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Traditional and Hybrid Dental Assisting Program: An Exploration of Design and Optimal Outcomes for Community College Students

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by

Janet A. Sell

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Dr. Steve Bishop, Committee Member — Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work at Lindenwood University and that I have not submitted it for any other college or university course or degree.

Janet A. Sell

Signature:  Date: 3-21-16

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Abstract

This study was designed to investigate an accredited dental assisting educational program at a Midwest community college. The Bureau of Labor of Statistics (2015) claimed the profession of dental assisting is one of the fastest growing occupation, along with ongoing research that good oral health is linked to overall general health, thereby increasing the need for more dental assistants in the workforce. The aim of this study was to determine if dental assisting students taking courses in a face-to-face traditional format performed differently from students taking courses in a hybrid (a combination of face-to-face and online) format. The researcher invited a total of 92 students from cohorts in 2012, 2013, and 2014 to participate. Of the students who elected to participate, 62% were from the traditional cohort, and 39% were from the hybrid cohort. Data collected from a cross-sectional survey focused on the tenets of the theory of Communities of Practice. De-identified data were collected to compare students' progress between the traditional and hybrid cohorts with retention rates and national examination scores using a *t*-test for data analysis. The results confirmed no statistically significant performance differences were apparent between the two groups of students. The hybrid delivery format was as effective in educating dental assisting students as the traditional educational format.

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Chapter One: Introduction

The Bureau of Labor of Statistics (2015) reported one of the fastest growing occupations is a career in dental assisting. The conventional trio of dental providers, in the United States, is comprised of the dentist, the dental assistant, and the dental hygienist (Burton, 2010; Woolfolk & Price, 2012). The education of these providers has experienced noteworthy changes over past decades, as the demands for preventive dental services continue to grow as a result of ongoing research showing oral health is linked to overall general health (Bureau of Labor Statistics, 2015; Solomon, 2012). In order for dental teams to remain relevant in an industry characterized by constant change, dental assistants must possess dedication, integrity, personal responsibility, and a commitment to professional development (Bird & Robinson, 2015).

As the impact of technology has grown in higher education, one can no longer expect the face-to-face lecture method to be the standard (Amyot & Brockman, 2011; Bonnel & Smith, 2010; Gadbury-Amyot, Singh, & Overman, 2013; Glazer, 2012; Gwozdek, Springfield, Peet, & Kerschbaum, 2011; Park & Howell, 2015). Several alternatives to traditional delivery methods are currently in use (Glazer, 2012; Little & Housand, 2011; Park & Howell, 2015; Olmsted, 2014). One such alternative is online learning (Glazer, 2012; Gwozdek et al., 2011; Little & Housand, 2011).

Another alternative, blended learning, sometimes called hybrid learning, is a mixture of face-to-face classroom instruction and online learning (Glazer, 2012; Olmsted, 2014; Park & Howell, 2015; Snart, 2010). According to Caulfield (2011), the purpose of hybrid learning activities is to merge classroom sessions with online course features to provide optimal flexibility. By providing this flexibility, Poirier (2010) advocated for

combining the best of both alternative educational delivery methods into a "hybrid model [where] students are able to receive the best of both educational worlds" (p. 28). In this hybrid model time traditionally spent in the classroom is reduced, but not eliminated (Glazer, 2012; Park & Howell, 2015; Poirier, 2010).

Background of the Study

Woolfolk and Price (2012) noted dental education began over 150 years ago with students being "educated in apprenticeships and proprietary school settings and then transitioned to formal educational settings in dental schools and community and technical colleges" (p. 51). Many working dental assistants in the United States graduate from accredited dental assisting programs in order to develop their skills and improve employment opportunities, although formal education is not a job requirement (Solomon, 2012). However, most dental assistants graduate from programs accredited by the Commission on Dental Accreditation (CODA), which is under the umbrella of the American Dental Association (ADA) (Phinney & Halstead, 2013). These programs are typically nine to 11 months in length (Phinney & Halstead, 2013).

In 2015, the CODA had 298 approved dental assisting programs across the United States (Svetanoff, Romito, Ford, Palenik, & Davis, 2015). The CODA approved dental assisting programs can be found in community colleges, vocational schools, career colleges, technical institutes, universities, and dental schools (Bird & Robinson, 2015). As noted above, most dental assisting programs are nine to 11 months long, but, at community colleges, the curriculum of these programs is typically constructed to enable students to complete an associate's degree at the end of their dental assisting program (Bird & Robinson, 2015).

Most schools, including trade schools and technical institutes, offer a certificate and/or the ability to obtain national certification through the Dental Assisting National Board (DANB) (Lippincott Williams, & Wilkins, 2012). Solomon (2012) stated the number of dentists, dental hygienists, and dental assistants in the United States have dramatically increased over the past 60 years. Approximately 157,000 individuals were practicing in dental offices in the United States in 1950 (Solomon, 2012). Dental personnel now total over 927,000 individuals where "… less than 20 percent of these individuals are dentists… dental assistants making up about one-third of the practicing staff" (Solomon 2012, p. 1031).

Research has shown practically all dental offices in the United States employ one or more dental assistants who work directly with the dentist during patient procedures and who can assume and perform various duties in the dental office under direct supervision of a dentist (Phinney & Halstead, 2013). The procedures performed by these dental assistants vary from preventive services to restorative procedures (Bird & Robinson, 2015). In 1950, just fewer than 30% of the United States population had an annual dental visit (Solomon, 2012). However, by 2009, annual dental visits had increased to 65.4% of the population (Solomon, 2012). Bird and Robinson (2015) stated, "As modern dentistry changes and procedures and techniques become more complex, the role of the dental assistant will continue to evolve" (p. 23).

All educational programs embrace the changing role of dental assistants by including both classroom and laboratory instruction in dental assisting skills (Phinney & Halstead, 2013). Dental assisting students are also exposed to practical internship in

dental offices, dental clinics, and other schools before they graduate (Lippincott Williams, & Wilkins, 2012). Moreover, Gwozdek et al. (2011) acknowledged:

> The American Dental Education Association's Commission on Change and Innovation in Dental Education has headed an initiative for curricular change and modernization in dental education designed to keep pace with the rapid changes in science, technology, and oral health care delivery. (p. 339)

In order to keep stride with continuous change for career and technical educational programs, technology can be an asset in meeting the needs of learners (Poirier, 2010). Due to life circumstances, students must at times reprioritize how to meet their educational goals (Caulfield, 2011). Hybrid learning provides another option for students to consider (Caulfield, 2011; Park & Howell, 2015). Technology has allowed students to study at convenient times and locations (Bonnel & Smith, 2010). Snart (2010) noted the numbers of students are increasing with family responsibilities, and/or full-time jobs are increasing, and these students are looking for alternative ways to obtain high quality education.

In addition, students in dental education programs have changed drastically in the last several decades and are not the individuals the educational system was intended to teach (Park & Howell, 2015; Snart, 2010). Amyot and Brockman (2011) supported those claims and went on to characterize students who were born between the years of 1982 and 1991, around the same time as personal computers made their debut, as the Net Generation. Students of the Net Generation have grown up with technology and Internet access (Amyot & Brockman, 2011).

Having a basic understanding of the diversity of students' backgrounds, interests, and achievements is important to move the learning community forward (Bonnel & Smith, 2010). If educators want to reach all students, including those in the Net Generation, they will have to change their teaching practices because, for the first time in history, college students in the 21st century have spent their lives surrounded by technology and are seeking the same use of technology while they learn (Snart, 2010). With these students in mind, educational institutions have begun to realize the needs of learners can be satisfied with the addition of online learning (Foulger, Amrein-Beardsley, & Toth, 2011).

Theoretical Framework

Many different learning theories exist, each of which focuses on different aspects of the learning process (Bonnel & Smith, 2010; Wenger, 1999). Social learning theory, proposed by Bandura in 1963, was used as the guiding framework for this study. Social learning theory places emphasis on interpersonal relations and focuses on the study of the cognitive processes through which observation can become a source of learning (Bandura, 1977). It is clear social learning is part of a general discourse which can be traced back to one of the first ideas that occurred in the development of the psychology and biology fields of study (Wenger, 1999). More recently, the concept of social learning systems, as purported by Jean Lave and Etienne Wenger, focuses explicitly on collaboration and Communities of Practice and has been appearing in many learning environments (Blackmore, 2010).

Observational learning occurs through a reciprocal interaction among environment, behavior, and cognitive influences (Rutherford-Hemming, 2012). Social

learning theory is based on the idea that "humans learn in a social environment by observing other individuals in order to acquire knowledge, rules, skills, strategies, beliefs, and attitudes" (Bandura, 1977, p. 201). In other words, social learning theory combines fundamentals of both behaviorist and cognitivist orientations (Blackmore, 2010). Bonnel and Smith (2010) added, by observing others, students see the importance of learning new knowledge, which may provide the motivation necessary to learn the behavior.

Rutherford-Hemming (2012) posited social learning theory is one of the most influential learning theories as it has been extraordinarily useful in explaining how individual learn new things and develop new behaviors by observing others. Wenger (1999) supported this position by acknowledging people are social beings, which is a central characteristic of learning. Wenger (1999) further noted:

> Human beings are engaged in a process of collective learning and communities of practice, are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. (p. 45)

Immordino-Yang (2011) noted schools are social environments; therefore, connection and interaction are two major principles needed for learning to occur. Wenger (1999) suggested educators rethink learning by placing a focus on participation and engagement within a learner's community. Social learning manifests the concept into the idea of "interconnected communities of practice through which an organization knows what it knows and thus becomes effective and valuable as an organization" (Wegner, 1999, p. 8).

Social learning is a major force in education, and the Communities of Practice are appropriately applied in settings, such as this study, where students have different

educational delivery systems available to them (Mezirow, 2000; Park & Howell, 2015). According to Park and Howell (2015) blended learning promotes a student-centered environment and collaboration between students. Instructors can increase the engagement and success rates of students, regardless of the delivery system, by having students seek out their own supportive community in order to observe and share their ideas, as well as their values and commitments in challenging ways (Mezirow, 2000; Park & Howell, 2015). Individuals who possess a common concern, share ideas, and work together are aspects of Communities of Practice and social learning theory in action (Blackmore, 2010; Wenger, 1999).

Individuals gain knowledge from their past experiences as well as through collaboration with others in a community (Blackmore, 2010). Mezirow (2000) agreed, describing learning as "process of using a prior interpretation to construe a new or revised interpretation of the meaning of one's experience as a guide to future action" (p. 5). Wegner (1999) explained communities of learners who socially interact regularly, share a desire to learn, and learning is enhanced by observation. According to Blackmore (2010), the strength of a social learning system hinges on basic structural dimensions, and he identified these domains by stating the following:

> A community of practice focuses on a specific 'domain' which defines its identity and what it cares about. Passion for the domain is crucial. Members' passion for a domain is not an abstract, disinterested experience. It is often a deep part of their personal identity and a means to express what their life's work is about. The second element is the community itself and the quality of the relationships that bind members. The feeling of community is essential. It provides a strong

> foundation for learning and collaboration among diverse members. Each community develops its practice by sharing and developing the knowledge of practitioners in its domain. Elements of a practice include its repertoire of tools, frameworks, methods, and stories, as well as activities related to learning and innovation. (p. 110)

The reason for conducting this quantitative study was to establish the extent to which targeted aspects of Communities of Practice influence the learning of dental assisting students in different instructional delivery systems. Measures of student success based on their chosen learning delivery system were also explored in this study. The research questions were arranged around the theoretical framework of the social learning theory in order to evaluate which Communities of Practice factors are influences in student success. Because the profession of dental assisting is in a constant state of change and growth, information, such as was produced from this study, is important to guide different programs to educate individuals pursuing a career in dental assisting and address the upcoming workforce issues needed in dentistry (Solomon, 2012).

Statement of the Problem

According to the United States Bureau of Census (2012), a shortage of dental assistants exists in the United States. With the world's population projected to increase by 15% between 2000 and 2060, it is reasonable to assume more allied healthcare workers, including dental assistants, will be needed (United States Bureau of Census, 2012). According to the American Dental Association (ADA) (2012), individuals are living longer and continuing to improve their oral health. The Bureau of Labor Statistics (2015) reported the field of dental assisting is likely to grow by 25% by the year 2022.

This percentage of needed workers is growing at a faster rate than the projected United States population growth (Bureau of Labor Statistics, 2015). The Bureau of Labor Statistics (2015) also reported with ongoing research, good oral health will continue to grow, thereby increasing the need for more dental assistants in the workforce.

The student population in higher education, including dental assistants, is different than ever before (Hege, 2011; Park & Howell, 2015; Smilyanski, Boyd, Perry, Rothman, & Jenkins, 2015). Hege (2011) reported, "as institutions of higher education confront changing demographics, including an increasing number of second-career students managing the demands of careers, families, and education, creative teaching strategies are needed to meet the needs of contemporary students" (p. 1). Harrington (2010) supported the opinion that using the Internet has the potential to eliminate many socio-economic obstacles such as childcare problems, transportation and parking, and family and work obligations for students who desire to attain a higher degree.

Harrington (2010) further stated the use of the Internet can give students a feeling of belonging to the academic community. The ever-changing student population is the driving force behind alternative delivery platforms such has online learning (Smilyanski et al., 2015). According to Poirier (2010), higher education institutions are challenged to keep up with students and their fast-pace changing needs.

Technology has modernized the way instructors teach and students learn (Park & Howell, 2015; Poirier, 2010). Caulfield (2011) suggested a traditional course can be heightened with technology by simply placing a syllabus online and adding Uniform Resource Locators (URL) of websites to enhance student learning. Online learning environments are accessible anytime and anywhere, which makes learning convenient for

the students (O'Neil, Fisher, & Rietschel, 2014). According to Allen and Seaman (2013) reported hybrid instruction courses in higher education institutions are one of the fastest growing course enrollments.

While researchers have noted different delivery systems are necessary to meet the needs of today's learners, there is a gap of information on how higher education institutions will ensure student success (Conrad & Donaldson, 2010; Glazer, 2012; Snart, 2010). Social interaction has been thought to increase collaboration and, therefore, to result in increased learning (O'Neil et al., 2014; Smilyanski et al., 2015). According to O'Neil et al. (2014), "Learners who engaged in social interaction with their instructors and collaborative interaction with peers scored higher on outcome measures of learning than learners who did not engage in social and collaborative interaction" (p. 23).

Purpose of the Study

The purpose of this quantitative study was to explore how factors of Communities of Practice theory influenced students' sharing of knowledge in dental assisting classes at a Midwest community college in the United States. The researcher investigated whether the traditional students or hybrid students are achieving success at the same rate regardless of the class content delivery system. Because humans are social in nature, learning takes place naturally in environments where interaction and collaboration are encouraged (Smilyanski et al., 2015; Wenger, 1999). It was worthy of investigation to determine if different learning systems, such as traditional and hybrid courses, can provide opportunities for student success and encourage social learning. It was the intention of the researcher that this study's finding will contribute to the importance of offering multiple platforms of delivery to educating dental assistant, and ultimately

provide more opportunities for professional dental assistants to enter the workforce, thereby relieving the shortage in oral healthcare professions (Solomon, 2012).

Research questions and hypotheses. The following research questions and hypotheses served as a guide for this study:

1. What aspects of social learning theory, specifically Communities of Practice, do dental assisting students at a Midwest community college report as being influential?

2. What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates at a Midwest community college?

$H2_{0:}$ No significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates at a Midwest community college.

$H2_{a:}$ A significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates at a Midwest community college.

3. What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college?

$H3_{0:}$ No significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college.

$H3_{a:}$ A significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college.

Definitions of Key Terms

For the purpose of this study, the following terms are defined:

Allied dental healthcare providers. This team of providers includes the dental assistant, dental laboratory technician, and the dental hygienist who work closely with the dentist practitioner to provide oral health needs (Bird & Robinson, 2015).

Commission On Dental Accreditation (CODA). Commission that accredits educational curriculums for dental, dental hygiene, dental assisting, and dental laboratory program (Bird & Robinson, 2015).

Community of Practice. Interconnecting individuals who collaborate and have a passion for sharing ideas while learning (Serrat, 2011).

Course grade. A letter grade that communicates at what level the student met the expectation of the course (O'Neil et al., 2014).

Dental assistant. An oral health professional who assists the dentist and provides supportive procedures to patients (Bird & Robinson, 2015).

Dental Assisting National Board (DANB). United States testing agency responsible for administering the national certification examination and issuing the credential of certified dental assistants (Bird & Robinson, 2015).

Dentist. A dental care provider licensed to practice dentistry and provide oral health care for people in all age groups (Bird & Robinson, 2015).

Hybrid course. The hybrid course combines both the traditional and online classroom settings (Caulfield, 2011).

Online courses. A course in which communication regarding educational content is distributed between instructor and student through computer networking so students may connect with instructors and other students (Freeman, 2010; Park & Howell, 2015).

Social learning theory. Social learning theory places emphasis on interpersonal relations involving imitation and molding, and thus, focuses on the study of cognitive processes by which observation can become a source of learning (Bandura, 1977).

Traditional courses. Learning is directed in a synchronous environment with collaboration between instructor and student (McCann, Schneiderman, & Hinton, 2010).

Withdrawal rates. The calculation at which students depart from college at any point in time (Tinto, 2012).

