 18.7, two main effects, age group and years of teaching experience, were significant at the .05 level (Table 63). The technology proficiency main effect and four interactions were not significant. Post hoc tests for both main effect means were conducted but the Bonferroni post hoc test revealed no significant mean differences in these main effects for the statement 18.7.

Table 63

ANOVA Summary Table for Statement 18.7. Lack of Instructor's Facilitation for Interaction with Peers

Source	*SS*	*df*	*MS*	*F*	*P*
Age group (A)	10.409	3	3.470	2.776	.046
Years of teaching experience (B)	12.767	2	6.383	5.107	.008
Technology proficiency (C)	.052	1	.052	.042	.838
A X B	4.571	3	1.524	1.219	.307
A X C	1.399	3	.466	.373	.773
B X C	4.393	2	2.197	1.757	.178
A X B X C	2.667	2	1.333	1.067	.348
Error	111.242	89	1.250		
Total	1159.000	106			

Statement 18.8. OPD is lecture-based. To test hypotheses for the statement 18.8, a three-way ANOVA was conducted. As shown In Table 64, the three-way ANOVA showed no significant differences in the statement 18.8 for the three main effects and four interactions.

Table 64

ANOVA Summary Table for Statement 18.8. OPD is Lecture-Based.

Source	*SS*	*df*	*MS*	*F*	*P*
Age group (A)	.689	3	.230	.229	.876
Years of teaching experience (B)	.197	2	.098	.098	.907
Technology proficiency (C)	.641	1	.641	.638	.426
A X B	7.046	3	2.349	2.339	.079
A X C	5.843	3	1.948	1.940	.129
B X C	3.623	2	1.811	1.804	.171
A X B X C	2.600	2	1.300	1.295	.279
Error	89.358	89	1.004		
Total	1088.000	106			

Statement 18.9. Lack of technical support. The three-way ANOVA for statement 18.9 showed a significant difference for the main effect of age group at the .05 level (Table 65). The other two main effects and four interactions were not significant. The age

group main effect was made up of four levels. Post hoc comparison among the age group means were made by using the Bonferroni procedure with a significance level of .05. The Bonferroni post hoc test revealed a significant mean difference (p = .009) between 21-30 years (m = 2.36) and over 51 years (m = 3.22), and a significant mean difference (p = .007) between 31-40 years (m = 2.44) and over 51 years (m = 3.22).

Table 65

ANOVA Summary Table for Statement 18.9. Lack of Technical Support

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	7.903	3	2.634	2.840	.042
Years of teaching experience (B)	.094	2	.047	.051	.950
Technology proficiency (C)	1.354	1	1.354	1.460	.230
A X B	4.110	3	1.370	1.477	.226
A X C	2.340	3	.780	.841	.475
B X C	1.541	2	.770	.831	.439
A X B X C	3.497	2	1.748	1.885	.158
Error	82.548	89	.928		
Total	910.000	106			

Statement 18.10. Online discussion is not required or evaluated by instructor. To test hypotheses for the statement 18.10, a three-way ANOVA was conducted. As shown in Table 66, the three-way ANOVA showed no significant differences in the statement 18.10 for the three main effects and four interactions.

Table 66

ANOVA Summary Table for Statement 18.10. Online Discussion is Not Required or Evaluated by Instructor.

Source	*SS*	*df*	*MS*	*F*	*P*
Age group (A)	5.374	3	1.791	1.290	.283
Years of teaching experience (B)	6.377	2	3.189	2.297	.107
Technology proficiency (C)	1.472	1	1.472	1.060	.306
A X B	3.107	3	1.036	.746	.528
A X C	3.504	3	1.168	.841	.475
B X C	2.479	2	1.239	.893	.413
A X B X C	3.349	2	1.675	1.206	.304
Error	123.557	89	1.388		
Total	1108.000	106			

Statement 18.11. I do not like to wait for a response. To test hypotheses for the statement 18.11, a three-way ANOVA was conducted. As shown In Table 67, the three-way ANOVA showed no significant differences in the statement 18.11 for the three main effects and four interactions.

Table 67

ANOVA Summary Table for Statement 18.11. I do Not Like to Wait for a Response.

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	5.366	3	1.789	1.460	.231
Years of teaching experience (B)	2,974	2	1.487	1.213	.302
Technology proficiency (C)	1.956	1	1.956	1.596	.210
A X B	5.530	3	1.843	1.504	.219
A X C	2.180	3	.727	.593	.621
B X C	5.564	2	2.782	2.270	.109
A X B X C	2.275	2	1.137	.928	.399
Error	109.064	89	1.225		
Total	917.000	106			

Statement 18.12. Online interaction takes too much time. To test hypotheses for the statement 18.12, a three-way ANOVA was conducted. As shown in Table 68, the

three-way ANOVA showed no significant differences in the statement 18.12 for the three main effects and four interactions.

Table 68

ANOVA Summary Table for Statement 18.12. Online Interaction Takes Too Much Time

Source	*SS*	*df*	*MS*	*F*	*p*
Age group (A)	2.337	3	.779	.516	.672
Years of teaching experience (B)	.385	2	.192	.127	.880
Technology proficiency (C)	3.921	1	3.921	2.598	.111
A X B	.2386	3	.795	.527	.665
A X C	1.675	3	.558	.370	.775
B X C	.024	2	.012	.008	.992
A X B X C	.115	2	.057	.038	.963
Error	134.329	89	1.509		
Total	1063.000	106			

Analysis of opinions music teachers' opinions related to negative factors that may influence music teachers not to interact with peers in OPD courses by three independent variables using three-way ANOVAs showed significant differences in initial analysis but no significant difference in Bonferroni post hoc tests for the following statements: I am not interested in interacting with peers online, and Lack of instructor's facilitation for interaction with peers. Similar analyses showed significant differences among years of teaching experience for Other learners' low participation in interactions, and significant differences among age groups for Lack of technical support. A significant difference in initial analysis was found but no need for a post hoc test was the following statement: I am not accustomed to the technology.

Summary

This chapter reported the results of the survey instrument used in this study and analysis of data by research questions and sub questions. Chapter 5 includes a summary

and discussion of these findings, as well as recommendations for practice and future research.

CHAPTER FIVE

SUMMARY OF STUDY AND DISCUSSION, RECOMMENDATIONS FOR PRACTICE, AND RECOMMENDATIONS FOR RESEARCH

This chapter restates the purpose of the study and reviews the methods used before summarizing the results of this study. Following the results of this study and a discussion, recommendations for practice, recommendations for future research, and a conclusion are provided.

Summary of Study and Discussion

Methodology

The purpose of this study was to investigate the experiences and opinions of Arizona music teachers related to interactions with peers in formal OPD courses approved for recertification of their teacher credential. The researcher-constructed instrument for this study was a survey composed of twenty-six questions designed to gather information related to the research questions. The online survey instrument was hosted on ZipSurvey. Twenty-two music graduate students were recruited to validate the survey as the primary tool for this study.

The target population was current or in-service music teachers in K-12 schools in the state of Arizona who are members of the Arizona Music Educators Association. Five hundred eighty four of 791 music educators in the 2014 directory were eligible to participate in the study because of their current employment status in K-12 schools in Arizona. After several distributions of the online survey, a total of 279 respondents completed to the survey, for a 48% overall response rate. Of those respondents, 248 completed the survey thoroughly and 31 participants completed it partially.

Demographic Information

The demographic data of this study show that there are more female music teachers (55%) than male music teachers (33%) among the respondents (n = 279). In regard to their teaching areas, 47% (n = 116) of the 279 music teachers are teaching in only one area, 32% (n = 80) are in two areas, 17% (n = 40) in three areas, and 3.5% (n = 7) are teaching in four areas. The average age of the respondents was approximately 42 years. The age groups of 51-60 and 31-40 years showed the largest frequencies. Their average number of years of teaching music was approximately 15 years. As the largest frequencies, 23% (n = 63) of respondents (n = 279) had been teaching music more than 21 years. For the current level of technology proficiency, most participants (84%) rated themselves as either proficient (n = 121) or intermediate (n = 114) users of technology.

