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Discovering the Best Practices for Design and Development of High School Online

Physical Education: A Phenomenological Study

A Dissertation by

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Irvine, California

School of Education

Submitted in partial fulfillment of the requirements for the degree of

Doctor of Education in Organizational Leadership

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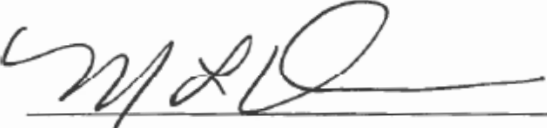
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Discovering the Best Practices for Design and Development of High School Online

Physical Education: A Phenomenological Study

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I would like to like to share my appreciation and gratitude to the people who made my research successful and assisted me to complete my dissertation.

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To my children Ross and Marina, thank you for your support. I promise no more writing during the holidays. I look forward to seeing where you go on your educational journeys as both of you were my constant companions on mine. You were both inspirational to me and the reasons I have pursued my education this far. I love you both.

DEDICATION

This work is dedicated to my maternal Granddad, Paul C. Minnick. You taught me unconditional love. You left me far too early, but your memory and spirit reside in me. You are a beautiful memory and I want you to feel pride as you watch over my success. This is for you, Granddad.

"If there ever comes a day when we can't be together, keep me in your heart; I'll stay there forever."

– Winnie the Pooh

ABSTRACT

Discovering the Best Practices for Design and Development of High School Online

Physical Education: A Phenomenological Study

by Marie Crosby

Purpose: Online physical education (OLPE) is a burgeoning field with questions and

disadvantages that must be addressed for its continued growth. With out-of-date

guidelines and best practice not established for OLPE, curricula get designed and

developed without consistency. Current standards are needed to assess the design of

OLPE curricula to ensure courses meet state and/or national standards, and quality

guidelines for the online environment. The purpose of this qualitative study was to

identify and describe the best practices used in the design and development of high

school OLPE curricula based on the International Association for K-12 Online Learning

(iNACOL) National Standards for Quality Online Courses, as reported by OLPE

curriculum design experts.

Methodology: This phenomenological qualitative study collected data using interviews

of 13 OLPE curriculum design experts throughout the United States. Semi-structured

interview questions aligned to the iNACOL National Standards for Quality Online

Courses were utilized for this study. Artifacts were also collected to add to the

qualitative data. After the data were collected and transcribed, the coding process began

and themes were identified.

Findings: The study revealed 21 best practices used in the design and selection of

content, instructional design, assessments, and technology integration, as well as ways to

evaluate curriculum effectiveness and support teachers based on the iNACOL National

Standards for Quality Online Courses.

Conclusions: By identifying the best practices associated with the design and

development of high school OLPE curricula, curriculum designers can develop courses

equivalent to and potentially superior to face-to-face high school physical education

courses.

Recommendations: Further research is recommended to replicate this study utilizing a

quantitative method to further validate this study's findings and add to the sparse

literature regarding best practice for high school OLPE curricula.

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CHAPTER I: INTRODUCTION

A student rolls out of bed, eats breakfast, and puts on her smartwatch and heart rate monitor. After completing 30 minutes of exercise, she pulls out her tablet and makes sure the data from her smartwatch transferred to her health monitoring application for review by her online physical education (OLPE) teacher. She then logs into Blackboard and begins her physical education (PE) lesson for the day, calculating her target heart rate. This student, like a growing number of students across the United States, is taking online courses to fulfill her high school graduation requirements.

Throughout the United States, students typically engage in PE at school. Considering students spend a considerable amount of time at school, schools have an obligation to provide opportunities for physical activity, including quality PE (Lyons, Tate, Komoski, Carr, & Ward, 2012; U.S. Department of Health and Human Services [HHS], 2008). When designed and delivered appropriately, high-quality PE programs can increase short- and long-term health benefits, and form students with the potential to become active adults (Lyons et al., 2012; HHS, 2008). However, this potential was often not realized due to lack of quality face-to-face programs and conflicting school policies, including political and economic pressures to improve test scores (Trout & Graber, 2008).