Limitations and Assumptions

The following limitations were identified in the study:

Demographics. The data generated by this study were limited to past and present students in a dental assisting program in one educational institution in the Midwest. The participants were mostly female, which is a reflection of the actual demographic of the profession of dental assisting (Woolfolk & Price, 2012). According to Creswell (2014), these individuals were convenient to study because they were available. A convenience sample may not be an accurate representation of a population's demographics because the population was not sampled randomly (Fraenkel, Wallen, & Hyun, 2011).

Instrument. In order to offer a complete view of what communities of practice factors influence dental assisting students, a survey instrument was presented to potential

respondents. A limitation on using surveys may be that some respondents may not understand the questions, or they may not return the survey (Fraenkel et al., 2011). To ensure respondents understood the survey questions, the researcher followed best practices as suggested by Fraenkel et al. (2011) by giving careful directions that facilitate honest answers and ensure anonymity of the respondents. Also, the survey was piloted to students who were not in the actual study prior to distributing to the actual participants (Fink, 2013). Changes were made accordingly to the responses the researcher received (Fink, 2013).

The following assumptions were:

1. The researcher assumed all past and present students volunteering for participation in the study completed the survey willingly, ethically, and with integrity. According Fink (2013), accurate instructions need to be provided to the respondents.

2. The researcher acknowledged an association with the program, as the director of the dental assisting program at the Midwest Community College, and was aware of the potential for the introduction of personal bias in data analysis.

3. Responses from survey were accurate and truthful.

Summary

As highlighted in this chapter, the importance of the study and the profession of dentistry was introduced. Chapter One gave a brief introduction of the value of educating dental assistants to alleviate the workforce shortage. In the chapter, the different platforms of educating dental assistants were discussed as well as the increasing need for alternative ways for delivering formal education to dental assistants (Snart, 2010). The

theoretical basis for this study was founded in social learning and reflected the concept of Communities of Practice (Wenger, 1999).

Educational programs, including dental assisting, are, for many reasons, increasing the use technology in the classroom (Snart, 2010). In order to move toward the goal of refining student educational results, it is essential to understand what factors influence dental students to take full advantage of today's technology (Amyot & Brockman, 2011). In Chapter Two, a review of literature appropriate to the study is offered to provide a deeper understanding of the theory of Communities of Practice, the profession of dentistry, the history of dental education, and the different learning formats including traditional, online, and hybrid learning environments.

Chapter Two: Review of Literature

The purpose of this quantitative study was to explore factors involved with two platforms of delivery in a dental assisting program in a Midwest community college. In order to fully understand the importance of programming, it is necessary to review literature, both historical and current, in the field of dentistry and to provide a framework for establishing the significance of the research study (Creswell, 2014). In addition, it is important to examine different delivery instructional methods to educate dental assistants.

Due to the public demands for dental services, the past 60 years have seen dramatic increases in the numbers of dentists, dental hygienists, and dental assistants (Solomon, 2012). The need for successful dental assistant graduates has been reinforced by the nation's current shortage of dental care workforce and anticipated increases in the area of dental care (Bureau of Labor Statistics, 2015). One of the fastest growing careers in the United States is dental assisting, and this career is projected to outpace other professions in terms of growth (Bureau of Labor Statistics, 2015).

The following review of relevant scholarly literature is organized into four sections: the Community of Practice, the history of dentistry, dental education, and the historical evolution of learning environments. In the first section, information about Communities of Practice theory, as proposed by Wegner (1999), will be offered. The second and third sections begin with information about early dental practices and training activities to expand forward to modern dental education. Finally, the last section includes information about learning environments used for early and modern education. Specifically, the final section focuses on the traditional learning environment, the online

learning environment, and the hybrid learning environment. A summary of the literature review is provided at the end of this chapter.

Communities of Practice

There are valuable reasons for generating, improving, and discussing dental assisting education. Theoretically, Communities of Practice call for individuals to think and rethink how they imagine educating themselves and others (Sargeant, 2009; Smilyanski et al., 2015). The Communities of Practice theory has gained increasing popularity as a way to accomplish the social aspect of sharing knowledge (Blackmore, 2010; Jimenez-Silva & Olson, 2012). A significant amount of research has demonstrated the benefits of shaping education around social learning theory in several allied health professions such as dental hygiene, nursing, and chiropractic coursework (Bonnel & Smith, 2010; Smilyanski et al., 2015). However, there is little research regarding application of social learning theory in the specific realm of dental assisting education.

Social learning is not a new concept (Woodhill, 2010). Polin (2010) suggested that learning is a social process which takes place in every-day-life. Bandura's (1977) social learning theory explained how different individuals engage with each other within a social environment to understand and influence the direction of social change. Others, including Woodhill (2010), have presented corresponding views:

> Social learning looks at how society understands both itself and its relations to the external environment, and then adapts its assumptions, belief systems, approaches to problem solving, and systems of social organization, either to achieve particular ambitions or cope with external and internal threats. (p. 63)

Woodhill (2010) also noted social learning involves different individuals with the same interest being able to engage in dialogue. Wenger and Lave (1999) acknowledged learning is well-established in social activities and occurs naturally in the workplace, formal educational, and training events. Wenger and Lave (1991) went on to say, "learning is inextricably entwined with making meaning, sharing social and historical practices, forming identity, and belonging to a community" (p. 54). Additionally, Bielaczyc and Collins (1999) stated:

The defining quality of a learning community is that there is a culture of learning in which everyone is involved in a collective effort of understanding. There are four characteristics that such a culture must have: (1) diversity of expertise among its members who are valued for their contributions and given support to develop; (2) a shared objective of continually advancing the collective knowledge and skills; (3) an emphasis on learning how to learn; and (4) mechanisms for sharing what is learned. (p. 272)

Theories guide education including best teaching and learning practices (Bonnel & Smith, 2010). Polin (2010) suggested the "social learning theory model can thrive as members of the same professional community, with differing expertise, engage in real world work" (p. 166). According to Bonnel and Smith (2010), social learning theory in particular provides many of the basic tenants of good teaching with technology today.

There are many historical obstacles which make it difficult to move from traditional concepts of education to a social one (Park & Howell, 2015; Polin, 2010). For instance, traditionally, students have physically gone to the college; the college did not go to the student (Polin, 2010). Another historical obstacle of traditional practice in

education has been instructors have taught the same way they were taught as students (Jimenez-Silva & Olson, 2012). The history of education has shown a teacher-focused/teacher-centered classroom (Conrad & Donaldson, 2011). The academic evolution has added technology to the equation (Conrad & Donaldson, 2011).

In recent years, using the Internet in education has become very popular and has increased dramatically (Solomon, 2012). Online learning has been criticized for the lack of student interaction and engagement (Conrad & Donaldson, 2011). According to Park and Howell (2015), hybrid learning encourages peer-to-peer contact and teamwork in a shared learning setting and inspires student interaction and engagement. Smilyanski et al. (2015) agreed by stating research that has been done in higher education provides clear evidence that a sense of community between students reassures quality learning outcomes.

Polin (2010), noted traditional learning has evolved as researches have studied education in informal settings, learning on-the-job, in practitioner communities, and in everyday life. Researchers have identified social engagement around shared work as a powerful mechanism (Polin, 2010; Smilyanski et al., 2015). The observation process may provide motivation to the students to learn the same behavior (Bonnel & Smith, 2010). Jimenez-Silva and Olson (2012), clarified by stating:

> The members of a community of practice interact, share, and participate in a particular cultural practice over time; they develop their understanding about the practice, about who they are, and about what they know in relation to the community and its goals. (p. 335)

The two key concepts in the theory of Communities of Practice focus on community and practice (Blackmore, 2010; Polin, 2010). Community is defined as a group of people who share relationships, while doing group shared activities (Blackmore, 2010; Polin, 2010). Further stated, Polin (2010) noted, "Practice refers, not to repetitive behaviors intended to increase memory, but to a body of practice knowledge used to accomplish work, that is, a domain or field of expertise" (p. 165).

Smilyanski et al. (2015) confirmed student collaboration is a strong predictor of success with educational outcomes. Sargeant (2009) explained, to build a strong collaborative practice, members of a group will share implied knowledge through interaction and working together. Communities of Practice cultural framework is helpful in describing the ways socio-cultural structures of a community act as a go-between the development of the individual, from an initial novice state of limited participation, to a fully developed identity of deeper participation (Polin, 2010).

According to Wenger (1999), the components of social learning consist of "engagement, imagination, and alignment," which are all the ingredients of participation (p. 217). Jimenez-Silva and Olson (2012) stated members of Community of Practice develop a sense of belonging to a community and practice a way of thinking and engaging through activities in a social setting. Sargeant (2009) acknowledged, "building on concepts of situated learning, communities of practice are described as groups of people informally bound together by shared expertise and passion for joint enterprise" (p. 27).

The fast growth and demand for distance education in allied health education have increased and studies have shown there are no major differences in traditional learning

and distance education (Corum, Gadbury-Amyot, Johnson, & Strait, 2014; Olmsted, 2014). One study by Smilyanski et al. (2015) was conducted to determine if a connection between distance education and students' sense of classroom community in six dental hygiene programs existed. The study was prepared with the authors first reviewing several articles published in the *Journal of Dental Education* to explore new ways to deliver dental education (Smilyanski et al., 2015).

A cross-sectional survey was created to measure the students' sense of classroom community with the results showing the students who prefer distance education have specific reasons such as location, family and/or work obligations, or other situations keeping them from selecting a traditional learning format (Smilyanski et al., 2015). According to Glazer (2012), the use of technology promotes student engagement by allowing more time to reflect on the course content when it is convenient for the student. The outcomes for the research of Smilyanski et al.'s (2015) suggested distance education can have some negative effects on important aspects of shared learning, even though previous research suggested distance learning is the best way to accommodate the needs of students.

Blackmore (2010) declared Community of Practice theory is as significant today as it was in the 20th century when Jean Lave and Etienne Wenger expanded social learning theory. The influence of the expansion is credited to individuals finding other ways to learn and continue with professional relationships (Blackmore, 2010). In the review of Communities of Practice research, Polin (2010) concluded, "social and technical networking tools are viewed as a means of bridging a range of academic communities" (p. 104). The Internet has made it easier to communicate beyond

geographical areas, and “the idea of communities of practice has mushroomed since Wegner’s 1998 book” (Blackmore, 2010, p. 103).

Dental History

Dentistry has an intricate history (Bird & Robinson, 2015). Solomon (2012) reported the practice of dentistry, as well as dental education, has experienced significant changes over the past years when he stated, “Dentistry has evolved from a cottage industry to an integral component of the healthcare system” (p. 1028). Since the beginning of recorded time, humans have suffered from dental pain, and numerous dental treatments were tried and perfected (Phinney & Halstead, 2013). Dentistry has evolved from being a very primitive practice, to one that demands sophisticated technology (Tyler, 2009). The following subsections provide an understanding of the advancements in dentistry.

Early times. Dental ailments have existed from the beginning of recorded time (Phinney & Halstead, 2013). Cave dwellers were spared some misery of tooth pain since refined sugar was not a part of their diet (Wynbrandt, 2000). Early man’s dental problems arose from excessive wearing of teeth due to a strong jaw and a diet of grains prepared in a stone bowl with a stone pestle (Wynbrandt, 2000). Particles of stone, sand, dirt, and grit mixed with the grain caused severe wear on the teeth and possible nerve exposure (Wynbrandt, 2000). Extreme wear of teeth and bone loss, as well as gum disease, is seen in the dental remains of all prehistoric cultures (Wynbrandt, 2000).

An extensive examination of ancient mummies revealed the Egyptians were plagued with toothaches and tooth loss (Bird & Robinson, 2015; Taylor, 1922). Wynbrandt (2000) noted loss of teeth appeared among Egyptian aristocrats as early as

2500 B.C. Egyptians of a higher class had servants to assist with their personal hygiene regimes including teeth cleaning and fixing their hair (Wynbrandt, 2000). Throughout this time period, medical physicians were well respected and gave teeth serious attention (Wynbrandt, 2000).

According to Wynbrandt (2000), as early as 5000 B.C. "all cultures of the world credited tooth pain to one of three causes: tooth demons, toothworms, or humors (fluids)" (p. 6). Tyler (2009) also noted people believed worms bored holes through teeth, hiding beneath the surface, and causing pain until the worm rested. Present day researchers now think the worms were either the appearance of tooth pulp, or maggots introduced into the mouth from consuming rotting food (Tyler, 2009). These myths were believable because people thought demons were evil spirits sent by the gods or the result of spells cast by an enemy (Wynbrandt, 2000). People during this time period believed if an individual had a toothache, the individual must have upset the tooth demons and deserved the pain (Tyler, 2009).

Other problems in ancient times included missing teeth due to lack of dental hygiene care (Tyler, 2009). Ancient civilizations used a thin twig with frayed ends from the branches of the *salvadora persica*, also known as the toothbrush tree (Wynbrandt, 2000). These twigs were the first documented toothbrush, which was called a chew stick, to clean teeth with a rubbing action (Taylor, 1922).

One of the earliest documentation of oral hygiene described how the Babylonians chewed sticks until the ends were soft and brush-like to clean their teeth (Tyler, 2009). Ancient Chinese produced a toothbrush from coarse hairs taken from the back of a hog's neck, which was fastened to a handle whittled out of bone or bamboo (Taylor, 1922).

The evidence of these earlier practices can be found in other cultures as well as in India, Egypt, and Japan (Wynbrandt, 2000).

Early remedies prescribed to alleviate tooth pain were typically brutal, often horrific, and commonly lethal (Tyler, 2009; Wynbrandt, 2000). Bird and Robinson (2015) supported Tyler and Wynbrandt's findings when they asserted, historically, people have sought out a variety of means to alleviate the suffering from dental pain. According to Taylor (1922), the ancient civilization of China executed crude remedies for dental pain.

One remedy the Chinese used was arsenic pills to alleviate tooth pain caused by worms in the teeth (Taylor, 1922). An arsenic pill was placed near the aching tooth, at which point the pain would absolutely cease (Taylor, 1922). Around 2700 B.C., the Chinese began using mouthwashes, massage, and herbal remedies, as well as acupuncture to treat pain associated with dental pain (Bird & Robinson, 2015; Wynbrandt, 2000). Taylor (1922) noted practicing acupuncture for the relief of toothaches and abscesses, this being, perhaps, one of the oldest forms of oral surgery.

In Greece, during the 5th century, Hippocrates, known as the "father of medicine," began to teach a civilized approached to medicine (Tyler, 2009, p. 2). Hippocrates outlined a rational approach to treating patients and explained magic and medicine should be separated (Bird & Robinson, 2015). Hippocrates rejected the notion that demons or spirits caused illness and embraced medicine as a science (Tyler, 2009; Wynbrandt, 2000).

Hippocrates put forth an explanation in regards to health and dental disease and stressed the importance of keeping teeth clean and in good condition (Phinney &

Halstead, 2013). Tyler (2009) noted in addition to providing a platform to follow in regards to treatment, Hippocrates also ventured into the arena of patient confidentiality, and privacy could be found in Hippocrates's writings. Hippocrates' famous letters are the foundation for the "Hippocratic Oath, a solemn obligation to refrain from wrongdoing and to treat patients with confidentiality and to the best of one's ability, [which] still serves as the basis of the code of ethics for medical and dental professions" (Phinney & Halstead, 2013, p. 4).

Both Hippocrates and Aristotle wrote their beliefs about dentistry in their journals (Phinney & Halstead, 2013). In these writings, they discussed dental diseases, oral hygiene, and explained the use of wires to stabilize loose teeth (Bird & Robinson, 2015; Tyler, 2009). Aristotle is known to be the first to study comparative anatomy of the teeth (Tyler, 2009). Wynbrandt (2000) noted Aristotle devoted an entire chapter in one of his studies to the subject of teeth and described the blood supply of the teeth as well as the extraction process.

Ironically, some of Hippocrates and Aristotle's writings were incorrect. For example, both Hippocrates and Aristotle mistakenly stated men had 32 teeth, while women only had 30 (Phinney & Halstead, 2013; Tyler, 2009; Wynbrandt, 2000). This is now known not to be true, and many of these ideas were not corrected for many years (Wynbrandt, 2000).

Early advancement. The practice of dentistry started to advance between 100 and 400 B.C.E., when the Etruscans in Italy began to use the restorative art of dentistry to make repairs to existing teeth using a bridge made of a band of gold that fastened to natural and artificial teeth (Tyler, 2009). The artificial replacement teeth for the bridge

were made using calves' teeth (Tyler, 2009). The Etruscans are also given credit for engineering the first dentures (Wynbrandt, 2000).

Because the Romans conquered the Etruscans and their cities came under Roman rule, the field of dentistry was then taught to the Romans by the Etruscans (Tyler, 2009). Bird and Robinson (2015) noted the "Romans had a high regard for oral hygiene and developed the first tooth-cleaning powders made from eggshells, bones, and oyster shells mixed with honey" (p. 4). Bird and Robinson (2015) further noted the upper-class Romans picked their teeth with elaborately decorated toothpicks of gold, and these were given to invited guest as gifts to take home. During the fall of the Roman Empire, reputable physicians, who worked in dentistry, fled the area leaving uneducated individuals to fulfill dental care (Wynbrandt, 2000).