Research Questions and Discussion of Findings

Four research questions guided this study. This section provides a summary and discussion of findings for each research question.

Research question 1

Research question 1 asked whether Arizona music teachers participated in formal online professional development (OPD) related to recertification of their teacher credential. Sub questions considered access to technology, frequency of participation, effectiveness of participation for personal growth, kinds of OPD courses in music, and other online forums teachers use. Participation and reasons for participation were also examined by age group, years of teaching experience, and self-reported technology proficiency.

Forty-eight percent (*n* = 133) of the music teachers who responded to the survey in this study (*n* = 279) have participated in OPD courses. Twenty-seven percent (*n* = 36) of the 133 respondents who participated in OPD courses indicated that they had participated in music-specific OPD courses. It can be supposed that music teachers in this study participated in more general OPD courses rather than music-specific OPD courses. When those (*n* = 36) who had taken music OPD courses were asked to list the kinds of music-specific OPD courses they took, respondents (*n* = 23) listed online music classes (*n* = 11, 49%), webinars (*n* = 4, 18%) and online music degree programs (*n* = 3, 13%).

Bishop (2006) suggested that ease of use and accessibility are important factors for online learning systems. Riel and Levin (1990) stated that participants should have easy access and the prerequisite experience to technical resources in order to contribute to online discussion boards. The majority of the respondents in this study indicated that they accessed the internet at home (*n* = 118, 89%) and/or at school (*n* = 117, 88%) for OPD courses. When asked what types of technology they used for OPD courses, the respondents indicated laptop computers (*n* = 106, 80%) or desktop computers (*n* = 87, 65%).

In regard to the frequency of music teachers' participation in OPD courses, it is notable that over 36% (*n* = 48) of the 133 respondents who reported participation in OPD courses, or 17% (*n* = 48) of a total of 279 respondents, also reported participating in OPD courses more than five times.

In the question related to the effectiveness of the OPD experience, approximately 85% (*n* = 114) of music teachers (*n* = 133) considered OPD courses to be at least somewhat effective. The results of the survey question asking what motivates

music teachers to participate in OPD courses showed 112 of the 133 respondents rated "Location: convenience" (M = 4.36) most strongly, followed by "Time: saving and flexibility" (82%, M = 4.15), "Self-paced learning" (75%, M = 3.60), and "Less expensive alternative" (71%, M = 3.60).

This result is consistent with other research findings that emphasized convenience of location as one merit of OPD (Bishop, 2006; Brown & Green, 2003; Deal, 2002; Fishman et al., 2013; Talor, 2011; Thomas, 2010; Treacy et al., 2002). Similar to the results of this study, other researchers suggest that one of the most important benefits of OPD is time saving and flexibility (Bishop, 2006; Deal, 2002; Dede, Breit, et al., 2005; Dede, Ketelhut, et al., 2009; Fishman et al., 2013; McNamara, 2010; Talor, 2011; Thomas; 2010; Treacy et al., 2002; Wu & Hiltz, 2004).

Although several previous researchers stated that one of the benefits of formal OPD is the abundant resources for teachers (Bishop, 2006; Fishman et al., 2013; McNamara, 2010; Treacy et al., 2002), music teachers in this study were not highly motivated to participate in OPD by having "Lots of information available online" (58%, M = 3.36). Other researchers have also pointed out that formal OPD offers the possibility of online discussion and/or interaction among learners (Bishop, 2006; Deal, 2002; Dede, Ketelhut, et al., 2009; McNamara, 2010; Muirhead & Juwah, 2004; Sutton, 2001; Treacy et al., 2002; Woo, 2005; Woo & Reeves, 2007; Wu & Hiltz, 2004; Yousef, 2012). However, music teachers in this study rated "Possibility of online discussion with others" as the least strong reason (M = 2.85) for participating in OPD courses.

Research questions 2 and 3

The second primary research question for this study asked whether teachers who participated in OPD courses interacted with peers online during these courses. Sub questions included perceived effectiveness and potential benefits of interactions in OPD courses, and whether interaction varied by age, teaching experience, and self-reported technology proficiency. The third primary research question had to do with the nature of self-reported peer interactions in OPD courses, including tools for peer interactions and kinds of interaction.

When the respondents (n = 133) who reported participating in OPD courses were asked to indicate whether they interacted with peers in OPD courses, 63% (n = 84) responded positively. However, the survey question about the nature of these participants' interactions with peers in OPD courses showed that for most respondents (n = 78, 92%) interactions with peers in OPD courses was mandatory. Very few music teachers (n = 3, 4%) indicated that peer interactions were exclusively elective.

This finding is interesting because respondents who reported participating in OPD courses rated the possibility of online discussion with others least strongly as a reason for taking OPD courses. We can suppose that the purpose of music teachers' participation in OPD courses might not be online discussion with others, but other motivations such as conveniences related to location, time savings, and flexibility.

However, when asked whether or not online interaction with peers during OPD was effective for their own learning, 80% (n = 68) of the respondents (n = 84) who indicated that they interacted with peers during OPD courses considered online interaction with peers during OPD courses somewhat effective (46%), effective (27%), or

very effective (7%). Only, 16% (*n* = 13) considered the interaction "not at all effective." Similar to this study, Talor (2011) reported that interactions between teacher participants in OPD courses were successful and positive; in Talor's study, all participants were required to interact with peers. Conversely, Kale (2007) investigated four history teachers and four university staff members to identify the overall online communication patterns in the online discussions. He found that only a limited number of participants posted messages to one another, and the participants tended to interact more with faculty than with each other. Findings showed that the online communications were monotonous and ineffective because they was not required.

In regard to benefits gained from interactions with peers in OPD courses, 64% of respondents (*n* = 84) considered "sharing ideas or opinions" as the highest interaction benefit, followed by "acquiring information and experience" (*n* = 43, 51%), "validating personal views" (*n* = 38, 45%), "networking" (*n* = 25, 30%), and "problem solving" (*n* = 23, 27%). The number of the respondents who chose "no benefits" was fifteen (18%).

When participants (*n* = 84) were asked to list the kind of tools they utilized for peer interactions in OPD courses, the majority (*n* = 79, 98%) reported that they used discussion boards. Over half of the respondents selected e-mail (*n* = 46, 57%), followed by live chat room (*n* = 22, 27%). Relatively few mentioned that they used online interaction via microphone only (*n* = 11, 14%), and online interaction via microphone and webcam in the course platform (*n* = 11, 14%). It seems that most respondents in this study who interacted with peers in OPD courses might be more familiar with using text-based interaction tools rather than other forms of interaction such as using either video or microphone.

In regard to kinds of interactions that the respondents (n = 84) had with peers in OPD courses, 51% (n = 41) selected "I posted a single message, someone responded, someone else added to that response, and so on," followed by "I posted a single message and two or more people responded" (n = 36, 44%), "I posted a single message and two or more people responded, and then even more people added their responses" (n = 35, 43%). However, very few selected online conversations (multiple exchanges) via camera or webcam face to face with one person (n = 10, 12%) or with multiple people (n = 13, 16%).

Overall, it is notable that the respondents generally had experienced a single message exchange rather than online conversations (multiple exchanges) in their peer interactions in OPD courses. Similar to the result of the question that asked about tools used for peer interactions in OPD courses, music teachers in this study had more often experienced peer interactions through text-based message (email or chat) rather than through camera or webcam face to face with peers. This result might be due to technology set-up costs and the need to be trained in that technology.