The 21st century brought changes to education, including multiple instructional models for high school students. Many high school students can now earn credit and satisfy graduation requirements through online courses, including OLPE. Currently, more than half the states offer OLPE courses that earn graduation credits (Daum & Buschner, 2012). OLPE provides a solution for high school students (1) needing PE

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credits but were unable to accommodate the course in their regular schedule, (2) needing make-up credits, or (3) looking for alternatives to traditional PE classes (Mohnsen, 2012). Students were also drawn to an educational opportunity that closely resembled their preferred technology-integrated lifestyle (Revere & Kovach, 2011). The cost savings related to online classes made it attractive to administrators as well (Daum & Buschner, 2012).

Despite their growing popularity, none of the existing OLPE programs are research-based (Kooiman, Sheehan, Weselek, & Retegui, 2017; Mohnsen, 2012; National Association for Sport and Physical Education [NASPE], 2007). Also, the *Initial Guidelines for Online Physical Education* (NASPE, 2007) were written in 2007 and noted:

- Students should demonstrate competency in basic movement concepts and motor skills through an assessment of physical fitness, and a foundational knowledge of PE.
- Students should learn how to navigate the internet, download instructional videos, and participate in webinars and podcasts.
- Students should have access to, and familiarity with, computer technology, the internet, and basic software such as Microsoft Word and PowerPoint.
- Students should demonstrate and understand safety procedures and protocols when performing movements and exercises.
- Students should demonstrate time management skills to work independently in a self-paced online course.

- Students and parents should complete an honor code contract that includes information on internet safety, plagiarism, and copyrights, and accuracy of documenting physical activity time for the student.

- Teachers should require an initial in-person or phone-based parent/student orientation meeting with additional student-teacher meetings before the student completes the course.

- Parents must agree to supervise and assist when needed with OLPE learning.

The rapid growth of technology made many of these initial guidelines obsolete. With out-of-date guidelines and best practice not established for OLPE, developed curricula lacked consistency (Kooiman et al., 2017).

Any of the concerns that plagued OLPE classes were also concerns in face-to-face PE classes. High school PE should provide students with health-related skills and knowledge to become and remain physically active and fit throughout their lives. However, a disproportionate number of PE programs failed to deliver (Trout & Graber, 2008). Many reforms took place to ensure quality face-to-face PE, but PE courses remained only as good as the quality of the program. Many adults today experienced a "roll-out-the- ball" PE teacher who took roll-call, poured the balls out of the equipment bag, and then sat in his or her chair to watch or sometimes read. Even some current face-to-face programs resemble roll-out-the-ball models or rely on recreational models that do not meet the standards of a quality PE program (Dodds & Locke, 1984; Mitchell, 2005).

OLPE is a burgeoning field with questions and disadvantages that need to be addressed for its continued growth (Mohnsen, 2012). Sparse research provided little support for the use of OLPE as effective for providing students with the opportunities and

knowledge to become physically active and health literate (Barbour, 2013; Buschner, 2006; Cavanaugh, Barbour, & Clark, 2009; Daum & Buschner, 2012; Kooiman, 2014; Mohnsen, 2012; Reed, 2012; J. Rice, 2006; Trent, 2016; Yang, Smith, & Graham, 2008). Many OLPE programs were fitness-based and not comprehensive PE programs inclusive of knowledge, social, and cooperative skill development. This created concerns regarding accountability of student learning and performance, and accountability of student engagement in physical activity.

Despite its drawbacks, OLPE is and will remain an option for PE credit for high school students, but there is a need to examine OLPE to ensure courses are designed and developed with instructional best practices (Mosier, 2012; NASPE & AHA, 2012; Society of Health and Physical Educators [SHAPE] America, AHA, & Voices for Healthy Kids, 2016; Trent, 2016). Current standards are needed to assess the design of OLPE to ensure courses meet state and/or national standards and quality guidelines for the online environment (Trent, 2016).

Background

PE is a content area of study in schools that assesses student learning based on standards and benchmarks. In K-12 curricula, the instruction focuses on motor skills, knowledge, and behaviors of healthy and active living, physical fitness, sportsmanship, self-efficacy, and social-emotional intelligence. Fitness, gross motor skills, and health are all developed in the K-12 PE classroom. The development of PE in the United States continues to be diverse.

Face-to-Face Physical Education

PE was viewed with multiple levels of enthusiasm throughout history, but its importance in promoting good physical and mental health led to its enduring presence throughout the history of public education. Many concepts and principles important to that history helped shaped PE today.