In the Middle Ages, also known as the Renaissance period, further achievements in dentistry occurred, including the separation of science from theology and superstition (Bird & Robinson, 2015). For instance, in China, the development of a silver paste to fill cavities was created more than 1,000 years before dentists in the Western hemisphere used a similar material, known today as amalgam (Bird & Robinson, 2015). Also during this time period, artists became more interested in human anatomy to enhance their artwork (Phinney & Halstead, 2013). A case in point, Leonardo da Vinci dissected a human skull and with his drawings defined the anatomy of teeth (Phinney & Halstead, 2013).

Dentistry was also practiced by monks, who were the most educated people at the time (Taylor, 1922). Dental procedures performed by monks were considered a sort of religious rite (Taylor, 1922; Tyler, 2009). In 1163, Pope Alexander banned monks from

performing any operation in which blood would be shed, stating it was "incompatible with the divine mission" (as cited in Wynbrandt, 2000, p. 42). He further advised turning all minor surgeries over to the barber industry, an industry which had previously only assisted the monks (Wynbrandt, 2000).

Wynbrandt (2000) also noted in 1210, France established the Guild of Barbers. The barbers were split into two groups: the educated group, who performed dental surgeries, and the lay group, who performed routine dental services such as shaving and tooth extraction (Tyler, 2009). Dentistry was also practiced by traveling charlatans, who resorted to music and various other forms of entertainment to attract patients (Taylor, 1922).

Traveling charlatans were uneducated individuals, also known as tooth-drawers, who specialized in extracting teeth (Tyler, 2009). Tooth-drawers left no written records of their own, but the history of their work is shown in paintings and artwork (Wynbrandt, 2000). The earliest picture dated 1523, displays an amusing tooth-drawer persistently removing a tooth from a patient's mouth, while a female accomplice is engaged in picking the patient's purse (Wynbrandt, 2000).

In 1723, Pierre Fauchard, a French physician who earned fame and respect during his lifetime, developed dentistry as an independent profession (Bird & Robinson, 2015). According to Tyler (2009), Fauchard, well-known as the "father of modern dentistry," published *The Surgeon Dentist, A Treatise on Teeth* in which he described a comprehensive system of dentistry, which signaled the beginning of the modern era of dentistry. The manuscript was clearly written and had step-by-step pictures that depicted easy-to-follow procedures (Phinney & Halstead, 2013).

Fauchard, who referred to himself as a surgical dentist, held a variety of beliefs about modern dental care (Bird & Robinson, 2015; Phinney & Halstead, 2013; Tyler, 2009). For instance, Fauchard recommended teeth be filled with lead, tin, or gold after the removal of decay, to strengthen them (Bird & Robinson, 2015). Fauchard is also recognized as being the first person to note a patient should be seated in a comfortable position on a chair, and the dentist should stand behind the patient so not to block any available light (Tyler, 2009). Fauchard also prescribed oil of cloves and cinnamon for inflamed nerves of the tooth, which is still used today as a sedative filling material (Tyler, 2009).

In his writings, Fauchard railed against the quackery of dentistry and reflected on cures of his own creation (Wynbrandt, 2000). For example, Fauchard recommended his patients rinse their mouths with their own urine to combat tooth decay (Tyler, 2009). Because Fauchard was highly regarded as a dentist, his teachings, regardless of how extreme, were used for more than 100 years (Bird & Robinson, 2015) and lends credibility to why the practice of rinsing with urine was a suggested treatment for periodontal disease until the early 1900s (Tyler, 2009).

The American experience. In early colonial America, a blacksmith or barber performed most of the dental work (Tyler, 2009). Around 1763, John Baker arrived in America from Cork County, Ireland, where he had studied dentistry (Bird & Robinson, 2015). Baker was one of the earliest qualified dentists in the colonies and set up practice in Boston (Wynbrandt, 2000).

One of Baker's most famous patients was George Washington (Tyler, 2009). Baker constructed an upper denture for Washington made out of a sheet of gold with

ivory riveted into it, and the lower denture was carved from a single piece of hippopotamus tusk (Wynbrandt, 2000). Several sets of dentures were eventually made for Washington, and none of them, as legend leads us to believe, were made of wood (Tyler, 2009).

The famous revolutionary and silversmith, Paul Revere, studied as an apprentice under Dr. Baker in Boston (Bird & Robinson, 2015) and was noted for performing dental procedures such as fillings, cleanings, and constructed dental bridges and dentures (Tyler, 2009). After working for six years as a part-time dentist, Revere decided to give up his dental practice and focus primarily on his using his skills as a full-time silversmith to make false teeth and dental instruments (Bird & Robinson, 2015). According to Tyler (2009), "oral health problems have overwhelmed civilization since the beginning of time, and having an understanding of how oral diseases affected early society has helped dentists over time discover ways to perform more humane treatments" (p. 24).

Preventative dental care. Before the 1900s, the procedure of preventative care in dentistry was vastly different from today's standards (Taylor, 1922). According to Wynbrandt (2000), the advancements in oral care can be seen by glancing inside a medicine cabinet or by a visit to the local dental office. Wynbrandt (2000) went on to say, "behind our bathroom mirrors crowds the appurtenances of a dentally pampered culture, all manner of brushes, flosses, and home-care tools" (p. 194).

It is easy to believe the ideas and techniques used in today's dentistry have been recently discovered or invented, but in actuality, most aspects of modern dentistry can be traced back to earlier times (Bird & Robinson, 2015). In 1844, an American dentist, Horace Wells, discovered a way to use nitrous oxide gas to relieve the pain of

extractions, and by 1884, anesthetic had been discovered to extract a tooth painlessly (Tyler, 2009). Wynbrandt (2000) emphasized the evolution from "yesterday's ignorance, misapprehension, and superstition to the enlightened and nerve-deadened protocols of today have been a long, slow, and very painful process" (p. 2). A true appreciation with the historic struggles that took place and the many contributions that were made have advanced the dentistry profession into what it is today (Phinney & Halstead, 2013).

Dental Education

Horst, Clark, and Lee (2009) acknowledged before the modern era of school-based dental education was launched, the common progression into clinical dental practice was earned through extended apprenticeships. An apprenticeship is an example of Community of Practice theory when learning takes place as a social interaction (Jimenez-Silva & Olson, 2012; Wenger, 1999). Sargeant (2009) explained learning takes place when individuals interact interpersonally with each other and within their environments. Dentist practitioners and allied dental providers learned their trade through cycles of observation and closely guided situations with skilled professionals already practicing in the field (Bird & Robinson, 2015).

The practice of mentoring is also supported by the theory of social practices (Wenger, 1999). Early dental education mirrors the theoretical framework of this study. With advanced levels of involvement and sharing, participants within the Community of Practice become experienced and knowledgeable (Jimenez-Silva & Olson, 2012). In essence, DePaola (2012) stated, "Over the last century, dental education has evolved from a self-taught and self-proclaimed profession to an actual one with formal education" (p. 15). Allied dental providers' education history includes a transition from proprietary

school settings and apprenticeships, to dental schools, community colleges, and technical colleges (Haden, Morr, & Valachovic, 2001).

Similar to the allied dental providers, dentist practitioner dental education also moved from a stage of largely proprietary education to one of science-based education housed within an academic health center structure or a university (DePaola, 2012). Tyler (2009) reported in the early 1800s, Drs. Chapin Harris and Horace Hayden campaigned for formal dental education, and their tenacity paid off when the world's first dental school was established in Baltimore, Maryland. The Baltimore College of Dental Surgery opened its doors and began to award doctor of dental surgery (D.D.S.) degrees in 1840 (Tyler, 2009).

Wynbrandt (2000) noted the arrival of the first dental journal, *American Journal of Dental Science*, and the first dental organization, which was called the American Society of Dental Surgeons. The development of formal education and professional organizations for dentistry has assisted in advancing the entire field of dentistry (Tyler, 2009). As the dental field moves forward, the need for well-educated, skilled dental professionals has also increased (Tyler, 2009). Baltimore College still exists and is now at the University of Maryland, School of Dentistry and is the home of the Dr. Samuel Harris National Museum of Dentistry (Phinney & Halstead, 2013).

Many things in dental education have changed (Solomon, 2012). Approximately half of the schools in 1900 were for-profit proprietary schools, and the other half were affiliated with private and public universities (Solomon, 2012). In the 1930s, a system of accreditation from the ADA was established, which resulted in the end of the proprietary school (Solomon, 2012). Horst et al. (2009) explained the beginning of formalized dental

education has standardized the methodology and training for each student. Horst et al. (2009) went on to say:

> This has moved dental education from an almost completely unregulated process fraught with profit-based diploma mills and licensure fraught to a system of regulated education that serves to ensure members of the public that their dental practitioner has the required amount of knowledge, skills, and experience. (p. 919)

Today, dentists are educated in the United States in four-year, post-baccalaureate university-based graduate programs and are responsible for all patient care services including those that can be delegated to other allied health providers (Edelstein, 2010). The Commission on Dental Accreditation, an American Dental Association agency, authorized by the United States Secretary of Education, establishes standards and approves curriculum for dental education (Edelstein, 2010). Moreover, there have been innovative changes in dental education such as the growing numbers of affiliations with universities and the implementation of uniformed accreditation processes since the first dental school was established in the 1800s (Nadershahi, Bender, Beck, Lyon, & Blaseio, 2013).

Registered dental hygienists. Educating allied dental providers such as dental hygienists and dental assistants mirrors the history of educating the dentist (Woolfolk & Price, 2012). Both roles began with students being taught by apprenticeships (Woolfolk & Price, 2012). The dental hygienists' primary functions are oral disease prevention and dental health promotion (Edelstein, 2010). The first individual to become a dental

hygienist was Irene Newman, a dental assistant employed by Dr. Fones in Bridgeport, Connecticut, in the early 1900s (Bird & Robinson, 2015).

Fones trained Newman in his dental office to clean teeth and give preventative treatments, while he focused on more complex dental procedures (Phinney & Halstead, 2013). The first dental hygiene school was established by Fones in 1913, and it still exists today as the Fones School of Dental Hygiene, at the University of Bridgeport (Phinney & Halstead, 2013). According to Haden et al. (2001), "In 1907, dental hygiene was legally recognized in Connecticut as an adjunct to dental practice, and in 1916, Connecticut passed legislation specially describing the practice of dental hygiene" (p. 480).

Dental hygiene, as a profession, came of age in the second half of the 20th century with 26 accredited dental hygiene programs in the United States in 1950 (Solomon, 2012). Similar to dental education, allied dental education's history includes a transition from proprietary school settings and apprenticeships to dental schools, community colleges, and technical colleges (Haden et al., 2001). There has been an increasing number of dental hygiene programs open throughout the country (Woolfolk & Price, 2012).

The completion of an accredited dental hygiene educational program is the entry requirement for licensure for all dental hygienist who practice under indirect supervision of a dentist (McKinnon, Luke, Bresch, Moss, & Valachovic, 2007). As with dentistry, dental hygiene curricula must meet accreditation requirement of CODA (Edelstein, 2010). In January 2012, there were 333 dental hygiene programs, with the majority in

community colleges awarded associate's degrees and 52 are bachelor's degree-granting programs in universities (Woolfolk & Price, 2012).

Dental assisting. Edelstein (2010) defined dental assistants as those who assist the dentist with the direct delivery of dental care. Tyler (2009) noted women took on the role of dental assistants in the early 1900 and were first known as ladies in attendance. A practicing dentist in New Orleans, Dr. Edmund Kells, is well-known for hiring the first dental assistant (Bird & Robinson, 2015). Tyler (2009) described, during historical times, it was not proper for women to visit the dentist alone. A female dental assistant working in the dental office made it possible for women to receive dental care without an escort (Tyler, 2009).

According to Wynbrandt (2000), Dr. Kells was an innovator, a leading pioneer of the day. His approach towards dentistry was advanced for the times (Wynbrandt, 2000). Dr. Kells expressed his views on using dental auxiliaries and announced to others that someday a lady in attendance would be found in every dental office (Finkbeiner & Johnson, 1995). The responsibilities for dental assistants in the dental office included sterilizing and cleaning dental instruments, assisting in dental procedures, and working beside the dentist for the wellbeing of the office (Finkbeiner & Johnson, 1995). Today's modern dental assistants are educated in formal educational programs, such as accredited high schools, vocational schools, or community colleges (Edelstein, 2010). In some cases, dental assistants are still trained on the job (Edelstein, 2010).

According to Finkbeiner and Johnson (1995), formal education for dental assistants was officially recognized in 1947, when the Certifying Board of the American Dental Assistant Association (ADAA) started to administer examinations to certify dental

assistants. In 1948, educational programs for dental assistants designed by the ADAA began to appear in the United States (Finkbeiner & Johnson, 1995). These mail-order courses were described as 104-hour study coursework, which prepared students for the certifying examination by local ADAA chapters throughout the country (Finkbeiner & Johnson, 1995).

The 104-hour study coursework was designed to provide credentials to dental assistants who passed a written and clinical examination, while working in a dental office (Phinney & Halstead, 2013). Therefore, the 104-hour study coursework provided a professional setting for the occupation and provided basic skills and cognitive knowledge about dentistry to dental assistants (Phinney & Halstead, 2013). Today, the 104-hour study coursework has now been replaced with a written examination given by the Dental Assisting National Board (DANB) to certify and give credentials to dental assistants (Tyler, 2009).

The University of North Carolina can also be credited for some of the greatest contributions in promoting education for dental assistants (Finkbeiner & Johnson, 1995). In 1954, Dr. John Brauer, Dean of the University of North Carolina, initiated a correspondence course program to try and solve the problems of the shortage of training facilities that educated dental assistants (Finkbeiner & Johnson, 1995). This attempt at educating dental assistants through correspondence was not for "college credit, but was intended to provide working dental assistants with practical and theoretical knowledge that would enable them to successfully complete the national certification examination" (Finkbeiner & Johnson, 1995, p. 14).

Additionally, in 1957, the University Of North Carolina School Of Dentistry was one of five pilot educational programs for training dental assistants in the United States and placed an emphasis on instructing dentistry students in how to utilize dental assistants in the practice of dentistry (Finkbeiner & Johnson, 1995). This pilot program was highly successful and resulted in the establishment of similar courses, not only in dental schools but also in community colleges and technical education centers (Finkbeiner & Johnson, 1995). Dental assisting programs prepare students for entry-level positions in the dental profession (Woolfolk & Price, 2012).

Around the same time, in 1957, the American Dental Association Council on Dental Education, now referred to as the CODA, conducted a workshop on dental assisting education and invited practicing dentists, dental educators, and dental assistants to participate (Haden et al., 2001). Out of this workshop came recommendations for education and certification of dental assistants, laying the groundwork for the development of the requirements for an accredited dental assisting program (Finkbeiner & Johnson, 1995). In 1960, the ADA House of Delegates approved these recommendations, which became the first accrediting standards for formal education for dental assistants (Haden et al., 2001).

The CODA currently accredits educational programs, and its mission is to "… serve the public by establishing, maintaining and applying standards that ensure the quality and continuous improvement of dental and dental-related education and reflect the evolving practice of dentistry" (Cinotti, 2012, p. 115). Haden et al. (2001) stated, "accreditation ensures that programs meet rigorous educational standards developed by dental educators and the profession" (p. 491). For this reason, Solomon (2012) noted,

"although not a job requirement, many dental assistants complete an accredited dental assisting program to develop their skills and improve employment opportunities" (p. 1031).

In 1961, the Council on Dental Education published a list of 26 accredited dental assisting programs (Finkbeiner & Johnson, 1995). This list grew to 294 accredited dental assisting programs in 1979 (Finkbeiner & Johnson, 1995). By 1995, the list had decreased due to cost containment in schools, the demographics of prospective students, and the changing roles of women who make up the majority workforce of dental assistants (Haden et al., 2001).

Woolfolk and Price (2012) reported the number of enrolled dental assisting students, predominantly female, has increased substantially from 6,448 in the 2000-01 academic years to 10,761 in 2009-10. Solomon (2012) agreed that accredited dental assisting programs have expanded dramatically. Solomon (2012) explained this expansion is necessary since dental assistants make up about one-third of the workforce in a dental practice staff. The demand for allied dental personnel in dental assisting has consistently been strong throughout the 20th century and is projected to be a strong career in the coming years (Haden et al., 2001).

Learning Environments

There are different ways to learn in classrooms today (Glazer, 2012). In a traditional learning environment, students spend many hours sitting in a classroom (Bonnel & Smith, 2010). In an online learning environment, technology increases the ways in which knowledge can be delivered through worldwide connectivity and convenience (Amyot & Brockman, 2011; Olmsted, 2014; Sherman, Crum, & Beaty,

2010). In addition, hybrid classrooms have options to combine the best of traditional and online experiences by offering components of both formats to create information and vital communication between the instructor and student (Park & Howell, 2015).

McFarlane (2011) stated all educational settings have one thing in common, despite the differences between methods of delivery; education can provide students with social skills. Schools are social environments that result in social activities (Amyot & Brockman, 2011; Silvers, O'Connell, & Fewell, 2007). Lin (2011) agreed by stating higher education is shifting, and the union of social interaction and technology is pushing higher education to the tipping point of a noteworthy change. One of the challenges with online learning is building a social community (Harrison & West, 2014; Silvers et al., 2007). A concern of moving to an online environment is a lack of synchronous experiences could reduce the student's sense of social community (Harrison & West, 2014).