In addition, music teachers in this study might be inclined to prefer asynchronous interaction (discussion aboard) to synchronous one (live chat) with peers in OPD courses because text-based interaction tools can be edited, are not as threatening, and may be less intimidating. Or, it could be that asynchronous interactions are easier and take less time than synchronous conversations, and time savings was reasons to select OPD courses by teachers in this study. It could be that teachers are not highly motivated to participate in OPD courses of any kind. In relation to assumptions about time, Wang and Green (2006) also found that online graduate students preferred asynchronous

communication tools to synchronous tools because of flexibility in scheduling. However, Stephens and Hartmann (2004) found that secondary math teachers preferred the direct interaction of the chat room rather than the online discussion board due to participants' time constraints.

Research question 4

The fourth primary research question sought information about music teachers' opinions of peer interactions in OPD courses, including tools they preferred to use for online interactions with peers in OPD courses, what might prevent them from interacting, and how their opinions might vary by age, teaching experience, and self-reported technology proficiency.

The respondents (n = 84) in this study reported that they prefer to use discussion boards (n = 69, 82%) and e-mail (n = 56, 67%) as tools for peer interactions as part of future OPD courses. This response is similar to the tools that the respondents (n = 84) reported using in the past for peer interactions in OPD courses: discussion boards (n = 79, 98%) and e-mail (n = 46, 57%). Similar to their past practices, respondents preferred to use text-based interaction rather than either video or microphone interaction in future OPD courses. In addition, music teachers in this study tended to prefer asynchronous interactions (discussion aboard) to synchronous interactions (live chat) with peers in future OPD courses. In an open-ended question response, two of five teachers listed tools outside of the course platform such as Facebook, Google docs, or wiki pages.

Previous researchers have identified poor quality content as one of many weaknesses in formal OPD (Brown & Green, 2003; Hebert, 2007; McNamara, 2010). "Poor quality content" may have to do with the content of the online materials, however,

content of interaction may also discourage participation in peer interactions in OPD courses. The results of this study show that "Superficial level message content" was rated most strongly by respondents as a reason not to interact with peers. The second most strongly rated reason for not interacting with peers in OPD courses was "Peers' low participation in interactions." Several researchers have emphasized that a sense of responsibility to their tasks and/or to the group in online interaction is an essential part of successful interaction with peers (Fung, 2004; Hultgren, 2008; Riel & Levin, 1990). Superficial message content of low participation may show lack of responsibility and can be discouraging.

In this study, the third most frequently rated reason for not to interacting with peers in OPD courses was "Lack of a well-specified task" (M = 3.12). Similar to this result, researchers suggested that learning groups should receive well-designated or more structured online tasks to accomplish their goals (Hirumi, 2002; Riel & Levin, 1990; Stephens & Hartmann, 2004; Woo, 2005; Woo & Reeves, 2007; Wu & Hiltz, 2004).

Previous researchers have found that for learners to have successful interactions, the instructor's role in facilitating online interaction activities is important (Fung 2004, Hultgren, 2008; Moore, 1989; Riel & Levin, 1990; Swan, 2002; Woo, 2005; Wu & Hiltz, 2004). In other words, in order to avoid a superficial level of interaction between peers, instructors should encourage the participants and provide consistent support. In this study, "Lack of instructor's facilitation for peer interactions" (M = 3.11) was the fourth most highly rated reason that the respondents might decide not to interact with peers in OPD courses. For effective interactions between peers, music teachers in this study expressed a need for online interaction guidance and facilitation from the instructor.

Online interaction that is required and/or evaluated by the instructor may motivate learners to participate in online interaction (Fung, 2004; Riel & Levin, 1990; Stephens & Hartmann, 2004; Talor, 2011). Similar to the literature review, findings of this study showed that "No required or evaluated online discussion" (M = 3.04) was the fifth strongly rated reason that music teachers in this study might decide not to interact with peers in OPD courses. If they are not required, interactions in OPD may seldom occur.

If communication does not happen immediately in an online interaction, interactions between learners may not take place (Sanders, 2005; Yousef, 2012). Fung (2004) found that most music graduate students felt a lack of time to interact with peers in online courses. However, other reasons, such as "Too much waiting time" (M = 2.94) or "Delayed communication" (M = 2.73) which may be related to lack of time, were less strongly rated by the teachers in this study.

Several researchers (Hultgren, 2008; Riel & Levin, 1990; Woo & Reeves, 2007) state if learners have similar skills and knowledge, then online interaction between peers will be more successful. For music teachers in this study, lack of similar skill and knowledge were not the barriers that prevented them from interacting with peers in OPD courses. Some of prior researchers' studies were populated by college or high school students. This study was populated by certificated professionals, and their skills and knowledge were probably on an equivalent level. However, some teachers reported "No interest in interacting with peers" (M = 2.81) and "Hesitation to interact with peers online" (M = 2.55), although these were not highly rated reasons to not interact.

Based on the literature, learners should have the expertise necessary to use the technical resources needed for online interaction (Hillman et al, 1994; Riel & Levin, 1990; Salavuo, 2008; Stephens & Hartmann, 2004; Woo & Reeves, 2007). Stephens and Hartmann (2004) claimed that teachers need to achieve levels of technological literacy as life-long learners. If respondents are less confident with the use of computers, they might interact less with peers than people who are experts in technology. Deal (2002) pointed out, "Courses that have significant instructional components that include audio and video may prove to be very frustrating to students with dial-up connections and probably will result in poor success or satisfaction with the course" (p. 24). However, Hillman et al. (1994) suggested that learners become accustomed to using the delivery system. Technology was not a barrier in this study. Respondents seemed to be comfortable with the use of networking technology; "Unfamiliarity with the technology" (M = 1.92) was the lowest ranked reason teachers might decide not to interact with peers. In addition, most respondents (84%, n = 279) rated themselves as either proficient (n = 121) or intermediate (n = 114) users of technology. It can be supposed that current music teachers in this study had at least some technology experience.

The respondents (n = 133) who reported participating in OPD courses were asked to list any other factors that may prevent music teachers from interacting with peers in OPD courses. Twenty-one respondents (16%) listed items such as: uninteresting topic, ineffective experiences, lack of enough knowledge about the topic, no online interaction in their OPD courses, scheduling, preference for face-to-face interaction, or no necessity for interactions.

Previous researchers have found that some music teachers have an interest in more informal types of PD (Bush, 2007; Conway, 2008; Conway & Christensen, 2006; Kim 2012). Also, several researchers have asserted that informal online learning communities can expand educational activities beyond traditional classrooms (Plant, 2004; Salavuo, 2006; Salavuo, 2008; Waldron, 2012). The results of this study support those of previous studies on informal OPD. In this study, 153 (55%) of 279 participants responded positively to an open-ended question regarding other kinds of useful online teacher groups or interesting online professional activities *not* related to recertification hours. Interestingly, the number of the respondents (*n* = 153, 55%) to this question was higher than that of the respondents (n = 133, 48%) who participated in OPD courses for recertification of their teacher credentials. This indicates that current music teachers in this study seem to have interests in informal OPD activities. Teachers may be interested in informal OPD opportunities for two reasons: (1) they can choose content in which they are most interested, and (2) they can choose the format that they prefer such as Facebook. Analysis of the responses shows that 99 (65%) of the153 respondents listed Facebook as an informal online group (Salavuo, 2008), and 42 (27%) reported using music teacher group websites such as informal forums offered by professional organizations. It can be supposed that music teachers are much more interested in and familiar with Facebook group websites rather than music teacher group websites. Other kinds of online professional activities listed which are not related to recertification hours were general websites (19%), online music websites (12%), blogs (7%), online education (5%), offline education (5%), online sources (4%), email (3%), twitter (3%), or Google docs (3%). Interestingly, music teachers found informal OPD activities such as blogs, email, twitter,

or Google docs far less interesting or utilized them more infrequently than Facebook, the most popular informal online venue.

Although the findings of this study may not be generalizable to all music teacher populations, the result of this study may be beneficial to other similar music teacher settings. Recommendations follow.