Physical education in schools. PE promotes physical active among students (Centers for Disease Control and Prevention, 2006; Kretchmar, 2008; Pangrazi, Beighle, & Pangrazi, 2009). Beginning in the 19th century, PE was a part of the public school day with a focus on fitness. Yet today, there is a growing concern with the child obesity epidemic (Cawley, Meyerhoefer & Newhouse, 2006; NASPE, 2007; Pangrazi, Beigle, & Pangrazi, 2009), related health problems (Center for Disease Control and Prevention, 2016; Thunfors, Collins & Hanlon, 2009), and sedentary lifestyles that plague students' health. Sallis et al. (2001) identified the two primary goals of PE as: (1) preparing students for a lifetime of physical activity, and (2) engaging students in physical activity during the school day.

Curriculum models. Curricula were typically selected at the local level based on national and state standards, and adopted programs varied in form and structure (Lonsdale et al., 2013). The three primary models identified in the literature were movement education, fitness education, and sport education. However, schools were responsible for analyzing PE curricula to ensure the selected model was developmentally appropriate, inclusive, and taught students about the importance of leading a physically active lifestyle (Lonsdale et al., 2013).

Movement education. Movement was a central focus of PE since the 1800s as students focused on using their bodies for self-expression (Ables & Bridges, 2010). During the 1960s, the focus shifted to function and application of movement. Stevens-Smith (2004) outlined three domains (cognitive, psychomotor, and affective) and four movement concepts (body, space, effort, and relationships) that evolved during that time. The NASPE (2004) acknowledged the importance of movement by addressing it in the National Standards for Physical Education, noting students should engage in movement along with other games, sports, and physical activities.

Sport education. Daryl Siedentop (1994) introduced the sport education model. Students participated on teams in multiple units that mimicked professional sports. These were often planned in conjunction with sports seasons (Siedentop, 1994). However, little research was completed on the effectiveness of students developing motor skills or fitness using this model (Wallhead & O'Sullivan, 2005).

Fitness education. The fitness education model focused on the science behind why students needed to be physically active. Physical activity was identified as essential to a healthy lifestyle and behavior change was believed to come from a student's understanding of fitness (NASPE, 2012). Lonsdale et al. (2013) conducted a meta-analysis of studies using PE curricula that incorporated fitness activities and found a significant increase of moderate to vigorous physical activity time.

Fitness assessment. Health-related fitness was always a critical theme in PE with an emphasis on physical fitness. Fitness assessments measured muscular fitness, flexibility, and abdominal strength, and health studies dating back to WWI pointed to a lack of physical fitness and a need for PE (Wuest, 2003). Based on such studies, most

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schools included PE as part of their curricula, and in 2010 NASPE developed a position statement on the appropriate use of fitness assessments.

Quality physical education programs. Effective PE programs should include the components specified by NASPE's *Characteristics of a High-Quality Physical Education Program* (2009). Including these characteristics ensured the materials promoted students to become knowledgeable and skillful in all forms of physical activity to ultimately achieve a healthy lifestyle. The NASPE (2004) also ensured student learning through six standards that included knowledge, skills, behaviors, and confidence.

A standards-based curriculum was not sufficient for implementing high-quality PE programs in schools. In secondary schools, teachers needed to be certified PE specialists to ensure students could achieve the standards; Sallis et al. (2001) found PE specialists provided longer and more meaningful opportunities for students to meet physical activity guidelines compared to classroom teachers. However, the quality and number of PE teacher education programs needed further research to guarantee a continued pool of qualified teachers (College Board, 2016). Ongoing professional development was also essential in quality programs as Martin, Mccaughtry, Hodges-Kulinna, and Cothran (2008) found PE teachers who engaged in regular professional development increased their ability to instruct students on motor skills, physical activity, fitness, and social objectives. Quality professional development was essential to both novice and veteran teachers for continued quality PE (Martin et al., 2008).

Online Instruction

Although technology was quickly integrated into daily life in the United States, public schools were slow on their integration (Tucker, 2007). Online provided students

with instruction that included familiar technology (Tucker, 2007). A growing number of students were expected to complete at least one online class during their education experience (Barbour & Reeves, 2009; Brown, 2012; Watson, Murin, Vashaw, Germin, & Rapp, 2012). Attendance in virtual schools was increasing by approximately 30% per year in the United States (Beem, 2010; iNACOL, 2013; Young, 2010). The three predominant types of virtual K-12 schools were statewide public virtual schools, district-run virtual schools, and district-run virtual schools using proprietary vendors (Beem, 2010).