O'Neil et al. (2014) explained studies have shown there are no major differences in student outcomes when comparing a traditional classroom environment with an online-supported classroom environment. With technology available, higher education is changing the classroom settings so courses can vary based on the needs of the students (Glazer, 2012). Utilizing technology has become increasingly popular in higher education, even in a traditional class setting, to enhance student education (Lin, 2011; Park & Howell, 2015).

In 2013, the Sloan Consortium defined online learning in terms of proportions of content that are delivered online (Glazer, 2012). When there is 80% or more of course content online, the course is considered an online class (Glazer, 2012; O'Neil et al.,

2014). When 30% to 79% of the course is delivered online, the course is categorized as a hybrid class (Glazer, 2012; O'Neil et al., 2014). If less than 30% of the content is delivered online, the course is referred to as enhanced with an online platform (Glazer, 2012; O'Neil et al., 2014). When no part of the curriculum of a course is delivered online, it is called a traditional class (Glazer, 2012; O'Neil et al., 2014). The following subsections provide deeper explanations of the different learning environments found in today's higher education classrooms.

Traditional learning environment. According to McFarlane (2011), traditional classrooms have been around since individuals' appeal with learning. Schools are a destination located where students meet to learn and have the opportunity to participate with groups of students who share the same interest (Polin, 2010). Traditional classrooms have placed the instructor at the front of the classroom, behind a piece of furniture that is strategically placed as a barrier, and students sit in undifferentiated rows (Polin, 2010).

O'Neil et al. (2014) pointed out traditional schools were established as physical locations with scheduled classes offered at set times. O'Neil et al. (2014) went on to state, the approach to traditional learning tends to be an all-purpose fit, and the foremost teaching style is lecturing. Additionally, McFarlane (2011) noted schools were constructed to model the real world at the time, which benefited people to develop into functional individuals. In a traditional classroom, education is the process of learning, and this course of action is imperative in the development of a society (McFarlane, 2011).

Social interaction has long been thought to increase collaboration and, therefore, result in increased learning (O'Neil et al., 2014). Educational institutions have served as

gathering places where special environments are created and education becomes an intimate societal development between instructors and learners, which is seen as the ideal place for teaching students (McFarlane, 2011). Social interaction premises build on a sense of shared understanding, knowledge from one another, and mutual support among learners, which are elements of the theory of Community of Practice (Blackmore, 2010; Wenger, 1999).

Building a support system as students interact in the classroom can increase a student's sense of community (Harrison & West, 2014). Implementing the tenets of communities of practice can make the college campus a better place for students to interact and share their learning experiences (Boettcher & Conrad, 2010; Smilyanski et al., 2015). The use of the theory Community of Practice, in specific programs, including dental assisting, is a key to the success of those programs (Cowan, 2012).

Online learning environments. Education is vital to society, and with the development and growth of the Internet, online learning has become a request of today's generation (McFarlane, 2011; Sherman et al., 2010). Olmsted (2014) agreed by stating, "technological changes are allowing learning through various means other than traditional face-to-face classrooms" (p. 1460). The interactive television has been replaced by asynchronous and hybrid learning delivery systems (Olmsted, 2014).

Colleges are facing a change with increased enrollments including non-traditional students who typically have other commitments such as family and employment (McFarland, 2011). Because the current student population falls outside the traditional college student population, online courses are being offered more frequently (Bonnel & Smith, 2010; McFarlane, 2011; Sherman et al., 2010; Snart, 2010). Online learning can

satisfy the scheduling of high-demand classes, manage limited physical classroom space problems, and support the student with significant life responsibilities (Snart, 2010). Educational institutions are attracted by the benefits of online learning, especially when online learning addresses issues like classroom space (Snart, 2010).

Freeman (2010) defined online learning as a type of learning in which communication regarding educational content is distributed between the instructor and student through computer networking, thus allowing students to connect with instructors and other students. With numerous distractions and motivational challenges, the lives of online students are complex (Conrad & Donaldson, 2011). Online learning can provide greater flexibility for both the student and the educational institution to engage with the online concept (Harrison & West, 2014).

Lin (2011) pointed out the differences between the traditional learning environment and the online learning environment are the reliance on verbal and nonverbal communication. In a traditional classroom, communication is conveyed in actual context, while online communication occurs in written text format without the help of nonverbal clues (Lin, 2011). Online learning can be an approach for digital exchange where communication is an essential element of computer mediated communication (Silvers et al., 2007).

McCann et al. (2010) explained some students do favor the online format over the traditional format because of the accessibility; ease of use; freedom of their time; high image quality, such as viewing x-rays; and the advantage of repeated practice afforded in the online format. According to Bonnel and Smith (2010), “Online education provides amazing opportunities to engage students in learning concepts and to create enhanced

learning using a world of resources" (p. 158). Students of the 21st century, including those being educated in the dental field, have an online world at their fingertips and learning resources, which are as accessible at their convenience (DeBate et al., 2011; McCann et al., 2010).

When discussing distance learning, Olmsted (2014) found asynchronous learning, where students learn the same material at different times and locations, was quickly growing and is being used worldwide. The results of the study confirmed alternative methodology for delivery dental hygiene education was as effective as traditional learning (Olmsted, 2014). DeBate et al. (2011) reported the "integration of online learning into the dental curriculum has been consistently recommended in the literature to allow students to receive much of their education within the communities where they live" (p. 589).

Hybrid learning environment. Hybrid learning, sometimes called blended learning, is a mixture of online learning and traditional learning (McCann et al., 2010; McFarlane, 2011; Park & Howell, 2015). According to Garrison and Vaughan (2008):

> The basic principle [of the hybrid learning environment] is that face-to-face oral communication and online written communication are optimally integrated such that the strengths of each are blended into a unique learning experience congruent with the context and intended educational purpose. (p. 5)

Freeman (2010) agreed by defining hybrid learning as a method which combines traditional face-to-face instruction with the Internet to provide online learning, which decreases actual classroom contact. According to Snart (2010), "The fundamental paradigm shift away from traditional classroom instruction and toward online learning

that happened in the 1990s, a shift whose effects reverberated today, was one of the most ground-shaking that higher education has ever experienced" (p. xv). Snart (2010) went on to say, online learning was a game changer for higher education, and hybrid learning is here to change the game, again (Snart, 2010).

According to Harrison and West (2014), blended learning environments are implemented for three reasons: improve learning, increase accessibility and flexibility, and cost efficiency. Time spent outside the traditional classroom includes online learning activities that take place in the community without the presence of a faculty member (Caulfield, 2011). Higher education institutions have discovered both online and traditional learners do not have to be separated (Park & Howell, 2015). Integrating technology provides students with quality classroom experiences (Caulfield, 2011). According to Park and Howell (2015), the United States Department of Education has reported instruction combining online and face-to-face elements was more effective than either face-to-face or online instruction alone.

The United States Census Bureau (2012) has included questions about computer use in their census surveys since 1984 and Internet use since 1997. The United States Census Bureau (2012) reported almost 80% of United States households had computers, and 75% of the population lived in a household with Internet access. These statistics are supported by today's college students who lead blended lives, and most have access to the Internet through computers, tablets, and smart phones (Glazer, 2012). The United States Census Bureau also reported approximately 11% of students are taking courses online (O'Neil et al., 2014).

Park and Howell (2015) found that students describe blended learning as "fun, interactive, and collaborative… and the amount of in-class interaction with the instructor and with their peers was better than in a traditional lecture format" (p. 566). The foundations of Community of Practice theory hold true for online learning as the progression of social learning happens when individuals, who have a shared concern, collaborate over a period of time and share ideas (Smilyanski et al., 2015; Wenger, 1999). Bonnel and Smith (2010) explained, while dental clinical experiences and traditional classroom learning do not routinely come online, it is a great opportunity to blend them together allowing the students to effectively use resources and time.

The shifting roles of higher education. Historically, a traditional college student could be described as being between 18-24 years old and typically from a white middle or upper class family (Caulfield, 2011). In the past many students had the luxury of living on campus or nearby housing, while focusing primarily on their education (Caulfield, 2011). According to Hege (2010), "Traditional on-campus courses ensure consistent engagement with the course material through regular class meetings in physical community, where teachers and learners interact with one another in one location for a shared period of time" (p. 2).

There is a growing presence of adult students defined as those aged 25 and above who are often referred to as non-traditional students (Caulfield, 2011). Adult students are found in many allied health fields and are often self-motivated to achieve an educational goal (Caulfield, 2011; Olmsted, 2014). According to Conrad and Donaldson (2010), the lives of adult students can be complicated, with numerous distractions and motivational challenges, such as family needs, employment demands, and health issues. The

flexibility of the online learning environment is enticing, and many students who would not be able to obtain a degree in traditional educational settings are now able to take courses and earn degrees online (O'Neil et al., 2014). Online learning promotes critical thinking skills through the opportunities of peer assessments (Park & Howell, 2015).

Most adult students have responsibilities such as full-time employment and parenting, or are people seeking second careers (Cowan, 2012). While traditional programs are suited for students who are able to attend school in a five-day-a-week format, non-traditional students can make use of the asynchronous format of an online or hybrid program on their schedule, not the schedule of the school (Boettcher & Conrad, 2010; O'Neil et al., 2014). According to Olmsted (2014), "Adult students desire timely to-the-point training directly related to their needs" (p. 1461). Because the profile of today's college student is different, colleges need to modify their thinking to the needs and demands of their students (Caulfield, 2011).

Documented research shows a strong predictor of student success comes from student engagement in the learning community (Smilyanski et al., 2015). Because the skill of working as a team is imperative to being successful in the workplace, students enrolled in a dental assisting program need to work collaboratively in an active cohort to be successful (Blackmore, 2010). In order to accomplish this feat, dental assisting program curriculum needs to include tenets of the Community of Practice theory (Cowan, 2012).

The changing faculty in higher education. The roles of faculty members are shifting from a faculty-centered approach to a coaching and mentoring practice (Boettcher & Conrad, 2010; Park & Howell, 2015). Educators can use technology in

ways that can affect interaction with students and information processing to reshape the educational process (Sherman et al., 2010). According to Boettcher and Conrad (2010) the faculty's role in an online course is primarily guiding and directing learning to the student rather than lecturing.

The Internet can be utilized in education for teaching almost any topic (Bonnel & Smith, 2010). Teaching an online course shifts to preparing short mini-lectures, planning community building experiences, and steering students in their learning experiences (Boettcher & Conrad, 2010). O'Neil et al. (2014) explained faculty need to "create a learning environment that is predictable yet flexible; one that is a quality learning environment with feedback that moves learning in a forward direction" (p. 11).

The use of technology in the classroom is an advantage for faculty members because of an increased ease of updating course content, distributing course materials, and allowing an instructors to teach from anywhere (McCann et al., 2010). Gadbury-Amyot et al. (2013) found positive outcomes from a study that transitioned an oral histology course from a traditional format to an online format. The reasoning behind the change allowed a faculty member with the specialized knowledge of the subject to teach the course as an adjunct instructor after relocating to a different state (Gadbury-Amyot et al., 2013).

According to Bonnel and Smith (2010), the technology utilized in online learning make it easy for instructors to organize, manage classroom activities, and control non-traditional office hours. Confirmed by McFarlane (2011), online learning can meet the goals and missions of higher education institutions, prevent the loss of students, and reach new customer segments, which may be located anywhere. Technology can also

solve the growing issue of a shortage of qualified faculty to teach specialty areas of dentistry (Gadbury-Amyot et al., 2013).

Many decisions are being made in dental education about how to provide different formats of classroom instruction (Gadbury-Amyot et al., 2013; McCann et al., 2010). Nadershahi et al. (2013) explained some views of adult learning in dental education have been criticized for the traditional delivery style that presents subject information primarily in a lecture format. Lecture can be defined as the most expeditious way to deliver large amounts of information to students who have become accustomed to an almost entirely passive role in learning (Nadershahi et al., 2013).

According to Nadershahi et al. (2013), there is a strong need to improve and restructure dental education. The insufficiencies of the traditional educational approaches can be improved by technology and online learning (Bonnel & Smith, 2010; Glazer, 2012). Higher education learning management systems can now be used to organize curriculum and replace multiple paper copies of classroom documents for students to view electronically or print exactly what they want (Bonnel & Smith, 2010; Glazer, 2012). A hybrid course requires students to be on-site for certain activities, such as labs, clinicals, and proctored examination, and the learning management system provides the asynchronous environment for the course (Gadbury-Amyot et al., 2013).

Summary

The literature review provided a theoretical, historical, and practical basis for understanding the design of this study. By using the Community of Practice theory, students work together to develop common goals and solve real world problems (Wenger, 1999). This collaborative process allows students of varying degrees of skill

and mastery to further their knowledge, while at the same time establishing a group sense of accomplishment and commitment (O'Neil et al., 2014).

A history of professional dentistry and the history of dental education were also included in Chapter Two. According to Woolfork and Price (2012), the history of dental assistant education is parallel to the history of dental education; "both started with students being educated in apprenticeships and proprietary school settings and then transitioned into formal educational settings in dental schools and community and technical colleges" (p. 52). Leaders in dental and allied dental education have identified many challenges facing the declining workforce (Gadbury-Amyot et al., 2013).

Different learning environments, including traditional learning, online learning, and hybrid learning, were also highlighted in Chapter Two. Traditional learning is a synchronous learning environment where students are required to be on-site at a scheduled time (Glazer, 2012). Online learning is an asynchronous learning environment that includes some form of technology and provides flexibility to the students (Little & Housand, 2011). Hybrid learning, a third option, is a combination of both synchronous and asynchronous, providing the best of both worlds (Poirier, 2010; Snart, 2010).

The roles in higher education are changing for both students and faculty members (Bonnel & Smith, 2010). According to O'Neil et al. (2014), successful college students are "mature, open-minded, self-motivated, [with] good written communication skills and a minimum level of technology experience" (p. 10). Faculty members who teach must have an open-mind and must be flexible to facilitate learning in an online environment (O'Neil et al., 2014). Technology in the changing classroom provides opportunities to

combine the best of traditional learning and new teaching approaches (Bonnel & Smith, 2010).

In particular, there is little literature available that explains the structure of a dental assisting program that offers both a traditional and hybrid delivery format, and how this might affect how students collaborate and share knowledge. This is an important issue. Because of the workforce shortage and the demographics of today's students, more educational institutions are transitioning programs to online and hybrid formats.

In Chapter Three, the methodology of this study is addressed. An overview of the problem, purpose, research questions, and hypothesis is presented. The population and sample, instrumentation, and data collection procedures are explained. The remaining section contains information regarding the analysis of the data.

Chapter Three: Methodology

This chapter presents the methodological framework that was used to explore the effects of different educational delivery formats on the success of dental assisting students at a Midwest community college. A survey was used to collect information from current dental assisting students and graduates and was analyzed by descriptive statistical methods. Furthermore, data were collected from student retention rates and national board scores using an inferential statistical method. Communities of practice was the theoretical base used to guide the study and determine the effects of offering both traditional and hybrid learning methods at a Midwest dental assisting program. The research methodology, as well as the data collection procedures, are further discussed in this chapter.

Problem and Purpose Overview

As discussed in previous chapters, dental assisting is one of the fasting growing careers in the United States (Bureau of Labor Statistics, 2015). The dental assisting profession is expected to experience a 25% growth by the year 2022 (Bureau of Labor Statistics, 2015). Demands for preventative dental services are growing due to the continuing research showing oral health is linked to overall general health (Solomon, 2012). According to Olmsted (2014), due to the implementation of "technologically based delivery systems" learning opportunities are growing, and dental assisting education is taking advantage of the opportunity (p. 10). This quantitative study focused on the addition of delivery learning models to a dental assisting program which can ultimately increase the number of eligible workers to be placed in a skilled career.

A common mission shared by educational institutions is to educate their students in the best possible ways (Conrad & Donaldson, 2010). Bonnel and Smith (2010) noted that the student population is very different than ever before. Hybrid learning is not new, but its popularity has increased rapidly in recent years (Amyot & Brockman, 2011). Based on current growth trends, hybrid learning is an additional model of course delivery; that is available to serve students (Snart, 2010). The intent of these changes is to extend program marketability to students who need alternative options for education. However, no studies have provided useful recommendations for guiding online technology into the area of the dental assisting curriculum.

Within the framework of Wenger's (1999) Communities of Practice, the purpose of this quantitative study was to explore which aspects of social learning theory students report as influential and determine the effect of different course delivery methods on three measures of student success; collaboration, retention, and pass rates. The goal of the study was to determine how the Communities of Practice model affects the success of a Midwest dental assisting program that offers both traditional and hybrid learning methods. Wenger (1999) suggested people are social beings who learn from each other as they engage and interact with each other.

A quantitative approach was appropriate for this study because the research involves an understanding of what factors of collaboration were encountered throughout a dental assisting program that contributed to the success of the program (Creswell, 2014). In addition, student retention rates and national board scores were analyzed to show if a difference existed between students in a traditional learning environment and a hybrid learning environment. It was hopeful the outcomes of this study would assist in

providing feedback related to guiding instructional practices for similar accredited dental assisting programs.

Research questions and hypotheses. The following research questions and hypotheses served as a guide for this study:

1. What aspects of social learning theory, specifically Communities of Practice, do dental assisting students at a Midwest community college report as being influential?

2. What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates at a Midwest community college?

$H2_{0:}$ No significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates at a Midwest community college.

$H2_{a:}$ A significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates at a Midwest community college.