Recommendations for Practice

This study reveals that in-service music teachers in Arizona have a variety of experiences with and opinions about OPD. This study surveyed only music teachers in Arizona who were members of AMEA in the fall of 2014, so the results may not apply to other teachers in Arizona or in other states. I will discuss some options for peer interactions in formal OPD courses for music teachers based on data from this study. This study's data suggest that many busy music teachers have found OPD to be an effective learning avenue to access new information and share experiences and ideas with other teachers in similar occupational roles. The results of this study may be beneficial to OPD instructors, OPD course developers, and administrators and policy-makers to improve the quality of OPD for music teachers.

For OPD Instructors

Of those (n = 133, 48%) who did participate in OPD courses, 30% (n = 40) did not interact with other participants within the course. Of the respondents (n = 84) who indicated they interacted with peers, 18% (n = 15) stated that they did not benefit from interactions with peers in OPD courses. Why did some have negative experiences with and opinions about interactions with peers in OPD courses?

The results of this study indicated that superficial message content was the primary reason that music teachers in OPD did not interact with peers. The second reason for failure to interact was peers' low participation in interactions. In this study, many music teachers experienced a single message exchange rather than online conversations (multiple exchanges) in their peer interactions in OPD. Of the 133 teachers who participated in OPD courses, the most frequently selected response (n = 41, 51%) was "I posted a single message, someone responded, someone else added to that response, and so on." The second most frequently selected kind of interaction was "I posted a single message and two or more people responded" (n = 36, 44%). These two kinds of interactions imply one-way communication and were the most frequently experienced interactions.

My study contributes to a gap in the research identified by Woo (2005), who noted, "Many research studies have been conducted to find good strategies; however, most of them were focused on instructors' or instructional designers' perspectives. Learners' thoughts did not get much attention" (p. 3). When asked to list any ideas to promote more interaction with peers in OPD courses, the respondents in this study indicated that they wanted instructors to make course discussion topics creative and interesting. Four music teachers recommended specific topics such as creative discussions about music, creating music, and sharing music in/out of class to help music teachers interact with peers in OPD courses. Some of the respondents indicated that interacting with peers in OPD courses would not occur if the topic was not interesting, or was too limited, political, or difficult. It seems to be important that instructors consider learners' interests and their personal professional goals when requiring peer interactions

in OPD courses. In addition, instructors could provide participants in OPD courses with motivating and interesting discussion topics. I suggest that instructors in OPD courses might shift their focus from the quantity of interaction to high quality interactions.

Music teachers in this study ranked "Lack of a well-specified task to be accomplished with interaction" as the third highest reason that they decided not to interact with peers in OPD courses. One teacher in this study suggested, "Well-structured tasks to be accomplished during the discussions and accountability for the quality of the discussion would be a strong motivator for quality interactions" (found in Table 51). Similarly, Woo (2005) recommended careful planning and adequate strategies for effective online interaction. My findings suggest that instructors in OPD could provide learning groups with well-specified or structured online tasks to promote more motivating and meaningful peer interactions.

Some survey respondents listed interaction tools outside the course platform such as Facebook, Google docs, or wiki pages. Therefore, if an OPD course does not include an integrated platform for peer interactions, instructors could encourage learners to use informal tools outside the course platform for peer interactions.

For OPD Course Developers

One of the findings of this study showed that nearly two-thirds (n = 84) of the 133 respondents who participated in OPD courses have interacted with peers in the OPD courses. Of these 84 music teachers, 68 (80%) considered their interactions to be at least somewhat effective. Relating to the effectiveness of peer interactions in OPD courses, one music teacher stated the following in an open-ended survey question;

> · · · I thought that OPD would be less rigorous than brick and mortar options. My experience now with the online master's degree program has shown the opposite to be the case. The level of interactions for 6 classes on the forum and the idea exchanges are much more time-consuming and have a much greater depth than sharing in the classroom could ever have. Conversations can be continued in the forum a lot longer and deeper than they ever could be in the classroom. I feel I am learning much much more than I ever could in the classroom. I can also cut and paste and paraphrase my classmates comments into Microsoft Word so I can remember information much better than fleeting conversations and note-taking would allow in a physical classroom. In one sense it saves time, because I can organize as I type instead of taking notes home from a physical class, retyping them, and spending a huge amount of time reorganizing them for easy retrieval when I teach. I now have over 90 pages of organized notes that have been alphabetized for easy retrieval. When I do lesson plans and teach, I'll be able to access them promptly! I don't think I would have ever done that with six brick and mortar classes! (found in Table 55)

Therefore, music teacher OPD interactions can be important and effective to course participants. However, some factors might prevent music teachers from interacting with peers in OPD courses. Some music teachers claimed that online interaction was not required in their OPD courses or that they did not have a platform for interactions in their OPD courses. Similar to this opinion, Yousef (2012) noted that "Course designers and instructors should strive to develop activities that will foster collaboration and learner interaction" (p. 24). I suggest that course designers could consider integrating peer interaction platforms into OPD courses that encourage more in-depth interactions.

Few music teachers in this study reported technology proficiency limitations; they could easily access the internet and the required technology tools for their OPD courses. For example, 121 (43%) of the respondents (n = 279) rated themselves as proficient users of technology. However, we should consider that the other respondents (46%) rated themselves as either intermediate (n = 114) or beginner (n = 13) users of technology. Teachers who consider themselves more technologically proficient may be more likely to participate in OPD courses. In my study, there was statistically significant

association in self-reported technology proficiency and participation in OPD courses. Music teachers who self-report intermediate or beginning levels of technology proficiency may be less likely to take OPD courses. Yousef (2012) mentioned that "Careful consideration must be given to the design of online courses in relation to each of these generations [i.e. Generation X and Millennials] with regard not only to their preferences for technology, interactivity, and communication, but also to their abilities to utilize and incorporate technology into their learning experiences" (p. 81). Similarly, Moore (1989) noted that "Educators need to organize programs to ensure maximum effectiveness of each type of interaction, and ensure they provide the type of interaction that is most suitable for the various teaching tasks of different subject areas, and for learners at different stages of development" (p. 5). Therefore, my study's results suggest that OPD course developers consider participants' abilities to utilize technology tools for peer interactions in the OPD courses before designing OPD courses.

Findings in this study showed that music teachers might be more familiar with using text-based interaction tools rather than video or microphone for synchronous interactions. Only 12% (n = 10) of those who participated in OPD courses indicated that their peer interaction was "online conversations (multiple exchanges) via camera or webcam face to face with one person." Sixteen percent (n = 13) experienced online conversations (multiple exchanges) via camera or webcam face to face with multiple people. Even though music teachers seldom used camera or webcam in OPD course platforms for peer interactions, I feel that they might utilize these technologies in or out of OPD courses in the future, particularly if course content is interesting or relevant and the kinds of interactions included in the course are meaningful. Therefore, course

developers could design OPD courses employing user-friendly interfaces, but not hesitate to enable course participants to expand their online technology familiarity with synchronous online tools. Course developers should also consider working with teachers to learn about their interests in the type of content available in OPD courses.

For Administrators and Policy-Makers

According to the results of this study, of music teachers (n = 133) who participated in OPD courses, almost 40% (n = 48) chose to enroll in OPD courses more than five times. In addition, 85% (n = 114) of music teachers considered OPD courses at least somewhat effective, and some respondents wanted more OPD courses and/or more opportunities to interact with peers in open-ended questions. Therefore, regardless of whether OPD courses are for the purpose of teacher recertification or not, it seems important that administrators and policy-makers supply various and ample opportunities for OPD courses. My findings support Bowles' (2002) claim, "Licensing agencies should consider the broad range of activities and experiences that might benefit the music professional over a lifetime" (p. 40). Through these various opportunities learners can acquire various skills and experiences utilizing technology tools to help them accomplish their professional learning goals.

In response to open-ended questions, some music teachers reported that they seek interesting and relevant music PD. One respondent said, "Subject related material is limited to mostly general topics" (found in Table 55). Another wanted "Forums related to: marching band instruction, music theory, festival level compositions" (found in Table 51). A third respondent looked for "Creative discussions about music, creating music, and sharing music in/out of class" (found in Table 51). Conway, Hibbard, Albert, and

Hourigan. (2005) reported a disconnect between administrators and music teachers regarding PD needs. One of the keys to successful PD may be for administrators and organization officials to query music teachers about their desired PD courses. When administrators or organization officials make a decision about PD topics in both face-to-face PD and online PD, these topics will then reflect the interests of the music teachers who are required to participate. Therefore, I suggest that administrators and policy-makers communicate with music teachers and find out what OPD courses or topics are important to them.

In conclusion, findings from this study may lead to a better understanding of music teachers' peer interactions in OPD courses. Using the recommendations of the researchers in the literature review and the suggestions of the in-service music teachers as recorded in the survey, OPD can be expanded to include more relevant and valuable teacher interactions. The findings of this study may serve to influence instructors of OPD courses, administrators, policy-makers, and online course developers to improve OPD by integrating more meaningful peer interactions into OPD courses for music teachers.

Recommendations for Research

Additional research on the many aspects of OPD for music teachers is needed to improve educational practice. The following recommendations for research are based on the results of this study of Arizona music teachers.

In this study, the survey had a 48% overall response rate. Bauer (2007) notes that many survey studies for in-service music teacher PD had relatively small return rates. In order to get trustworthy results of the effectiveness and impact of interactions in OPD, future studies could explore ideas for achieving larger sample sizes and response rates

such as surveys in other states or a national survey. In addition, OPD courses for music teachers could be investigated through a variety of research methods such as qualitative, quantitative, and mixed-methods studies. In future studies interviews could explore music teachers' experiences and opinions of OPD peer interactions in more depth and detail than is possible in a survey instrument.

In this study more than half (n = 146, 52%) of the participating music teachers (n = 279) indicated that they did not utilize OPD for their recertification. In addition, approximately 87% (n = 243) of the music teachers did not participate in music-specific OPD courses. Future studies could explore in more depth why many music teachers did not participate in OPD courses.

One of the survey questions in this study was to list other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) that music teachers have found to be interesting or useful. Findings showed that many current music teachers had an interest in informal OPD activities. In addition, the results of the survey showed that many music teachers are participating in online learning communities (e.g. Facebook group or music teacher group websites). These informal interactions are the types of social networks and informal professional learning communities wherein music teachers voluntarily engage. How do participants in informal PD or OPD interact with peers? And how do the online learning communities play a role in their interactions? It would also be worthwhile to research the actual condition of online learning communities for music teachers, noting both the benefits and limitations of these informal interactions. In the future music education researchers could also study online music communities as learning environments, especially informal music learning

in the virtual music community outside of formal music education (Salavuo, 2008; Waldron, 2011; Waldron, 2009).

This study focused on OPD defined as formal professional development activities that are completed entirely through the internet for the purpose of teacher recertification with the state licensing authority, but did not explore hybrid PD. Because researchers have found that music teachers prefer face-to-face PD, hybrid classes may be one way to combine the benefits of both face-to-face PD and OPD. For example, Salavuo (2008) noted that blended courses are more appropriate or interesting for students than exclusively face-to-face or exclusively online courses. Treacy et al. (2002) reported that "OPD works best when it is integrated carefully into ongoing local programs and combined with face-to-face opportunities" (p. 44). Literature related to teachers who participate in hybrid PD was very limited (Bowen, Chingos, Lack, & Nygren, 2014; Walls, 2008; Watson, 2006). Therefore, more future research related to hybrid PD would be beneficial in general education as well as in music education. In addition, relatively little is known from the literature about music teachers' experiences of online interaction during hybrid PD. In my study, some respondents reported they prefer face-to-face interaction rather than online interaction. One respondent said, "I would rather go to a class at a set time than try and figure it out at home. Honestly, it takes less time overall. I would only take an online PD class if there were no other option" (found in Table 55). Another said, "I guess I would rather take a class in person and have a 'real' interaction with another person" (found in Table 37). Future music education researchers could study the online and face-to-face interactions of music teachers who participate in hybrid PD courses.

In the research reviewed for this study, I found one study about OPD in Hong Kong music education (Fung, 2004). Because online learning for both teachers and students is becoming an increasingly important part of the education system, international research on OPD courses in multiple countries could be worthwhile. Although OPD courses for teachers in Korea are limited, I personally would like to conduct research that compares OPD for music teachers in the U.S. and Korea.

Conclusion

For recertification, music teachers are encouraged to continue to grow throughout their professional lives and to view themselves as lifelong learners. Sustained PD may have a greater impact on their teaching practice than short-term efforts. Effective PD represents an organized process that takes place in the form of long-term opportunities (Bowles, 2002; Conway, 2006; Hammel, 2007). To this end, formal OPD courses can be a good venue for music teachers to gain varied and ongoing education throughout their careers. Peer interactions in OPD courses can encourage both individuals and groups to promote deeper understandings of diverse music education topics. Therefore, continued research related to peer interactions in OPD courses will be a worthwhile effort for music education researchers.

REFERENCES

Ally, M. (2008). Foundations of educational theory for online learning. In T. Anderson (Eds.), *Theory and practice of online learning* (pp. 15-44). Canada: Athabasca University.

Anderson, T. (2003). Modes of interaction in distance education: Recent developments and research questions. In M. G. Moore & W. Anderson (Eds.), *The handbook of distance education* (pp. 129-144). Mahwah, NJ: Erlbaum.

Ashley, J. L., & Kaplan, S. (2003). Synchronous and asynchronous communication tools. *Executive Update Online.* Retrieved from http://www.asaecenter.org/Resources/articledetail.cfm?itemnumber=13572. Oct. 3. 2013.

Babbie, E. (1990). *Survey research methods* (2nd ed.). Belmont, CA: Wadsworth Publishing Company.

Bauer, W. I. (2007). Research on professional development for experienced music teachers. *Journal of Music Teacher Education, 17*(1), 12-21.

Bauer, W. I., Forsythe, J., & Kinney, D. (2009). In-service music teachers' perceptions of professional development. In *Thought and practice in music education,* 101-123. Age Publishing.

Bernard, A. D. Sr.. (2009). *Professional development and teacher leadership in the era of NCLB: A study exploring elementary music teacher preferences.* Retrieved from ProQuest Digital Dissertations. (AAT 3366274).

Bishop, A. (2006). Online professional development: Get the facts. Retrieved from http://www.techlearning.com/showArticle.php?articleID=193600873. Nov.13. 2013.

Bowen, W. G., Chingos, M. M., Lack, K. A., & Nygren, T. I. (2014). Interactive learning online at public universities: Evidence from a six-campus randomized trial. *Journal of policy analysis and management, 33*(1). 94-111.

Bowles, C. (2002). The self-expressed professional development needs of music educators. *Update: Applications of Research in Music Education, 21*(2), 35-41.

Boyarko, M. A. (2009). *Online professional development: A study of first year online teachers.* Retrieved from ProQuest Digital Dissertations. (AAT 3357569).

Brown, A., & Green, T. (2003). Showing up to class in pajamas (or less!): The fantasies and realities of on-line professional development courses for teachers. *Clearing House, 76*(3), 148-151.

Bush, J. E. (2007). Importance of various professional development opportunities and workshop topics as determined by in-service music teachers. *Journal of Music Teacher Education,* 16(2), 10-18.

Chou, C. (2003). Interactivity and interactive functions in web-based learning systems: A technical framework for designers. *British Journal of Educational Technology, 34*(3), 265-279.

Conway, C. M. (2008). Experienced music teacher perceptions of professional development throughout their careers. *Bulletin of the Council for Research in Music Education, 176*, 7-18.

Conway, C., & Christensen, S. (2006). Professional development and the beginning music Teacher. *Contributions to Music Education, 33*(1), 9-25.