3. What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college?

$H3_{0:}$ No significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college.

$H3_{a:}$ A significant difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college.

Research Design

A quantitative approach, using both descriptive analysis and inferential statistics was used. Descriptive analysis is a technique that enables the researcher to meaningfully describe the data with numerical indices or in graph forms (Creswell, 2014). Inferential analysis is a technique for determining how likely it is that results based on a sample or samples are similar to results that would have been obtained for the entire population (Fraenkel et al., 2011). A causal comparative quantitative approach was used to explore the cause of, or consequences of, existing differences in withdrawal rates and passing rates on national certification in a dental assisting program using both traditional and hybrid learning methods.

Quantitative research is an approach that can be used for testing a series of hypotheses which propose to explain the differences between variables without manipulation of the outcomes (Creswell, 2014; Fraenkel et al., 2011). Creswell (2014) explained, on a survey instrument, variables are measured. Numbered data are used to determine how the data connect to the research questions (Creswell, 2014). This study provided a numeric description of the aspects of social learning theory that students report to be influential in a dental assisting program.

In order to garner the different types of quantitative data necessary to answer the research questions of this study, both a survey instrument and post-hoc, de-identified data

collection were used. Research Question One was best addressed by performing a descriptive analysis of the information gathered from survey responses of students in the dental assisting program. The process of descriptive analysis consisted of collecting, organizing, summarizing, and presenting the data (Bluman, 2014). Creswell (2014) noted, using a survey methodology approach allows for the researcher to capture knowledge on groups of individuals by surveying the group about their attitudes, feelings, behaviors, and other related information.

Research Question Two and Research Question Three garnered information about student success in two different course delivery formats by using retention rates and national certification passage rates. The data gathered were analyzed by using inferential statistics. All of the data gathered surrounded the Community of Practice theory by involving forms of student mutual engagement (Wenger, 1999).

Population and Sample

The boundary for exploration in the study included a dental assisting program at a two-year educational institution in a metropolitan city in the Midwest. The two-year educational institution has been in existence for 25 years (Zweigle, 2015). Residents of 14 school districts voted to establish the community college in April 1990 along with the approval of the Coordinating Board of Higher Education (Zweigle, 2015). In the first semester, 1,198 students enrolled in the newly established community college (Zweigle, 2015). Today, the community college admits on average 15,000 students per semester who have a choice to register in nearly 50 different certificate option programs or associate degrees, or plan to transfer to a four-year institution in quest of a bachelor's degree (Zweigle, 2015).

The selection site was determined by investigating the five existing dental assisting programs in Missouri. There was only one program which offered a dental assisting program with two different educational formats, traditional and hybrid. The primary reason for selecting a dental assisting program with two educational formats is the research on this level of dental assisting education is extremely limited. Few research studies pertain specifically to educating dental assistants (Smilyanski et al., 2015). For quantitative research, it is important for the researcher to select an appropriate site to study, such as a program, group, or activity (Creswell, 2014).

The dental assisting program at the chosen community college is a selected admission program, and students are admitted based on the following admission criteria: 40 hours of job shadowing, residents' status, and a number of general education courses that can be finished prior to applying to the dental assisting program (Community College, 2015). Due to the limitation of lab space and CODA standards on faculty-to-student ratio, the maximum amount of students who can be accepted into each cohort per year is 24 (CODA, 2014). On average, two-thirds of the students who apply to the traditional dental assisting program each year are denied (Community College, 2015).

The population for the study was comprised of all students who were enrolled in both traditional and hybrid courses of the dental assisting program. The sample included 92 participants who were graduates and current students. The traditional education program has been offered since the community college began in 1990, and the hybrid pathway is in its fourth year of existence (Community College, 2015). During the time of the study, the program had a class size of 24 students enrolled in the traditional course, and 13 students enrolled in the hybrid course (Community College, 2015). The dental

traditional education program has graduated an average of 20 students each year (Community College, 2015). The dental assisting hybrid course selected its first class in the spring semester of 2012 and has graduated four cohorts, for a total of 46 graduates to date (Community College, 2015).

Instrumentation

Data collection for the first research question in this study was completed through a web-based survey. The survey contained questions grounded in the Communities of Practice model. These questions were grouped into four main categories: sense of community or collegiality, collaboration, exchange of knowledge, and observational learning. The survey instrument was distributed to current and past dental assisting students in both class delivery formats.

The data used to address Research Question Two and Research Question Three were withdrawal rates and national certification passing rates from the past three years (2012, 2013, 2014) of students enrolled at the Midwest community college. Retention data were gathered from the college's research department. National certification scores are publicly available through the Dental Assisting National Board website.

Fraenkel et al., (2011) determined using quality instruments in research is essential for the researcher to explain accurate conclusions. Creswell (2014) acknowledged, "One type of nonexperimental quantitative research is *causal-comparative research* in which the investigator compares two or more groups in terms of cause (or independent variable) that has already happened" (p. 12). Therefore, it was crucial for the researcher to use multiple ways to collect data to examine the two delivery formats in a dental assisting program (Fraenkel et al., 2011).

Survey. A cross-sectional survey (see Appendix A) was carefully designed by the researcher to describe what aspects of social learning theory, precisely communities of practice, dental assisting students report as being influential on some characteristic, attitude, and/or behavior. The researcher created an original survey through the online program, Fluidsurveys™, and emailed the link to participants to be completed. The software provided by Fluidsurveys™ was used to report the descriptive statistics.

The most important part of the theoretical framework was to determine if social interaction plays an essential part in the process of learning by peer collaboration. On the other hand, engagement and group learning are an important part of the professional of dental assisting (Polin, 2010). According to Fink (2013), surveys collect information used to compare, describe, and explain individual's behavior. Creswell (2014) explained advantages of a survey are economical, convenient for the participants, and the rapid turnaround in data collection.

Validity. Creswell (2014) posited all researchers recognize "whether one can draw meaningful and useful inferences from scores on instruments" (p. 160). The survey instrument was verified by dental hygiene students, a group not included in the study, for accuracy and clarity. The assurance that the information obtained from the survey enabled the researcher to draw the correct conclusion (Fraenkel et al., 2011). The goal of establishing validity of a quantitative study was to minimize the errors and biases, and this can be alleviated by choosing the most precise and accurate survey method for the specific purpose (Fink, 2013).

Reliability. Fink (2013) described reliable surveys as those that are constructed in a way which ensures the definitions and selected questions are grounded in the theoretical

framework of the study. Reliability refers to the uniformity of scores from one instrument to another instrument (Fraenkel et al., 2011). A pilot study was completed using a convenience sampling (Fink, 2013). Bluman (2014) explained convenience sampling can be representative of the entire population. In order to increase the reliability of this study, pilot testing the survey on a small sample group of at least 18 current dental hygiene students, who were not included in the study, was performed, and then revisions were made based on the learned information.

A reliability analysis was performed to determine how specific questions affected the reliability of the overall survey. A well-designed, easy-to-read survey contributed to the reliability and validity of the study (Fink, 2013). The researcher asked the respondents if any of the survey questions were unclear or confusing. Questions that may have affected the reliability were inspected and removed without disturbing the content of the complete survey.

De-identified data. The researcher reviewed student data, withdrawal rates, and student national examination results. Data were gathered in a non-identifiable format from current dental assisting students and graduates from the past three years, from both traditional and hybrid programs, by the research department at the Midwest community college.

Data Collection

Data collection for this quantitative study occurred in the fall semester 2014 after obtaining permission from the IRB at Lindenwood University (see Appendix B) and approval and permission from the site of study (see Appendix C). Participants in the dental assisting program, both current and graduates, were asked to complete the survey

based on Wenger (1999) notion of social interaction by participating and interacting in a Community of Practice (see Appendix D).

Participation in the quantitative study was voluntary, and the students understood their course grades were not affected. Once the permission forms were returned, the researcher compiled a list of students who agreed to participate in the study. Then, the survey was emailed out. Because institutional permission had been obtained, the researcher distributed the survey to the students' educational email addresses. When the results were collected the researcher performed statistical analysis on the data.

Data Analysis

The results of the survey and the de-identified data collected were analyzed using descriptive analysis as well as inferential statistical measures (Creswell, 2014). Data analysis in quantitative research consists of preparing and organizing the data (Creswell, 2014). Specifically, descriptive analysis was used to obtain the mean, median, and mode from the results of the survey.

Data collected on withdrawal rates and results from the national certification board were examined using inferential statistics, particularly *t*-tests (Fraenkel et al., 2011). A *t*-test is best to decide whether there is a statistically significant difference between the means of two groups of data, such as the traditional course and the hybrid course in the dental assisting program (Fraenkel et al., 2011). To protect the anonymity of the students, all names were removed from the data collected from the survey, withdrawal rates, and the results of the national certification results before being obtained by the researcher.

Summary

This chapter included a discussion of the quantitative methodology used to examine the influences factors in a traditional course and a hybrid course dental assisting program in a Midwest community college. Creswell (2014) explained quantitative research is a method for testing theories by variables and their differences. The data gathered focused on the tenets of Communities of Practice theory (Wenger, 1999).

This study's potential research population consisted of enrolled and graduated students in dental assisting classes from 2012 through 2014 at a community college in the Midwest. In all, 92 students were eligible to participate in the study. Of those students eligible, 61 students received traditional learning methods, and 31 received hybrid learning methods.

A cross-sectional survey instrument was created and de-identified data were collected of withdrawal rates and national examination certification scores. Procedures which establish trustworthiness, including maintaining each participant's confidentiality were guaranteed by using a pseudonym for the name of the dental assisting program, participants, and the college (Fraenkel et al., 2011). One hundred percent of the data gathered were analyzed and used to answer the three research questions.

In Chapter Four, the results of this study will be offered. An overview of the demographic, collaboration and survey results is presented. The statistical analyses of withdrawal rates and national certification are explained. Chapter Five contains the study's summary, conclusion, and any recommendations for future studies.

Chapter Four: Analysis of Data

In the United States, over a half million dental assistants, dental hygienists, and dentists have something to smile about (Solomon, 2012). Population growth, greater retention of natural teeth by middle-aged and older individuals, and an increased focus on preventative dental care for younger generations have fueled the demand for dental services (Solomon, 2012; U.S. Bureau of Labor Statistics, 2015). The need for oral health care will create continuing growth for the dental assisting occupation (Solomon, 2012). The profession of dental assisting is projected to grow by 25% by the year 2020 (U.S. Bureau of Labor Statistics, 2015).

The main purpose of this study was to explore if the theory of Communities of Practice influenced student learning in a Midwest dental assisting program that offers both traditional and hybrid learning formats (Wegner, 2008). Over time, members of a social group build strong collaborative ties and share implied knowledge through interactions and working together (Jimenez-Silva & Olson, 2012). By observing others, students see the importance of learning, which may provide the motivation to succeed (Bonnel & Smith, 2010). In this chapter, quantitative results from this study will are presented.

This study was approved by the Institutional Review Board of Lindenwood University and the participating institution. Those who agreed to participate met the criteria of being a current student or a graduate of the targeted dental assisting program. In all, students from six different learning cohorts took part in the study. All participants gave their informed consent before taking the online survey. All personal information and recognizing details were kept confidential. Multiple pieces of data were collected.

A survey was created which focused on the tenets of Communities of Practice (Wenger, 1999), which was presented to the participants. In addition, information was collected to compare the students' progress between the traditional and hybrid courses. Institutional data, including withdrawal rates and scores from the national certification examination, were collected over a three-year period from students who participated in the dental assisting program.

Data Analysis

In order to understand the data collected, the research questions were used as a guide to report the results. In addition, these questions addressed the theoretical framework used for this study; Community of Practice. Both descriptive and inferential analyses were used. The survey was used to evaluate the perceived collaboration between students in a dental assisting program in the Midwest community college. The data collected from the institution were used to determine if both traditional and hybrid courses were successful.

Survey analysis. In order to answer the first research question (*What aspects of social learning theory, specifically communities of practice, do dental assisting students at a Midwest community college report as being influential?)* a survey was developed to garner results to determine if evidence of collaboration existed while students were enrolled in the dental assisting program (Fink, 2013). The survey consisted of three components. The first component consisted of respondent demographics and education, as well as reasons for selecting a specific program.

Students were members of a community who intermingled, collaborated, and participated together while in the dental assisting program (Jimenez-Silva & Olson,

2012). The items in the second component of the survey focused on the collaboration within the programs using a rating scale from one (*not very important*) to five (*very important)*. Seven questions concerning potential indicators for communities of practice were asked. The survey items in the third component focused on the overall education each respondent received and asked for their level of agreement using a rating scale from one (*strongly disagree*) to five (*strongly agree)* concerning the overall education they received.

Demographic analysis. The survey created was dispatched to a mix of students who were either currently enrolled or had graduated from the targeted dental assisting program. Students, who were students in both types of delivery formats, traditional or hybrid dental assisting programs, were invited to participate. In all, 92 students from cohorts in 2012, 2013, and 2014 were considered eligible to take part in the study.

The first question on the survey addressed which delivery system the student attended in the dental assisting program. Of the students who were eligible to participate, 62% had taken the traditional course for dental assisting, while 39% were from the hybrid course. The participants received the invitation to participate in the survey via individual email and through the college's dental assisting alumni Facebook group page. Initially, 47 participants started the survey with 44 participants seeing it through completion.

There was a noticeable variation in the type of program the participants had completed at the Midwest community college. Of the 47 participants who completed the survey, 76.6% reported being enrolled or had completed the traditional dental assisting program. Twenty-three percent of the participants conveyed being enrolled or had completed the hybrid dental assisting program.

The second question on the survey asked students to respond to the reasons they chose either the traditional or hybrid program format. The top reason reported by survey responders was convenience (42.6%). Likewise, other reasons given were desired/anticipated graduation date (34.6%) and job responsibilities (31.6%). Family responsibilities were noted by 21.3% of the participants. Even with two program formats available to students, 12.8% noted limited options available. Nine participants did not choose one of the survey choices, but preferred to mark "other" noting the student's learning style preferences, steps to further training on dental hygiene, and a love for the seated classroom environment.

The age range of participants was the third piece of demographic information collected on the survey. In this sample, the majority of participants, 59.6%, reported being in the age category of 18-24 years. Only one participant reported being over 35 years of age. The remaining 18 participants were in the age range of 25-35. All 47 of the respondents were female, which reflects the actual population of the student body.

The participants in the study brought varying degrees of educational experience with them to the Midwest dental assisting program. The fifth question on the survey asked the students what prior education they had received before applying to the dental assisting program. Seventeen of the participants surveyed had completed at least two years of college or trade school, while six contributors had completed four years of college without a receiving a degree before entering the dental assisting program. Eleven participants reported receiving an associate's degree, and three students held a bachelor's degree or higher. Ten participants reported having a high school diploma with no prior college experience.

Collaboration analysis. Collaboration within the program was addressed in the second component of the survey. Seven questions were asked concerning potential indicators for Communities of Practice. Learning theorists advocate the learning process consists of interactions between learners, the learner's environments, and the desire to gain new knowledge and behaviors (Bonnel & Smith, 2010).

The study's first research question (*What aspects of social learning theory, specifically communities of practice, do dental assisting students at a Midwest community college report as being influential?)* was best addressed by performing a descriptive analysis of the information gathered from survey responses of students in the dental assisting program. The survey questions are discussed individually.

Survey question 6: *While in the program, did you feel you shared knowledge with each other?* The first aim of the survey was to assess the extent respondents perceived themselves as working together in the program. The responses were logical due to students working collaboratively on many assigned projects.

Regarding sharing knowledge with each other, the dental assisting students overwhelmingly (96%) agreed shared knowledge was a component of the program, and they reported sharing with each other while in the program. Differences in responses did occur between the students in the traditional and hybrid programs. All responders from the traditional program agreed to sharing knowledge, while only 78% of the participants in the hybrid program agreed.

Survey question 7: *While in the program, did you feel you learned from each other?* Again, the majority of the participants in the dental assisting program stated collaboration with knowledge had occurred while in the program. Of the students

surveyed, over 96% responded affirmatively to the question asking if students felt they learned from each other in addition to the course content. Differences in responses did occur between the participants in the traditional and hybrid program. All of the responders from the traditional program concurred they learned from each other while in the program. Only 78% of the participants in the hybrid program affirmed they learned from each other while in the program.

The amount of time spent on homework was the focus of question 8 in the survey. The answers are discussed separately by response choice. Differences in cohort responses are also noted.

Survey question 8a: *How much effort did you put into your homework?* The choice, 1-5 hours a week, was the lowest period chosen by participants. Only nine percent of the total participants reported spending 1-5 hours per week on homework. Of the nine percent there was a notable difference between the cohorts. Six percent of traditional cohort students claimed they spent 1-5 hours on homework while more of hybrid students, 22%, reported spending the same amount of time.

Survey question 8b: *How much effort did you put into your homework?* Overall, 11% of the participants reported spending 6-10 hours per week on homework. The difference between the cohorts on the effort spent on homework was also notable. Fourteen percent of the traditional cohort students and none of the hybrid cohort students reported spending 6-10 hours per week on homework.

Survey question 8c: *How much effort did you put into your homework?* The choice, 11-20 hours a week, was the top answer for any of the categories regarding amount of time spent on homework. Forty-seven percent of the overall participants chose

this amount of time. More traditional cohort students, 50%, chose 11-20 hours per week on homework as opposed to 33% of hybrid cohort students respectfully.