Conway, C. M., Hibbard, S., Albert, D., & Hourigan, R. (2005). Professional development for Arts Teachers. *Arts Education Policy Review. 107*(1). 3-9.

Creswell, J. W. (2013). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* Pearson Education Inc., Upper Saddle River, NJ.

Deal, W. F., III. (2002). Distance learning: Teaching technology online. *The Technology Teacher, 61*, 21-26.

Dede, C., Breit, L., Ketelhut, D., McCloskey, E. & Whitehouse, P. (2005). An Overview of current findings from empirical research on online teacher professional development. Cambridge, MA: Harvard Education Press.

Dede, C., Ketelhut, D. J., Whitehouse, P., Breit, L., & McCloskey, E. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education, 60*(1), 8-19.

Eros, J. (2012). Second-stage music teachers' perceptions of their professional development. *Journal of Music Teacher Education, 22*(2), 20-33.

Fisher, J. B., Schumaker, J. B., Culbertson, J., & Deshler, D. D. (2010). Effects of a computerized professional development program on teacher and student outcomes. *Journal of Teacher Education, 61*(4), 301-312.

Fishman, B., Konstantopoulos, S., Kubitskey, W. B., Vath, R., Park, G., Johnson, H., & Edelson, C. D. (2013). Comparing the impact of online and face-to-face professional development in the context of curriculum implementation. *Journal of Teacher Education, 64*(5). 426-438.

Friedrichs, C. (2001). The effect of professional growth opportunities as determined by California public high school instrumental music teachers (Doctoral dissertation, University of San Diego, 2001). *Dissertation Abstracts International, 62*(03), 955.

Fullan, M. G. (1991). *The new meaning of educational change.* New York: Teachers College Press.

Fung, Y. H. (2004). Collaborative online learning: Interaction patterns and limiting factors. *Open Learning, 19*(2), 135-148.

Gammill, R. (2005). *Online professional development: The experiences of a first-time facilitator.* Retrieved from ProQuest Digital Dissertations. (AAT 3201846).

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-945.

Hammel, A. M. (2007). Professional development research in general education. *Journal of Music Teacher Education, 17*(1), 22-32.

Hebert, D. G. (2007). Five challenges and solutions in online music teacher education. *Research and Issues in Music Education, Vol. 5*(1), 1-10.

Hillman, D. C., Willis, D. J., &Gunawardena, C. N. (1994). Learner interface interaction in distance education. An extension of contemporary models and strategies for practitioners. *The American Journal of Distance Education, 8*(2), 30-42.

Hirumi, A. (2002). The design and sequencing of E-learning interactions: A grounded approach. *International Journal on E-learning, 1*(1), 19-27.

Hookey, M. R. (2002). Professional development. In R. J. Colwell & C. Richardson (Eds.), *The New Handbook of Research in Music Teaching and Learning,* 887-902. New York: Oxford University Press.

Huck, S. W. (2012). *Reading statistics and research* (6th ed.). New York: Addison Wesley.

Hultgren, L. P. (2008). *The essences of interaction in online education: The experience of six doctoral students*. Retrieved from ProQuest Digital Dissertations. (AAT 3320551).

Kale, U. (2007).*Online communication patterns in a teacher professional development program.* Retrieved from ProQuest Digital Dissertations. (AAT 3277966).

Kim, H. (2012). General music teachers' participation in and perceptions of professional development activities. Unpublished paper, Arizona State University, Tempe, AZ.

Macharaschwili, C. E., & Devetski, S. (2012). A blended learning model in the professional development of teachers: Successes and challenges. In P. Resta (ED.), *Proceedings of Society for information Technology & Teacher Education International Conference 2012* (pp. 599-605). Chesapeake, VA:AACE.

McNamara, C. L. (2010). *K-12 teacher participation in online professional development.* Retrieved from ProQuest Digital Dissertations. (AAT 3397316).

Moore, M. G. (1989). Editorial: Three types of interaction. *The American Journal of Distance Education. 3*(2), 1-7.

Moore, J., & Barab, S. (2002). The inquiry learning forum: A community of practice approach to online professional development. *TechTrends, 46*(3), 44-49.

Muirhead, B., & Juwah, C. (2004). Interactivity in computer-mediated college and university education: A recent review of the literature. *Educational Technology & society, 7*(1), 12-20.

Patten, M. L. (2001). *Questionnarie research: a practical guide.* LA: Pyrczak Publishing.

Patten, M. L. (2009). *Understanding research methods: An overview of the essentials.* LA: Pyrczak Publishing.

Picciano, A. G. (2001). *Distance Learning: Making connections across virtual space and time.* Prentice-Hall, Inc., Upper Saddle River, NJ, U.S.A. 69-87.

Plant, R. (2004). Online communities. *Technology in Society, 26,* 51-65.

Riel, M. M., & Levin, J. A. (1990). Building electronic communities: Success and failure in computer networking. *Instructional Science, 19,* 145-169.

Salavuo, M. (2008). Social media as an opportunity for pedagogical change in music education. *Journal of Music, Education, and Technology, 1*(2), 121-136.

Salavuo, M. (2006). Open and informal online communities as forums of collaborative musical activities and learning. *British Journal of Music Education, 23*(3), 253-271.

Sanders, R. L. (2005). Interaction and online learning communities. In C. Crawford et al. (Eds.), *Proceedings of Society for information Technology & Teacher Education International Conference 2005* (pp. 2320-2325). Chesapeake, VA:AACE.

Shale, D., & Garrison, R. D. (1990). Introduction. In D. Randy Garrion & Doug Shale (Eds.), *Education at a distance: From issues to practice* (pp. 1-7). Robert E. Krieger Publishing Company, Inc.

Stephens, A, C., & Hartmann, C. E. (2004). A successful professional development projects' failure to promote online discussion about teaching mathematics with technology. *Journal of Technology and Teacher Education 12*(1), 57-73.

Sutton, L. A. (2001). The principle of vicarious interaction in computer-mediated communications. *International Journal of Educational Telecommunications, 7*(3), 223-242.

Swan, K. (2002). Building communities in online courses: the importance of interaction. *Education, Communication, & Information, 2*(1), 23-49.

Talor, J. M. (2011). *Characteristics of effective online professional development: A case study analysis of an online professional development course offered via Blackboard.* Retrieved from ProQuest Digital Dissertations. (AAT 3501375).

Thomas, T. S. (2010). *Online vs. face-to-face: Educator opinions on professional development delivery methods.* Retrieved from ProQuest Digital Dissertations. (AAT 3409126).

Treacy, B., Kleiman, G., & Peterson, K. (2002). Successful Online Professional Development. *International Society for technology in Education. 30*(1), 42-27.

Vanderbilt, K. L. (2008). *Online professional development: An analysis of instructor beliefs and instructional strategies for the facilitation of learning with adult educators*. Retrieved from ProQuest Digital Dissertations. (AAT 3350604).

Voelker, H. D., Orton, Z. P., & Adams, V. S. (2001). *CliffsQuickReview: Statistics.* Wiley Publishing, Inc.

Vrasidas, C., & Zembylas, M. (2004). Online professional development: lessons from the field. *Education & Training 46*, 6/7. 326-334.

Wagner, E. D. (1994). In support of a functional definition of interaction. *American Journal of Distance Education, 8*(2), 6-26.

Waldron, J. (2012). Youtube, fanvids, forums, vlongs and blogs: Informal music learning in a convergent on- and offline music community. *International Journal of Music Education 31*(1), 91-105.

Walls, K. C. (2008). Distance learning in graduate music teacher education: Promoting professional development and satisfaction of music teachers. *Journal of Music Teacher Education, 18*, 55-66.

Wang, S., & Green, M. (2006). Experiences in Online Interaction. In T. Reeves & S. Yamashita (Eds.), *Proceedings of World Conference on E-Learning in Corporate,*

Government, Healthcare, and Higher Education 2006 (pp. 1002-1005). Chesapeake, VA: AACE.

Watson, G. (2006). Technology professional development: Long-term effects on teacher self-efficacy. *Journal of Technology and Teacher Education, 14*(1), 151-166.

Woo, Y. (2005). Meaningful Online Interaction. In P. Kommers & G. Richards (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2005* (pp. 3373-3376). Chesapeake, VA: AACE.

Woo, Y., & Reeves, T. C. (2007). Meaningful interaction in web-based learning: A social constructivist interpretation. *Internet and Higher Education 10,* 15-25.

Wu, D., & Hiltz, R. S. (2004). Predicting learning from asynchronous online discussions. *Journal of Asynchronous Learning Networks, 8*(2), 139-152.

Yousef, M. C. (2012). *Satisfaction, challenges, and interaction in online education: A generational comparison.* Retrieved from ProQuest Digital Dissertations. (AAT 3537460).

Application for renewal of certificate, http://www.azed.gov/educator-certification/files/2013/10/application-for-renewal-of-certificate.pdf

The Online Oxford English Dictionary, http://www.oed.com/view/Entry/152053?redirectedFrom=professional+development#eid28088484

APPENDIX A

SURVEY

Study title: An investigation of the perceptions of music teachers related to interactions with peers in online professional development (OPD) courses
(Survey title: Music teacher online professional development)

1. Have you ever participated in formal online professional development (OPD) related to recertification of your teacher credential, for example, an online course, class, workshop, or webinar? (Required)

□ Yes □ No (If Yes, keep going, If No, go to question #21.)

The following questions refer only to your participation in online professional development (OPD) related to recertification of your teacher credential, such as an online course, class, workshop, or webinar.

2. Where do you have access to the internet for OPD? (check all that apply) (Required)

□ Home □ School □ Other _____(please specify)

3. What technologies do you use for OPD? (check all that apply) (Required)

□ Desktop (Not portable) □ Laptop, e.g. Notebook
□ Tablet computer, e.g. iPad □ Smart phone, e.g. iPhone
□ Other _____(please specify)

4. Approximately how frequently have you participated in OPD activities? (Count each workshop, webinar, or entire online course as one activity.) (Required)

□ Once □ Twice □ Three times □ Four times □ More than five times

5. Please indicate the reasons you decided to participate in OPD programs by marking the applicable box for each item. (Required)

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
5-1	Lots of information available online	□	□	□	□	□
5-2	Time: saving and flexibility	□	□	□	□	□
5-3	Location: convenience	□	□	□	□	□
5-4	Less expensive alternative	□	□	□	□	□
5-5	Self-paced learning	□	□	□	□	□
5-6	Possibility of reviewing materials online	□	□	□	□	□
5-7	Possibility of online discussion with others	□	□	□	□	□
5-8	Only option for certain professional development activities	□	□	□	□	□
5-9	Mandatory for my job	□	□	□	□	□

6. (Optional) Please list any other reasons you decided to participate in OPD programs.

7. In general, how effective was OPD for your own learning? (Required)

□ Not at all effective □ Somewhat effective □ Effective □ Very effective

The following question refers only to your participation in online professional development (OPD) related to recertification of your teacher credential, such as an online course, class, workshop, or webinar.

8. Sometimes OPD includes interactions between people taking the course through discussion boards, email, or online chats that are part of the course. Have you ever interacted with other participants during OPD? (Required)

□ Yes □ No (If Yes, keep going, If No, go to question #16.)

The following questions refer only to your participation in online professional development (OPD) related to recertification of your teacher credential, such as an online course, class, workshop, or webinar.

9. What kind of tools for peer interactions have you experienced in OPD? (check all that apply) (Required)

□ E-mail
□ Discussion board (Internet forum)
□ Live chat room
□ Online interaction via microphone only (without webcam in the course platform)
□ Online interaction via microphone and webcam in the course platform
□ Video chat room outside the course platform (such as Skype, FaceTime, Google Hangout, or other)
□ Other _____(please specify)

10. Overall, the interaction with peers in OPD that I have experienced was _____. (Required)

□ Mandatory (required)
□ Elective (optional)
□ Both (I experienced some of each)

11. What kind of interactions have you had with peers in OPD? (check all that apply) (Required)

□ I posted a single message but received no response.
□ I posted a single message but only one person responded.
□ I posted a single message and two or more people responded.
□ I posted a single message, someone responded, someone else added to that response, and so on.
□ I posted a single message and two or more people responded, and then even more people added their responses.
□ I had online conversations (multiple exchanges) through email, chat, or other texts with one person.
□ I had online conversations (multiple exchanges) through email, chat, or other texts with multiple people.
□ I had online conversations (multiple exchanges) via camera or webcam face to face with one person.
□ I had online conversations (multiple exchanges) via camera or webcam face to face with multiple people.

12. Overall, how effective was the online interaction with peers during OPD for your own learning? (Required)
□ Not at all effective □ Somewhat effective □ Effective □ Very effective

13. What benefits did you gain from interactions with other participants in OPD? (check all that apply) (Required)
□ Acquiring information and experiences from other peers
□ Networking (social interaction)
□ Sharing materials, ideas, or opinions
□ Validating personal views
□ Problem solving
□ No benefits
□ Other _____(please specify)

14. Please choose the top three tools you would prefer to use for peer interactions as part of future OPD programs. (check ONLY three) (Required)
□ E-mail
□ Discussion board (Internet forum)
□ Live chat room
□ Online interaction via microphone only (without webcam in the course platform)
□ Online interaction via microphone and webcam in the course platform
□ Video chat room outside the course platform (such as Skype, FaceTime, Google Hangout, or other)
□ Other _____(please specify)

15. (Optional) Please list any other tools you prefer to use for peer interactions as part of future OPD programs.

The following question refers only to your participation in online professional development (OPD) related to recertification of your teacher credential, such as an online course, class, workshop, or webinar.

16. Have you ever participated in OPD programs related to music? (Required)
□ Yes □ No (If Yes, keep going, If No, go to question #18.)

The following question refers only to your participation in online professional development (OPD) related to recertification of your teacher credential, such as an online course, class, workshop, or webinar.

17. (Optional) In what kind of music OPD programs did you participate? (e.g., NAfME webinar) If possible, please list Web address (URL) for OPD experience or title of the course. (e.g., http://institute.soundtree.com/Tour.aspx)

The following questions refer only to your participation in online professional development (OPD) related to recertification of your teacher credential, such as an online course, class, workshop, or webinar.

18. Here are reasons you might decide ***NOT*** to interact with peers in an OPD course. Please indicate the degree to which these factors might prevent you from interacting with peers in an OPD course. (Required)

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
18-1	Poor quality content of interactions (superficial level message content)	□	□	□	□	□
18-2	Other learners' low participation in interactions	□	□	□	□	□
18-3	I am not interested in interacting with peers online.	□	□	□	□	□
18-4	I am hesitant to interact with peers online.	□	□	□	□	□
18-5	I am not accustomed to the technology.	□	□	□	□	□
18-6	Lack of a well-specified task to be accomplished with interaction	□	□	□	□	□
18-7	Lack of instructor's facilitation for interaction with peers	□	□	□	□	□
18-8	OPD is lecture-based.	□	□	□	□	□
18-9	Lack of technical support	□	□	□	□	□
18-10	Online discussion is not required or evaluated by instructor.	□	□	□	□	□
18-11	I do not like to wait for a response.	□	□	□	□	□
18-12	Online interaction takes too much time	□	□	□	□	□

19. (Optional) Please list any other factors that prevent you from interacting with peers in OPD programs.

20. (Optional) List any ideas to help music teachers interact with peers in OPD programs?