Survey question 8d: *How much effort did you put into your homework?* The choice, 21-30 hours per week was the next highest period chosen by participants. Overall, 24% of the participants reported spending 21-30 hours per week on homework. Twenty-two percent of traditional cohort students and 33% of students in the hybrid course chose this option.

Survey question 8e: *How much effort did you put into your homework?* This choice, more than 30 hours per week, was the final choice the participants could choose. Overall, only 9% of participants reported spending more than 30 hours per week on homework. Eight percent of the traditional cohort students and 11% of the hybrid cohort students chose this option.

Survey question 9a: *How important was it for you to collaborate with your classmates?* For this survey question 80% of the overall participants felt collaboration with classmates was *important/very important*, and 9% of the participants felt the collaboration was *very important/somewhat important.*

The remaining 11% of the participants indicated collaboration with classmates as neither important nor unimportant. Most (83%) of the traditional cohort students and about two-thirds (67%) of the hybrid cohort students reported the collaboration was important. Few (6%) of the traditional cohort students and about one-fourth (22%) of the hybrid cohort students indicated the collaboration was less important. *Neutral* responses were the same for both cohorts at 11%.

Survey question 9b: *How important was it for you to create a cooperative learning environment?* For this survey question, participants reported the creation of a cooperative learning environment was *important/very important*. Similarly, the comparison of traditional and hybrid cohort student cohorts, showed no differences. Both cohorts indicated the creation of a cooperative learning environment was *important/very important*.

Survey question 9c: *How important was it for you to work together on group activities?* Of the responses, 77% of the participants reported group activity work was *important/very important*. Only 7% of the participants chose *very important/somewhat important*.

The remaining 16% of participants indicated working together on group activities indicated *neutral* by choosing *neither important/nor unimportant*. The comparison of responses between the cohorts provided similar results. The majority of traditional cohort students and the majority of hybrid cohort students reported working together on group activities was *important/very important*.

Survey question 9d: *How important was it for you to learn and share areas of interest?* Among all participants, the majority (82%) of the students reported learning and sharing areas of interest was *important/very important*. Seven percent of the overall participants felt the learning and sharing of areas of interest were *not very important/somewhat important*, and 11% indicated no preference of importance.

Regarding differences between the cohorts, the majority of both traditional cohort students (83%) and hybrid cohort students (78%) indicated learning and sharing areas of interest with classmates was *important/very important*. Six percent of traditional

participants and 11% of hybrid participants reported learning and sharing areas of interest as *not very important/somewhat important*. Eleven percent of both traditional and hybrid cohort students indicated *neutral* by choosing *neither important/nor unimportant*.

Survey question 9e: *How important was it for you to make new friends?* For this survey question, most of the overall participants indicated the opportunity was *important/very important*. Sixteen percent of the students selected making friends was *not very important/somewhat important*. Similarly, 16% of the participants reported no preference.

Comparing differences between the cohorts, 78% of traditional cohort students and about one-third of the hybrid cohort students felt establishing new friendships was *important*. Forty-four percent of the hybrid cohort students indicated they felt making new friends was *not very important/somewhat important*, while 9% of the traditional cohort students felt the same. Finally, 14% of the traditional cohort students and 22% of the hybrid cohort students indicated new friendships were *neither important/nor unimportant*. The responses from each indicator in survey question nine are presented in Table 1.

Table 1
Responses from survey question nine.

How important was it for you to:

	Not very important	Somewhat important	Neutral	Important	Very important	*n*
Collaborate with classmates	6.8	2.3	11.4	31.8	47.7	44
Create a cooperative learning environment	0.0	0.0	0.0	36.4	63.6	44
Work together on group activities	6.8	0.0	15.9	27.3	50.0	44
Learn and share area of interest	2.3	4.5	11.4	43.2	38.6	44
Make new friends	9.1	6.8	15.9	43.2	25.0	44

Note. Survey question nine. *n* = participants. Responses are reported in percentages.

Survey question 10a: *How helpful were the following activities: Collaboration with your classmates*? Regarding collaboration with classmates, most participants indicated such activities were *helpful/very helpful.* Few (9%) of the participants felt collaboration with classmates was *not very helpful/somewhat helpful*. A smaller group of participants (5%) was *neutral* regarding the benefit of collaborative activities.

Comparing differences between the cohorts, 92% of the traditional and 69% of the hybrid responded collaborative activities were *helpful/very helpful*. The traditional cohort students (6%) and hybrid cohort students (22%) indicated the collaborative activities were *not very helpful/somewhat helpful*. Finally, only 2% percent of traditional cohort students and 11% of hybrid cohort students indicated *neutral* when describing the value of collaborative classmate activities.

Survey question 10b: *How helpful were the following activities: Creating a cooperative learning environment?* Overall, most participants indicated a cooperative learning environment was *helpful/very helpful*. While 11% of the overall participants indicated *neutral* regarding the benefit such an environment, 2% of the participants felt a cooperative learning environment was *not very helpful/somewhat helpful*.

The majority of traditional and hybrid cohort students felt the cooperative learning environment was *helpful/very helpful*. Eleven percent of the hybrid cohort students felt the environment was *very helpful/somewhat helpful,* but none of the traditional cohort students chose that response. Finally, one-third of the hybrid cohort students and 6% of the traditional cohort students chose the *neutral* response regarding the value of a cooperative learning environment.

Survey question 10c: *How helpful were the following activities: Working together on group activities?* Regarding the benefit of working together on group activities, approximately two-thirds of all participants felt the activities were *helpful/not very helpful*. Fewer participants (16%) felt the activities were *not very helpful/somewhat helpful*.

The remaining overall participants indicated *neutral* in their response for this survey question. The majority of traditional cohort students and about half of the hybrid cohort students felt working together on group activities were *helpful/very helpful*. While nearly half of the hybrid cohort students felt such activities were not very *helpful/somewhat helpful*, only 8% of the traditional cohort students provided the same response. Finally, 17% of the traditional cohort students and 11% of the hybrid cohort

students chose the *neutral* response regarding the benefit of working together on group activities.

Survey question 10d: *How helpful were the following activities: Learning and sharing areas of interest?* For this survey question, the majority of overall participants felt learning and sharing areas of interest was *helpful/very helpful*. Alternatively, about one-tenth of the overall participants indicated learning and sharing areas of interest was *not helpful/somewhat helpful*.

Only 7% of the overall participants were *neutral* regarding learning and sharing areas of interest with their classmates. The majority of traditional and hybrid cohort students felt learning and sharing areas of interest with their classmates were *helpful/very helpful.* Twelve percent of traditional cohort students and about one-tenth of the hybrid cohort students felt learning and sharing areas of interest activities were *not very helpful/somewhat helpful*. Finally, while nearly a quarter of the hybrid cohort students indicated *neutral*, only 3% of the traditional cohort students indicated *neutral* in their response in terms of learning and sharing areas of interest.

Survey question 10e: *How helpful were the following activities: Making new friends?* Seventy-five percent of the overall participants indicated activities for making new friends were *helpful/very helpful.* Of the remaining participants, 14% felt the activities were *not very helpful/somewhat helpful*; however, 11% of participants responded *neutral* regarding the benefit of activities for make new friends.

Regarding the difference between cohorts, the majority of traditional cohort students (83%) and nearly half (44%) of the hybrid cohort students felt activities for creating new friendships were *helpful/very helpful.* As many hybrid cohort students

(44%) and only 6% of the traditional cohort students indicated the friendship activities were *not very helpful/somewhat helpful*. Finally, 11% of students in both cohorts responded *neutral* regarding the value of activities for making new friends. The responses from each indicator in survey question 10 are presented in Table 2.

Table 2

Responses from survey question 10.

How helpful were the following activities:

	Not very helpful	Somewhat helpful	Neutral	Helpful	Very helpful	*n*
Collaborate with classmates	4.5	4.5	4.5	40.9	45.5	44
Create a cooperative learning environment	0.0	2.3	11.4	29.5	56.8	44
Work together on group activities	11.4	4.5	15.9	25.0	43.2	44
Learn and share area of interest	2.3	9.1	6.8	34.1	47.7	44
Make new friends	4.5	9.1	11.4	34.1	40.9	44

Note. Survey question 10. *n* = participants. Responses are reported in percentages.

Survey question 11a: *How frequently did you collaborate with your classmates?* For this survey question, 78% of the overall participants felt collaboration occurred *frequently/very frequently*. Interestingly, the remaining response choices for this survey question were equal. Eleven percent of overall participants indicated collaboration among classmates was *not very frequent/somewhat frequent,* and 11% of the overall participants indicated *neutral* in terms of frequency.

Comparing program types, the majority of traditional cohort students and almost half of the hybrid cohort students collaborated with classmates *frequently/very frequently*. While one-third of the hybrid cohort students indicated such collaboration was *not frequent/somewhat frequent*, 6% of the traditional cohort students concurred. Similarly, in terms of *neutral*, 9% of the traditional cohort students and 22% of the hybrid cohort students responded *neutral* in terms of the frequency of collaborations with classmates.

Survey question 11b: *How frequently did you create a cooperative learning environment?* The majority of overall participants felt creation of a cooperative learning environment occurred *frequently/very frequently*. Fewer (14%) of the participants were *neutral* regarding the frequency of such an environment.

Only 7% of the overall participants felt creation of a cooperative learning environment occurred *not very frequently/somewhat frequently*. Regarding cohort differences, the majority of both traditional and hybrid cohort students felt creation of a cooperative learning environment occurred *frequently/very frequently*. However, few of the traditional cohort students (3%) and about one-fourth (22%) of the hybrid cohort students indicated they created such an environment *frequently/somewhat frequently*. Finally, only 11% of the students from each of the traditional and hybrid programs chose *neutral* regarding how frequently they created a cooperative learning environment.

Survey question 11c: *How frequently did you work together on group activities?* Regarding overall participant responses, about two-thirds of the participants indicated working together occurred *frequently/very frequently,* while 19% of the participants chose *not very frequently/somewhat frequently*. Of the remaining overall participants,

only 14% indicated *neutral* in terms of frequency for working together on group activities.

Among differences based on cohort, the majority of the traditional cohort students and almost half of the hybrid cohort students worked *frequently/very frequently* together on group activities. Few of the traditional cohort students (12%) and about the same (44%) percentage of hybrid cohort students worked together on group activities *very frequently/somewhat frequently*. Similarly, 14% of the students reported *neutral* regarding working together on group activities, but few (11%) of the hybrid cohort students indicated *neutral*.

Survey question 11d: *How frequently did you learn and share areas of interest?* For this survey question, most of the overall participants reported learning and sharing areas of interest occurred *frequently/very frequently*. Of the remaining overall participants, 14% indicated *neutral* for the frequency of learning and sharing areas of interest, while 11% reported learning and sharing areas of interest *did not occur very frequently/somewhat frequently*.

When comparing differences among the traditional and hybrid cohorts, the majority of traditional cohort students and about half of the hybrid cohort students reported learning and sharing areas of interest with their classmates occurred *frequently/very frequently*. Few (9%) of the traditional cohort students and 22% of the hybrid cohort students felt learning and sharing areas of interest with classmates occurred *infrequently/somewhat frequently*. Similarly, only 9% of the traditional cohort students and one-third of the hybrid cohort students were *neutral* regarding the frequency of learning and sharing areas of interest.

Survey question 11e: *How frequently did you make new friends?* Most of the overall participants established new friendships while in the dental assisting cohorts. Only 14% reported they did not make new friendships *very frequently/somewhat frequently*. The remaining 16% of the overall participants chose *neutral* regarding frequency of building new friendships.

Regarding differences between the cohorts, the majority of traditional cohort students and about one-third of the hybrid cohort students developed new friendships *frequently/very frequently*. Alternatively, few of the traditional cohort students and about half of hybrid cohort students developed new friendships *not very frequently/somewhat frequently*. Finally, 14% percent of the traditional cohort students and 22% of the hybrid cohort students indicated *neutral* in their response in terms of making new friends while in their respective cohort. The responses from each indicator in survey question 11 are presented in Table 3.

Table 3

Responses from survey question 11.

How frequently did you:

	Not very frequently	Somewhat frequently	Neutral	Frequently	Very Frequently	*n*
Collaborate with classmates	2.3	9.1	11.4	29.5	47.7	44
Create a cooperative learning environment	2.3	4.5	13.6	31.8	47.7	44
Work together on group activities	4.5	13.6	13.6	36.4	31.8	44
Learn and share area of interest	2.3	9.1	13.6	36.4	38.6	44
Make new friends	6.8	6.8	15.9	40.9	29.5	44

Note. Survey question 11. *n* = participants. Responses are reported in percentages.

The following survey questions, 12a – 12f, focused on the participants' preferred learning style based on specified learning activities: reading assignments, chapter workbook activities, online discussion board assignments, group work, lab simulations, and quizzes/chapter exams. For reporting purposes, the response options for these survey questions v*aluable/extremely valuable* and *not valuable/somewhat valuable* were combined. Results for the *neutral* responses are presented apart from any other response option.

Survey question 12a: *Please rate the following learning activities based on your preferred learning style: Reading assignments.* For this survey item, approximately two-thirds (68%) of overall participants indicated reading assignments were

valuable/extremely valuable based on their preferred learning style. A few of the respondents (9%) felt the reading materials were *valuable/somewhat valuable*.

The remaining overall participants (23%) indicated they were *neutral* regarding the value of reading assignments based on their preferred learning style. Responses sorted by program type showed slightly different results. About two-thirds of each cohort (68% traditional and 66% hybrid) indicated the reading assignments were *valuable/extremely valuable* based on their preferred learning style. While one-fourth (22%) of the hybrid cohort students indicated, based on their preferred learning style, reading assignments were not *valuable/somewhat valuable,* only 6% of the traditional cohort students concurred. Finally, one-fourth (26%) of the traditional cohort students and a few (11%) of the hybrid cohort students were *neutral* regarding the value of the reading assignments.

Survey question 12b: *Please rate the following learning activities based on your preferred learning style: Chapter workbook assignments.* Most (80%) of the overall respondents reported workbook activities were *valuable/extremely valuable* based on their preferred learning style. Of the remaining overall participants, 10% felt the workbook activities were not *valuable/somewhat valuable,* and 11% indicated they were *neutral* regarding the value of the chapter workbook activities based on their preferred learning style.

The responses revealed slight differences between the two programs. Most of the traditional (86%) and hybrid (55%) students felt the chapter workbook activities were *valuable/extremely valuable*. The most significant difference between the cohorts was the indication the chapter workbook activities were *not valuable/somewhat valuable,* with

33% of the hybrid cohort students and 3% of the traditional cohort students choosing that response option. Only 11% of the students in each cohort reported no opinion on the value of the chapter workbook activities as based on their preferred learning style.

Survey question 12c: *Please rate the following learning activities based on your preferred learning style: Online discussion board assignments.* About one-fourth (27%) of the overall respondents reported online discussion board assignments were *valuable/extremely valuable,* while about half (52%) of the overall participants felt the assignments were *not valuable/somewhat valuable*. The remaining 20% of overall participants chose the *neutral* response regarding the value of online discussion board assignments based on their preferred learning style.

Differences between the cohorts were similar to the overall participant responses. About one-fourth (23%) of the traditional cohort students and about half (44%) of the hybrid cohort students indicated the online discussion board assignments were *valuable/extremely valuable* based on their preferred learning style. Half (51%) of the traditional cohort students and 55% of the hybrid cohort students felt the online discussion board assignments where *not valuable/somewhat valuable.* Finally, while no hybrid cohort students chose the *neutral* option, about one-fourth (26%) of the traditional cohort students chose the *neutral* option.

Survey questions 12d: *Please rate the following learning activities based on your preferred learning style: Group work.* Based on their preferred learning style, the majority (71%) of the overall participants felt group work was *valuable/extremely valuable.* Of the remaining overall participants, 18% felt group work was *not*

valuable/somewhat valuable, and 11% chose the *neutral* option regarding the value of group work based on their preferred learning style.

Slightly different results occurred from the comparison of responses from students based on their program. Most of the traditional cohort students (72%) and hybrid cohort students (66%) felt group work was *valuable/extremely valuable*. For the option *not valuable/somewhat valuable,* 14% of the traditional and 33% of the hybrid cohort students (33%) chose that response. Similar to the previous survey question, no hybrid cohort students indicated *neutral*, while 14% of traditional cohort students chose that response option.

Survey question 12e: *Please rate the following learning activities based on your preferred learning style: Lab simulations.* The lab simulations were the favorite learning activities among the study participants as the simulations involve hands-on clinical experiences. Nearly all of the respondents (98%) felt the lab simulations were *valuable/extremely valuable*. The remaining 2% of overall participants indicated they were *neutral* regarding the value of the simulations based on preferred learning style. Similar results occurred from the comparison of responses based on program type.

All of the traditional cohort students and most (89%) of the hybrid cohort students felt the lab simulations were *valuable/extremely valuable* based on their preferred learning style. None of the students in either cohort indicated the lab simulations were *invaluable/somewhat valuable* based on their preferred learning style. Finally, while no traditional cohort students chose the *neutral* response, 11% of the hybrid cohort students indicated a *neutral* response regarding the value of the lab simulations.

Survey question 12f: *Please rate the following learning activities based on your preferred learning style: Quizzes/Chapter exams.* Overall, 91% of all participants felt the quizzes/chapter exams were *valuable/extremely valuable* based on their preferred learning style. Only 2% of the respondents felt the quizzes/chapter exams were *not valuable/somewhat valuable*.