21. Please list other kinds of online teacher groups or online professional activities (not necessarily approved for recertification hours) that you have found interesting or useful. (e.g., facebook teacher group)

22. What is your gender?

□ Male □ Female

23. What is your current teaching area? (check all that apply) (Required)

□ General music □ Band □ Strings

□ Choral □ Other_____(please specify)

24. What is your age? (_____ years old)

25. Counting this year, how long have you been teaching music in a school setting? (_____year(s)) (Required)

26. In your opinion, what is your current level of technology proficiency? (Required)

□ None □ Beginner □ Intermediate □ Proficient

Thank you for your time and participation in completing this survey.

APPENDIX B

RECRUITMENT SCRIPT

October, 2014
Dear music teacher

I am a doctoral student under the direction of Dr. Margaret Schmidt and Dr. Sandra Stauffer in the School of Music at Arizona State University.

I am conducting an online survey about Arizona music teachers' online professional development. Because you are a music teacher in Arizona, your response to this survey will be invaluable to my study**, even if you have never taken an online professional development course.** Online professional development is defined as any kind of professional development activity completed through the Internet and counted as clock hours toward your teacher recertification in Arizona. Online professional development might be an online class, workshop, or a webinar offered by a university, the state, a school district, a professional association, or a business.

I am inviting your participation, which will involve taking an online survey. Completion of the survey will take approximately 10 to 15 minutes. If you have not taken any online professional development, your participation will require less than 5 minutes.

Your participation in this study is voluntary. If you have any questions concerning the research study, please contact the researchers at hkim191@asu.edu, Marg.Schmidt@asu.edu, and Sandra.Stauffer@asu.edu.

Please click on the following link to start the online survey.
http://www.zipsurvey.com/LaunchSurvey.aspx?suid=73412&key=70858704

If you received two emails, please delete one of them, and respond once to the survey.

Thank you for your consideration.

Sincerely,
Hyung Seok (Joshua) Kim
Ph.D. student in Music Education
School of Music
Arizona State University

APPENDIX C

SURVEY COVER LETTER

October, 2014
Dear music teacher

I am a doctoral student under the direction of Dr. Margaret Schmidt and Dr. Sandra Stauffer in the School of Music at Arizona State University.

I am conducting an online survey about online professional development (OPD). Your participation is valuable **even if you have never taken an online professional development course.**

OPD is defined as any kind of professional development activity completed through the internet and counted as clock hours toward your teacher recertification in Arizona. OPD might be an online class, workshop, or a webinar offered by a university, the state, a school district, a professional association, or a business. I am inviting your participation, which will involve taking an online survey. Completion of the survey will take approximately 10 to 15 minutes.

Your participation in this study is voluntary. If you choose not to participate or withdraw from the study, there will be no penalty.

Even though you may not directly benefit from the study, your honest thoughts and opinions regarding your participation in online professional development are important and may help others in developing future online professional development opportunities in your school district and profession.

Your responses to the survey are anonymous. The results of this study may be used in my dissertation, presentations, or publications but your name will not be used. Participants can be informed of survey results by contacting hkim191@asu.edu .

If you have any questions concerning the research study, please contact the researchers at hkim191@asu.edu, Marg.Schmidt@asu.edu, and Sandra.Stauffer@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Submission of the survey will be considered your consent to participate. Thank you for your time and participation.

Sincerely,
Hyung Seok (Joshua) Kim
Ph.D student in Music Education
School of Music, Herberger Institute
Arizona State University

APPENDIX D

IRB APPROVED FORM

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Margaret Schmidt
Music, School of
480/965-8277
Marg.Schmidt@asu.edu

Dear Margaret Schmidt:

On 4/14/2014 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	An investigation of the perceptions of music teachers related to interaction with peers in online professional development (OPD) programs
Investigator:	Margaret Schmidt
IRB ID:	STUDY00000956
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• First page of survey for informed consent(Hyung Seok Kim).pdf, Category: Consent Form; • IRB (Hyung Seok Kim).docx, Category: IRB Protocol; • Survey Questions (Hyung Seok Kim).pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Email reminders, Category: Participant materials (specific directions for them); • Recruitment script (Hyung Seok Kim).pdf, Category: Recruitment Materials;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 4/14/2014.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Hyung Seok Kim
Sandra Stauffer
Hyung Seok Kim

APPENDIX E

INFORMAL ONLINE TEACHER GROUPS OR INFORMAL ONLINE PROFESSIONAL ACTIVITIES

Facebook Groups	Facebook	26	99
	Band Director Group	19	
	School Orchestra and String Teachers	7	
	Music teacher groups	18	
	organizations	1	
	American choral Directors Association (ACDA)	4	
	American String Teachers Association (ASTA)	3	
	edutopia	2	
	Arizona Band and Orchestra Directors Association (ABODA)	3	
	NAfME Career Track	1	
	Organiation of American Kodaly Educators (OAKE)	3	
	American Orff Schulwerk Association (AOSA)	4	
	AZ Orff	1	
	Arizona Kodaly Teachers Society (AKTS)	2	
	Amercian council on education (ACE)	1	
	National Association for Music Education (NAfME)	1	
	National Board for professional Teaching Standards	1	
	IB music group	1	
	AZK12 Center	1	
Blogs	blog	8	10
	Education blogs	2	
Google Docs	Google docs	4	4
YouTube		4	4
Wiki		1	1
Dropbox		1	1
Email		5	5
Twitter	musedchat	3	4
	band directors	1	
Skype	lesson	1	1
LinkedIn	orchestra teachers groups	1	2
	music teaching group	1	
Chat Room	choral	1	2
	band	1	
Music teacher group websites	teacher group	1	42
	American Choral Directors Association (ACDA)	2	
	American String Teachers Association (ASTA)	5	
	Arizona Music Educators Association (AMEA)	12	
	Arizona Band and Orchestra Directors Association (ABODA)	2	
	Sweet Adeline Directors' group	1	
	Online teacher communities	1	
	National Association for Music Education (NAfME)	15	
	Orff	1	
	Kodaly	1	

	Online brass musicians of Arizona group	1	
Online group (interaction)	Online group (forum)	2	5
	Online interactions with peers	1	
	Novell instant Messenger in district	2	
Online Resources	self directed	3	6
	articles	1	
	Online book reviews (e-books)	2	
Listserv	Notification from University	2	3
	Notification from other school district music coordinators	1	
Online Education	online class through district	1	7
	The Virtual Music Education Conference 2014 (http://vmus2014.com/)	1	
	Online mentoring program	1	
	Webinar	2	
	Edupotia online seminars	1	
	Quavermusic.com webinars	1	
General Websites	Teacher website	1	29
	Google websites	4	
	Public TV website	1	
	Web newsletters	1	
	Radio website	1	
	mylearningplan.com	1	
	Pinterest	8	
	Teaching Channel	1	
	TeachScape (district's online evaluation program)	3	
	PD 360	1	
	websites for state organizations	1	
	Scott Lang's web page	1	
	District website or server	3	
	Candidate support training for National Board Certification	1	
	Edmodo	1	
Online Music Websites	music teacher websites	1	19
	district music website	1	
	Banddirector.com	1	
	Nash Clinics	1	
	Choralnet.org	7	
	www.thesingingclassroom.com	1	
	Fun music website (funmusicco.com)	1	
	violinist.com	1	
	SBO (SBOmagazine.com) emails and website	1	
	MusicFirst.com	1	
	bethsmusicnotes.com	1	
	Curriculum based online support	1	

	Band of America	1	
Offline Materials	Book or magazine	1	3
	teaching video(D'Addario)	1	
	Amazon Prime videos	1	
Offline Education	coursework for middle school certification	1	7
	Cmmunity College seminars	1	
	first aid classes	1	
	curriculum development	2	
	Violin Master class sponsored by Shar products	1	
	Music Instrument Museum	1	
Offline Group	playing in professional groups	1	5
	Collaboration through PLcs and time with constant area teachers	1	
	Meetings with peers	1	
	teacher forums	1	
	A group of music teachers from university	1	
	Total: 153	259	259