The remaining 7% responded *neutral* regarding the value of quizzes/chapter exams based on their preferred learning style. Sorted by cohort type, the majority (98%) of the traditional cohort students and 67% of the hybrid cohort students felt the quizzes/chapter exams were *valuable/extremely valuable* based on their preferred learning style. While 11% of the hybrid cohort students felt the quizzes/chapter exams were *not valuable/somewhat valuable*, none of the traditional cohort students chose that response option. Very few (3%) of the traditional cohort students and 22% of hybrid cohort students indicated they were *neutral* regarding the value of quizzes/chapter exams based on their preferred learning style.

Component three of the survey addressed two questions regarding the overall education students received and whether they would recommend the program to others. The participants had four response options: *strongly agree, agree, disagree, and strongly disagree*. *Strongly agree/agree* responses were combined in the analysis, as well as *disagree/strongly disagree*.

Survey question 13: *I am satisfied with the overall education I received*. When ask about the overall education received, out of both groups, 44 participants responded, of which 95% of the overall participants reported either *agreed or strongly agreed* with a

satisfaction of the level of education received in the dental assisting program. Leaving 5% of the overall participants reporting *disagreed or strongly disagreed*.

A slight difference in responses did occur between students who participated in the traditional dental assisting program and those students who took the course in a hybrid format. The majority of traditional cohort student (97%) and the majority of hybrid cohort students (89%) *agreed or strongly agreed*. This left 3% of traditional cohort students reportedly *disagreeing or strongly disagreeing* with the satisfaction of the program. Eleven percent of hybrid cohort students reporting *disagreed or strongly disagreed* regarding the satisfaction with the overall education they received.

Survey question 14: *I would recommend this dental assisting course to someone else.* Responses to the final question about recommending the dental assisting program were generally positive. Overall, 43 participants answered the last question on the survey. Ninety percent of the overall majority of the traditional cohort students and hybrid cohort students, reported *agreed or strongly agreed* with recommending the dental assisting course to someone else. Leaving 10% of the majority of the overall participants reporting *disagreed or strongly disagreed*.

There was a moderate difference in responses that occurred between the traditional cohort students and hybrid cohort students. The majority of traditional cohort students (97%) and the majority of hybrid cohort students (67%) reported *agreed or strongly agreed*. Three percent of traditional cohort students and 33 % of the hybrid cohort students reported *disagreeing or strongly disagreeing* when asked if they would recommend this dental assisting course to someone else.

Withdrawal rates results. The study's second research question (*What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates, at a Midwest community college?)* was best addressed by using institutional data. Student withdrawal rates were examined for traditional and hybrid cohorts in the dental assisting program for three consecutive years including, 2012, 2013, and 2014. The data were examined using a *t-test* (Bluman, 2014).

The *t-test* is a statistical test used to determine if there is a significant difference between the mean of withdrawal rates between the traditional cohort students and the hybrid cohort students (Bluman, 2014). The withdrawal rates between the students in the traditional course and the students in the hybrid course did not show a significant difference. Therefore, the null hypothesis was not rejected, and the alternative hypothesis was not supported. In Table 4 information gathered from this statistical analysis is displayed.

Table 4

Withdrawal Rate Differences for Traditional and Hybrid Cohorts

Delivery Model	*n*	*M*	*SD*	*t-stat*	*df*	*p*
Traditional	71	9. 7	9. 0	2. 0	4	0. 057
Hybrid	45	29. 3	14. 3			

Note. *n* = numbers in the traditional and hybrid cohorts spanned three period of time. *M* = Mean. *SD* = standard deviation. *t-stat* = t statistic. *df* = degree of freedom. *p* = probability level. Since *p*-value was greater than 0.05 there was no sufficient evidence to reject the null hypothesis at 5% level of significance.

Dental assisting national board results. The study's third research question (*What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college?)* was best addressed by gathering data from the Dental Assisting National Board. Student passage rates of the national certification examination were examined for traditional and hybrid cohort students in the dental assisting program for three consecutive years including, 2012, 2013, and 2014. The data were examined using a *t-test* (Bluman, 2014). The passage rates between the students in the traditional cohort and the students in the hybrid cohort did not show a significant difference. Therefore, the null hypothesis was not rejected. In Table 5 information gathered from this statistical analysis is displayed.

Table 5

Passage Rates of Dental Assistant National Certification Exam

Delivery Model	*n*	*M*	*SD*	*t-stat*	*df*	*p*
Traditional	57	95	5.5	-0.44	4	0.34
Hybrid	28	90	17.3			

Note. *n* = numbers in the traditional and hybrid cohorts spanned three period of time. *M* = Mean. *SD* = standard deviation. *t-stat* = t statistic. *df* = degree of freedom. *p* = probability level. Since *p*-value was greater than 0.05 there was no sufficient evidence to reject the null hypothesis at 5% level of significance.

Summary

The purpose of this quantitative study was to explore if the theory of Communities of Practice influenced student learning. In Chapter Four, data collected and data analysis results of the study were presented. The survey results were presented along with the statistical analyses of withdrawal rates and national certification test results. In Chapter Five, gathered information highlights the findings of the study, the research conclusions in relationship to the literature, implications for future practice, and recommendations for further research.

Chapter Five: Summary and Conclusion

The intention of this study was to determine whether students achieved similar success rates in differing dental assisting programs and to explore variances between traditional and hybrid student achievement outcomes. This quantitative study was conducted by gathering data regarding student success in a dental assisting program that offers both traditional and hybrid programming. Another purpose of this study was to investigate how dental assisting students collaborated in traditional and hybrid programs at a Midwest community college. Identifying of elements of dental assisting student learning success, regardless of the learning platform, can aid in determination of strategies to improve student retention rates and achievement of national certifications (O'Neil et al., 2014).

According to Serrat (2011), Communities of Practice are groups of like-minded individuals who work together to share knowledge with each other. The roles of faculty have changed from being the sole provider of information to acting as a mentor or coach in a blended learning format and a collaborative approach to teaching encourages peer-to-peer interaction and collaboration (Park & Howell, 2015). A review of scholarly literature provided evidence that few studies regarding investigation of whether dental assisting students learn from each other in collaborative learning experiences existed. Traditional and hybrid delivery methods offer differing opportunities for student success based on the format of each program and each provides different aspects of social learning (Glazer, 2012).

In the next five to 10 years, the number of dental assisting positions available will increase due to population growths and a strong emphasis will be on proactive dental care

(Solomon, 2012). The role of the dental assistant is one of fastest growing occupations in the United States (Bureau of Labor, 2015). Christensen, Horn, Caldera, and Soares (2011) noted finding the right people for the right job can be a challenging endeavor. With the recognition of the population growth and the demands for oral health care service, it is important dental assisting programs produce well trained workers to fill this void (Woolfork & Price, 2012).

One solution for reducing unemployment numbers in the oral healthcare industry is to increase the number of trained dental assistant program graduates (Christensen et al., 2011; Solomon, 2012). According to Olmsted (2014):

> Distance learning allows institutions to offer educational programming for nontraditional learners and working professionals and is considered cost-effective, giving institutions flexibility in responding to legislative mandates for higher education reform while completing effectively for students by offering a variety of flexible learning options. (p. 1460)

Creative approaches to accommodate individuals interested in oral healthcare jobs include providing academic opportunities that meet the needs of a diverse student population and applicable certification boards (Bandali, Craig, & Ziv, 2012; Doherty, Sharma, & Harbutt, 2015; Mehta, Hull,Young, & Stoller, 2013; Olmsted, 2014).

Findings

The findings of the study served as a foundation for a deeper understanding of collaborative learning among students placed in a traditional and hybrid dental assisting programs. The data for this study were obtained from a survey instrument presented to current and graduate dental assisting students who attended a specific Midwestern

community college during the academic years 2012-2014. The response data were disaggregated based on two course delivery platforms, traditional and hybrid cohorts.

The separation of data occurred to aid the identification of differences in success rates as measured by student retention and national certification passage rates. The analysis of the data and findings serve as evidence the theory of Communities of Practices is relevant for student success in a Midwest dental assisting program (Blackmore, 2010; Wenger, 1999). Data analysis and findings for each survey and research question are presented in this chapter.

Conclusions are also presented as the findings of the study are discussed in relation to the literature presented. In addition, implications of the study are presented regarding how cooperative learning environments can contribute to dental assisting student success. The chapter concludes with recommendations for future research and a summary of the information presented.

Research question one. *What aspects of social learning theory, specifically Communities of Practice, do dental assisting students at a Midwest community college report as being influential?* This research question was answered by the survey presented to present and past dental assisting students. The following is a summary of the results.

Survey question 6. *While in the program, did you feel you shared knowledge with each other?* Overall, most participants agreed sharing of information was a valuable component of the dental assisting program. All of the traditional cohort participants indicated that sharing of information occurred in the program. Most (78%) of the hybrid cohort participants also indicated sharing of information occurred in their cohort.

Survey question 7. *While in the program, did you feel you learned from each other?* The majority of the overall participants agreed collaboration among classmates was an important component of the dental assisting program. Similar to the previous survey question, comparative differences were identified in responses of traditional and hybrid cohort students. All of the students in the traditional cohort indicated they learned from shared learning exchanges. However, for the hybrid cohort, 78% of the participants indicated they learned from shared learning experience.

Survey question 8. *How much effort did you put into your homework?* Survey question eight was subdivided to gather information about four specific time periods of effort devoted to homework: 8a) *1-5 hours per week,* 8b) *6-10 hours per week,* 8c) *11-20 hours per week,* 8d) *21-30 hours per week,* and 8e) *more than 30 hours per week.* Only 9% of the overall participants reported spending *1-5 hours per week* on homework. Specifically, only 6% of the traditional cohort students and 22% of the hybrid cohort students reported they spent *1-5 hours per week* completing homework. While no hybrid cohort participants indicated they spent *6-10 hours per week* toward homework each week, 14% of the traditional cohort students indicated they spent that much time on homework.

Overall, 47% of the participants indicated they spent *11-20 hours per week* completing homework. For that same period, the comparative difference in the cohort responses was 50% of traditional cohort students and 33% of hybrid cohort students. Most of the students in the traditional cohort reported spending *11-20 hours per week* on homework. Of all participants, 24% reported spending *21-30 hours per week* on

homework. The comparative difference between the cohorts for that period was 22% for traditional students and 33% for students in the hybrid course.

The final response option for survey question eight was *more than 30 hours per week.* Overall, 9% of participants chose that option. The comparative difference between the responses from cohorts regarding spending *more than 30 hours per week* on homework, more than 30 hours per week was 8% of traditional students and 11% hybrid students.

Survey question 9. This survey question was subdivided into five topics: 9a) *how important was it for you to collaborate with your classmates,* 9b) *how important was it for you to create a cooperative learning environment,* 9c) *how important was it for you to work together on group activities,* 9d) *how important was it for you to learn and share areas of interest,* and 9e) *how important was it for you to make new friends?* The questions were intended to aid in the investigation of the influence of the theory of Communities of Practice. Overall, the majority of students in both the traditional and hybrid cohorts reported each topic for the ninth survey question was *important/very important*. This finding is evidence of Communities of Practice matters for relationships among students and their sense of belonging (Serrat, 2011).

Survey question 10. As with survey question nine, this survey question was subdivided into five topics: *How helpful were the following activities*: 10a) *collaborating with your classmates,* 10b) *creating a cooperative learning environment,* 10c) *working together on group activities,* 10d) *learning and sharing area of interest,* and 10e) *making new friends.* The questions were intended to aid in identifying the benefit of the course activities. The majority of all participants reported, both traditional and hybrid, each

topic as *helpful/very helpful* for them while in the dental assisting program. Again, this finding supports the proposition that the Communities of Practice theory is a fundamental advantage of a dental assisting program.

Survey question 11. Similar to survey questions nine and 10, this survey question was subdivided into five topics based on frequency: *How frequently did you:* 11a) *collaborate with your classmates*, 11b) *create a cooperative learning environment*, 11c) *work together on group activities,* 11d) *learn and share area of interest,* and 11e) *make new friends?* The results provided evidence a large majority of students preferred working with each other while in the dental assisting cohorts. There was little to no comparative difference between the two cohorts when asked how frequently the students interacted with each other. These results provide evidence the Community of Practice theory is relevant in the interaction among both traditional and hybrid dental assisting students.

Survey question 12. Survey question 12 was subdivided based on seven activities in relation to preferred learning style: *Please rate the following learning activities based on your preferred learning style:* 12a) r*eading assignments,* 12b) *chapter workbook assignments*, 12c) *general assignments*, 12d) *online discussion board assignments*, 12e) *group work,* 12f) *lab simulations*, and 12g) *quizzes/chapter exams.* This survey question resulted in some of the most interesting findings in the study. The participants reported lab simulations, quizzes/chapter exams, and general assignments were the best learning activities based on their preferred learning style. Additionally, respondents reported learning activities with lower preference were chapter workbook assignments, group work, and reading assignments. The online discussion board activity was rated the

lowest preference by all of the participants regardless of their traditional or hybrid cohort involvement. The response results for survey question 12 provided evidence students prefer gaining knowledge through collaboration and hands-on activities such as lab simulations.

Survey question 13**:** *I am satisfied with the overall education I received.* The respondents were asked to rate their satisfaction with the overall education they received while in the dental assisting program. Overall, the participants responded highly favorable regarding the education they received. The responses were complimentary of the dental assisting program and education the students received at the Midwest community college represented in the study.

Survey question 14**:** *I would recommend this dental assisting course to someone else.* This survey question was presented to gain responses regarding whether the participants would recommend the dental assisting program to others. The responses to this last survey question were generally affirmative with the majority of participants stating they would recommend the dental assisting program to others. Again, this question resulted in complimentary feedback from most of the respondents for the dental assisting program and the education the participants received.

Research question two. *What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates, at a Midwest community college?* This research question was answered by conducting a statistical analysis of withdrawal rates of students in both the traditional and hybrid dental assisting courses. There were no statistically significant differences between course delivery and withdrawal rates.

Research question three. *What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college?* This research question was answered by conducting a statistical analysis of the dental assistant national board examination scores of students in both the traditional and hybrid dental assisting courses. There were no statistically significant differences between course delivery and the dental assistant national examination scores.

Conclusions

It is important to review the data collected and compare them to the literature reviewed in this study. In this section, the findings of this study are compared to existing scholarly research. In addition, a discussion reflecting participant responses in terms of assigned category and research questions is presented.

Research question one. *What aspects of social learning theory, specifically communities of practice, do dental assisting students at a Midwest community college report as being influential?* The findings in the study align with the theory of Community of Practice research included in Chapter Two. The results from the survey and the reviewed literature supported the premise that students do like to work together and learn from each other while in the dental assisting program, regardless of delivery method used. According to Jimenez-Silva and Olson (2012) students can be a part of the learning process by applying what they have learned in the classroom through working with each other and professionals in their community.

Polin (2010) explained the two foundational concepts of the theory: community and practice. The term community can be defined as groups of people having common interests and sharing common activities (Polin, 2010; Wegner 1998). The term practice can describe the act of performing particular activities regularly in order to become proficient at those activities (Bonnel & Smith, 2010; Jimenez-Silva & Olson, 2012; Polin, 2010; Wenger, 1999).

Sargeant (2009) purported members of a group who work together and share knowledge create a strong collaborative work environment. According to Wenger (1999), the main qualities to learning consist of commitment, imagination, and alignment. Blackmore (2010) also supported social learning theory by stating "these qualities come from an approach that builds on the learners' experiences to the extent that those who engage with it are encouraged to integrate the many different dimensions of their learning" (p. 35).

The Communities of Practice theoretical framework and foundational concepts, community and practice, were evident in the survey results. The participant responses in both the traditional and hybrid formats confirmed collaboration and sharing of information occurred in their cohorts. The traditional cohort students and hybrid cohort students liked to work together and learn from one another while in the dental assisting program.

Research question two. *What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by withdraw rates, at a Midwest community college?* The second research question to guide this study was addressed through the collection of de-identified data

from the Midwest community college's institutional research department. The results obtained were not significant and the null hypothesis was not rejected. It appears from this study that both instructional methods, traditional and hybrid, are preparing students for successful completion of the dental assisting program.

In the early days of dental assisting, dental professionals recognized a need for formal education and different types of instructional methodologies to prepare workers for success in the dental profession (Finkbeiner & Johnson, 1995; Glazer, 2012; Woolfolk & Price, 2012). In the past, a college education was not always accessible for students (Polin, 2010), including the availability of technical education programs such as dental assisting. For instance, in the past students went to college spending many hours sitting in a classroom listening to a lecturer (Glazer, 2012, McFarlane, 2011). Moreover, traditional instructors had a tendency to teach in the same manner as they experienced in school (Jimenez-Silva & Olson, 2012).

There are many historical obstacles in traditional education, which has made change in methodologies difficult (Glazer, 2012). Traditional learning has evolved with technology and benefits are being realized (Polin, 2010). Research of scholarly literature presented in Chapter Two provided evidence online and hybrid education is the modern improvement over past types of distance education and correspondence courses.

Research question three. *What statistically significance difference exists between course delivery (i.e., traditional or hybrid courses) and dental assisting students' success as measured by passing rates on the Dental Assisting National Board certification examinations at a Midwest community college?* The third research question to guide this study was addressed through collection of de-identified data from the Dental

Assisting National Board. The results obtained were not significant and the null hypothesis was not rejected. It appears from this study that both instructional methods, traditional and hybrid, are preparing students for successful completion of the dental assisting program.

In 1954, the first dental assisting correspondence courses were launched at the University of North Carolina (Finkbeiner & Johnson, 1995). Phinney and Halstead (2013) stated the correspondence program consisted of a 104-hour curriculum designed to provide formal education and accessible credentials for employed dental assistants. This novel approach was an attempt to resolve a shortage of academic facilities for formal education of dental assistants (Finkbeiner & Johnson, 1995).

According to McFarlane (2011) there is one thing all educational environments have in common despite differences in instructional methodologies. There was evidence all educational environments provided students with social growth, well-being, and personal development (McFarlane, 2011). The premise of this study was there was no difference between the different delivery methods of success measurements of passing the national examination giving dental assistants the credentials as a Certified Dental Assistant (CDA). The consistency or lack of difference shows all students gained the knowledge and skills required to pass the national certification regardless of the course delivery format.

Implications for Practice

Implications are explanations of possible future effects or results (Creswell, 2014). The implications of this study provide broad significance for the profession of dental assisting and other healthcare programs. This study has implications for other

colleges and institutions considering implementation of a hybrid dental assisting or similar programs.

Implications of the Communities of Practice theory are applicable within many healthcare academic programs (Bonnel & Smith, 2010). In order to combat high unemployment, along with vacancies in dental assisting, it appears educational programs that produce individuals to fill those positions is necessary to resolve the shortage of dental assistants (Christensen et al., 2011). The use of modern technology to provide access to education is an important strategy in academia (Bonnel & Smith, 2010; Glazer, 2012). This study demonstrated little or no comparative difference between students in the traditional dental assisting program and students in the hybrid dental assisting program.

In the future, online learning will be an important element in education (Xu & Jaggars, 2013). From a student's perspective, online or hybrid learning is convenient, particularly for adult students who have multiple responsibilities and busy scheduled lives (Bonnel & Smith, 2010; Caulfield, 2011; Cowan, 2012; Ryan, Kaufman, Greenhouse, She, & Shi, 2015). From an educational institutional perspective, online or hybrid modalities provide alternative access options for potential students, increases enrollment, and improves retention (Ryan et al., 2015; Xu & Jaggars, 2013). As educational institutions faces changing student demographics, innovative approaches for teaching dental assistants are needed to meet the demands for modern-day learners.

Recommendations for Future Research

It is expected this quantitative study will be valuable for educational institutions, especially those institutions offering or considering accredited dental assisting programs.

As the student population evolves and technology advances, so should instructional methodologies (Woolfolk & Price, 2012). This study is not intended to replace traditional learning but is intended to highlight evolving technologies accessible for students. Based on the findings of this study, the following recommendations are offered for future research consideration.

One limitation of this study was the geographic area of the research was limited to one community college in the Midwestern United States. A larger study sample from a statewide or national pool of participants may yield more or different information regarding influences of instructional methodologies for dental assisting students. A larger sample of students may further address the research questions and confirm or add to the findings, especially if from a national perspective.

The dental assisting occupation has not been well researched by scholarly investigators. Emphasis could be placed toward research focused on the importance of how dental assistants interact with other dental workers. Further exploration of the dental assisting profession with emphasis of many different factors could add to the success of the students, institutions, workers, and employers.

Further scholarly research for the study of other variables affecting collaborations between students in a dental assisting program would be valuable. The findings of this study provided evidence students benefitted from collaborations and such experience enhanced student success. Another opportunity for further study may be investigation of causes for student withdrawal, voluntarily or otherwise, from traditional and hybrid programs. A scholarly study of the demographics of traditional and hybrid cohort students may enhance the presented study. For example, further investigation could be

conducted focused on traditional and hybrid dental assisting students and effects based on marital status, employment, and number of dependents while in the dental assisting program.

Summary

Chapter One introduced the importance of this study and focused on the education of dental assistants. According to the Bureau of Labor (2015), dental assisting is one of the fastest growing occupations in the United States. In order to keep up with the growth, using different delivery platforms for educating dental assistants were discussed (O'Neil et al, 2014). According to Olmsted (2014), "Colleges, universities, and postsecondary education are increasingly using distance education" (p. 1460).

In order to refine student educational results, it was essential to understand which factors cause dental students to take advantage of today's technologies in dental assisting programs (Amyot & Brockman, 2011). The theoretical foundation of social learning, specifically the theory of Communities of Practice, served as a theoretical framework for this study. According to Bandura (1977), social learning theory places emphasis on interpersonal relations and focuses on the study of cognitive processes through which observation can become a source of learning. Dental assistants learn primarily by observation and preceptor experience (Bird & Robinson, 2015).

In Chapter Two a review of scholarly literature to provide a deeper understanding of the theory of Communities of Practice, the profession of dentistry, the history of dental education, and different learning formats including traditional, online, and hybrid learning environments was included. The literature served as a foundation for evidence there are strong links between social learning theory, online and hybrid learning

opportunities, and authentic learning in communities of practice. The information in Chapter Two highlighted the value of Communities of Practice and ways in which dental assisting students interact with others in the dental assisting program for enhancement of their learning experience.

The literature also provided a historical look at dentistry and dental education supporting shared learning and collaboration throughout the times. In earlier literature, dentistry was described as an apprenticeship occupation. According to Wenger (1999), apprenticeship is supported by the theory of social learning, specifically communities of practice. Wenger (1999) defined communities of practice as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (p. 1).

Lastly, the review of literature focused on the different learning environments seen in classrooms today including traditional learning, online learning, and hybrid learning. Traditional education is established in physical location where students assemble to meet to learn (Polin, 2010). Online learning requires a computer, technology, and a learning system platform (Olmsted, 2014). Hybrid learning involves the integration of traditional learning and online learning (Park & Howell, 2015).

Technology is changing the way education is delivered and giving opportunities to others in a nontraditional way. According to Park and Howell (2015), "A 2010 U.S. Department of Education report documented that instruction combining online and face-to-face elements was more effective than either face-to-face or online instruction alone" (p. 563). This literature revealed many decisions are being made in how to use

technology in the classroom, yet there is little in the literature about the preferences of dental assisting students.

The information presented in Chapter Three served to define the selected quantitative study methodology intended for collection and analysis of data. A survey was used to gather information from graduates and current dental assisting students and was analyzed via descriptive statistical methods. A group of dental hygiene students piloted the survey, and then changes were made to the survey prior to sending it out to the participants.

Additionally, the de-identified data from retention rates and national certification passage rates were analyzed using an inferential statistical method. The de-identified data gathered provided evidence of the value of the Communities of Practice theory as a beneficial foundation for student learning enhancement (Wenger, 1999). All ethical and legal standards were followed to ensure the accuracies of the quantitative data collected, including the rights and wellbeing of the research participants.

The results of the data collected were presented in Chapter Four. Survey response information presented in Chapter Four included information regarding several relevant factors of student learning in the traditional and hybrid programs as necessary for investigation of Research Question One. The data analysis was presented as from survey responses, including demographic and collaboration factors. The comments in the chapter provided details about the gathered data for each survey question and statistical difference among and between responses from students in traditional and hybrid programs.

Data were presented regarding institutional withdrawal rates as relevant for Research Question Two in terms of different course delivery methods. A collection of withdrawal rates from three consecutive years included 2012, 2012, and 2014. No significant difference was shown between the retention rates between the traditional students and the hybrid students and the null hypothesis was not rejected.

Finally, information in Chapter Four served to address Research Question Three in terms of different course delivery and regarding national board exam success rates for dental assisting students. Again, the data were collected from the same three consecutive years 2012, 2013, and 2014. There were no significant differences shown between the traditional students and the hybrid students. Again, the null hypothesis was not rejected.

To finish the study, the information presented in Chapter Five highlighted the interpretation of the data presented in Chapter Four. The findings showed the theory of Communities of Practice is relevant in traditional and hybrid dental assisting programs. Olmsted (2014) pointed out sharing of knowledge fortifies the learners ability to comprehend the taught information (Olmsted, 2014).

Collaborations involving lab simulations, quizzes/chapter exams, and general assignments were noted as the most preferred activities among all participants. The least preferred activities were chapter workbook assignments, group work, reading assignments, and least of all, the online discussion board activities.

The results of this study suggested a hybrid learning methodology for delivering dental assisting education was as effective as traditional means. As described previously, this study invites opportunities for further study in the dental assisting and healthcare

industry. Academic institutions can use the information to examine effective methods for delivering instruction and determine plans to increase the success of their students.

Appendix A

Survey

Thank you for agreeing to complete this survey. It will be used for academic research in an attempt to explore the impact of Communities of Practice in a dental assisting course with different formats. Community of Practice theory is based on groups of individuals who come together to share and learn from one another. Communities of Practice are groups of individuals who have worked together and have developed a common sense of purpose and a desire to share knowledge (Wenger, 1999).

The attached survey should take approximately 10 to 15 minutes to complete. Your response is voluntary and anonymous; responses will be kept confidential and used strictly for this study. If you have any questions about the survey, contact me by email at [redacted]

Please follow the link below to complete the survey: http:/[redacted]

---

1. What type of dental assisting program did you enrolled in or have completed?
    - Traditional dental assisting program
    - Hybrid dental assisting program

2. What were your reasons for choosing this program format? (You may choose more than one option.)
    - Convenience
    - Job responsibilities
    - Family responsibilities
    - Desired/anticipated graduation date
    - Only option
    - Others _____

3. What is your age?
    - 18-24 years old
    - 25-35 years old
    - Over 35 years old

4. What is your sex?
    - Female
    - Male
    - Prefer to not answer

5. What is your prior education?
    - High school graduate
    - GED certificate
    - 2-year college or trade school, but not graduated
    - 4-year college, but not graduated
    - Graduated with an Associate's degree
    - Graduated with a Bachelor's degree or higher

6. While in the program, did you feel you shared knowledge with each other?
    - Yes
    - No

7. While in the program, did you feel you learned from each other?
    - Yes
    - No

8. How much effort did you put into your homework?
    - None
    - 1-5 hours per week
    - 6-10 hours per week
    - 11-20 hours per week
    - 21-30 hours per week
    - More than 30 hours per week

9.

How important was it for you to:					
	Not very Important	Important	Neutral	Somewhat Important	Very Important
	1	2	3	4	5
collaborate with your classmates?					
create a cooperative learning environment?					
work together on group activities?					
learn and share areas of interest?					
make new friends?					

10.

How helpful were the following activities:					
	Not very Important	Important	Neutral	Somewhat Important	Very Important
	1	2	3	4	5
collaboration with your classmates?					
creating a cooperative learning environment?					
working together on group activities?					
learning and sharing areas of interest?					
making new friends?					

11.

How frequently did you:					
	Not very Frequently	Frequently	Neutral	Somewhat Frequently	Very Frequently
	1	2	3	4	5
collaborate with your classmates?					
create a cooperative learning environment?					
work together on group activities?					
learn and share areas of interest?					
make new friends?					

12.

Please rate the following learning activities based on your preferred learning style:					
	Not Valuable	Valuable	Neutral	Somewhat Valuable	Extremely Valuable
	1	2	3	4	5
Reading assignments					
Chapter workbook assignments					
Online discussion board assignments					
Group work (table clinics, role playing, state comparisons)					
Lab simulations					
Quizzes/Chapter exams					

13. I am satisfied with the overall education I received.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

14. I would recommend this dental assisting course to someone else.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

Appendix B

LINDENWOOD

LINDENWOOD UNIVERSITY ST. CHARLES, MISSOURI

DATE:	October 23, 2014
TO:	Janet Sell, Ed. D
FROM:	Lindenwood University Institutional Review Board
STUDY TITLE:	[579254-1] Traditional and Hybrid Dental Assisting Programs: An Exploration of Design and Optimal Outcomes for Community College Students
IRB REFERENCE #:	
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
APPROVAL DATE:	October 23, 2014
EXPIRATION DATE:	October 23, 2015
REVIEW TYPE:	Expedited Review

Thank you for your submission of New Project materials for this research project. Lindenwood University Institutional Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to the IRB.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the completion/amendment form for this procedure. Your documentation for continuing review must

be received with sufficient time for review and continued approval before the expiration date of October 23, 2015.

Please note that all research records must be retained for a minimum of three years.

If you have any questions, please contact Robyne Elder at (314) 566-4884 or relder@lindenwood.edu. Please include your study title and reference number in all correspondence with this office.

If you have any questions, please send them to IRB@lindenwood.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Lindenwood University Institutional Review Board's records.

Appendix C

Permission Letter from Institution

Lindenwood University
School of Education
209 S. Kingshighway
St. Charles, Missouri 63301

Permission Letter from Institution

Date: August 26, 2014

Dear [redacted]

I am conducting a research study titled, *Traditional and Hybrid Dental Assisting Programs: An Exploration of the Design and Optimal Outcomes for Community College Students*, in partial fulfillment of the requirement for a doctoral degree at Lindenwood University.

The purpose of this quantitative study is to explore the factors involved with a Midwest dental assistant program which offers two platforms of classroom delivery of instruction. It is hopeful this study's findings will contribute to the importance of offering multiple platforms of delivery to educating dental assistants and ultimately provide more opportunities for professional dental assistants to enter the workforce, thereby relieving the shortage in oral healthcare professions.

I am seeking your permission as the Principal Investigator in this study to contact the faculty and staff at your institution that may be interested in participating in this study.

Participation in the study is completely voluntary. The participants may withdraw from the study at any time without penalty. The identity of the participants and the institution will remain confidential and anonymous in the dissertation or any future publications of this study.

Please do not hesitate to contact me with any questions or concerns about participation in the study. A copy of this letter and your written consent should be retained by you for future reference.

Yours truly,

Janet A Sell
Doctoral Candidate
Lindenwood University

Permission Form

I, [redacted] grant permission for the instructors and staff of Allied Health to be contacted regarding participation in the study, *Traditional and Hybrid Dental Assisting Programs: An Exploration of the Design and Optimal Outcomes for Community College Students,* by J[redacted]

By signing this permission form, I understand that the following safeguards are in place to protect those who choose to participate:

1. The participants may withdraw from the study at any time without penalty.

2. The identity of the participants and the institution will remain confidential and anonymous in the dissertation or any future publications of this study.

I have read the information above, and any questions that I have posed have been answered to my satisfaction.

[redacted]

Signature | 9-11-14 Date

Appendix D

LINDENWOOD

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Traditional and Hybrid Dental Assisting Programs: An Exploration of Design and Optimal Outcomes for Community College Students

Principal Investigator: [redacted] Telephone: [redacted]

Participant: _____

Contact info: _____

1. You are invited to participate in a research study conducted by Janet Sell under the guidance of Dr. Sherry DeVore. The purpose of this research is to explore the factors involved with a dental assisting program where two platforms (traditional and hybrid) of delivery are offered.

2. a) Your participation will involve:
   - Taking an online survey from FluidSurveys.com.
   - The amount of time involved in your participation will be a 10-15 minutes.
   - Approximately 40-60 people will be involved in this research.

3. There are no anticipated risks associated with this research.

4. There are no direct benefits for you participating in this study. However, your participation will contribute to the knowledge about the different factors associated with a traditional and hybrid dental assisting program and may help society.

5. Your participation is voluntary, and you may choose not to participate in this research study or to withdraw your consent at any time. You may choose not to answer any questions that you do not want to answer. You will NOT be penalized in any way should you choose not to participate or to withdraw.

6. We will do everything we can to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study and the information collected will remain in the possession of the investigator in a safe location.

7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, [redacted] or the Supervising Faculty,

Dr. Sherry DeVore, 417-881-0009. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Jann Weitzel, Vice President for Academic Affairs at 636-949-4846.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

_____	_____
Participant's Signature Date	Participant's Printed Name
_____	_____
Signature of Principal Investigator Date	Investigator Printed Name

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Vita

Janet Sell has been employed at Ozarks Technical Community College (OTC) since 1999 and enjoys teaching in the dental assisting and hygiene programs. Janet serves as the Dental Assisting Program Director and an instructor at the college. Prior to college employment, Janet worked as a certified dental assistant in private practices. Throughout the years, she has created, directed, and participated in numerous continuing education dental events and seminars at the local and state levels.

For the last 10 years, Janet has served as a curriculum consultant for the Commission on Dental Accreditation and has worked with the Missouri Department of Elementary and Secondary Education at the University Central Missouri serving as an instructor in the Career Technical Education Department. Janet has served on many professional organization boards, including the Missouri Dental Assistants Association, Springfield Dental Assistants Society, and Missouri Dental Assisting Educators.

Janet Sell holds a certificate in dental assisting, an A.A.S. in Occupational Education, a B.S. and M.A. in Communications, and a Certificate of Advanced Graduate Studies in Higher Education Leadership. She is a certified online instructor, an alumnus of the OTC Leadership program, and the inaugural OTC Chancellor's Leadership Academy. Janet has received formal recognition of achievement for her work, including a 2013 Excellence in Education award.

Janet Sell lives with her husband, David, and their two dogs, in Springfield, Missouri. She enjoys boating, spending time with family and friends, and traveling. Janet is actively involved in the community, such as overseeing a dental endowment scholarship program and providing volunteer services at charitable dental events.