A 2009 U.S. Department of Education meta-analysis was conducted using the findings from 51 published studies (Means, Toyama, Murphy, Bakia, & Jones, 2009). Although the meta-analysis highlighted a lack of online learning studies at the K-12, it showed that students in online learning environments performed better than those in traditional face-to-face classes. They also determined large group instructional strategies found in face-to-face classes were less successful than individual instructional strategies common in online classes (Means et al., 2009).

Online classes typically applied a student-centered approach by providing the learner with opportunities to engage in the content at a self-driven pace, frequently interact one-on-one with the teacher, and develop computer skills (Cavanaugh & Blomeyer, 2007; Ransdell, Rice, Snelson, & Decola, 2008). Online classes also met school district needs by addressing teacher shortages, limited course offerings, and the lack of space to provide necessary classes (Cavanaugh & Blomeyer, 2007; Ransdell et al., 2008).

Despite the positives associated with online learning, several challenges also emerged (Watson, 2007). The authenticity of student work was a common concern in the online classroom. Students could more easily cheat by submitting work that was not their own, although online schools often integrated technology to check for plagiarism and worked more closely with parents to reduce cheating (Watson, 2007). Another challenge was that students needed a computer and internet access to successfully access online classes, which resulted in disparity between families who could purchase such technology and those who could not (Picciano & Seaman, 2010). Additionally, Archambault (2010) found that although teachers appreciated the flexibility of online classes, they thought online teaching was more time consuming than face-to-face instruction.

Online Physical Education

Varying opinions about OLPE were found from both PE specialists and others outside the field (Daum & Buschner, 2012). High school students took OLPE courses to satisfy requirements for graduation as part of a growing reality of education (Richardson, 2006). OLPE provided the opportunity for students to achieve the National Physical Education Standards (NASPE, 2004) if the delivery of instruction included quality components of face-to-face programs. However, limited research and conflicting results slowed the adoption and use of OLPE by high schools (Daum & Buschner, 2012).

Advantages and disadvantages. Advantages associated with OLPE included that students could complete work at times convenient for them, progress at their own pace, easily communicate with the teacher and other students, participate from remote areas, receive immediate feedback, and receive personalized teaching (Mohnsen, 2012). However, with little research, OLPE was yet to be proven effect. In contrast,

disadvantages of OLPE included accountability issues for student performance and a lack of a comprehensive curriculum (Mohnsen, 2012).

Instructional design. Mohnsen (2012) suggested online course development did not need to differ much from traditional course development. However, current standards were needed to assess the design of OLPE to ensure courses meet state and/or national standards as well as the quality guidelines for online classes (Trent, 2016). Grade level standards remained the same for online and face-to-face PE classes, and assessments aligned with those standards. Online learning activities needed to be designed to meet the standards that linked informational, instructional, and learning elements (Koszalka & Ganesan, 2004). Instructional activities required online materials such as audio and video presentations, animations, digital textbooks (Watson, Gemin, Ryan, & Wicks, 2009). Instruction was provided by online teachers adept at "guiding and personalizing learning, assessing student understanding of learning objectives, creating and facilitating group discussions, developing group projects, making constant adjustments to course resources, and responding to students' questions and explaining concepts that they are finding most challenging" (Wicks, 2010, p. 12).

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Statement of the Research Problem

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OLPE is growing in popularity and more than half the states now allow PE credit to be earned through online courses (Daum & Buschner, 2012). However, only half of the states that allow OLPE require a credentialed PE teacher to teach the course (NASPE, 2007). Despite growing popularity, none of the existing OLPE programs are research-based (Kooiman et al., 2017; Mohnsen, 2012; NASPE, 2007). Adding to the concern, the *Initial Guidelines for Online Physical Education* (NASPE, 2007) were written in 2007

and provide outdated information. Without current OLPE standards at the national level, curriculum designers lack guidance on best practices for OLPE. OLPE courses differ from their traditional face-to-face courses, but still must address the grade-level standards adopted by each state, particularly when satisfying graduation requirements for high school (NASPE, 2007). Through OLPE, the same PE standards should be addressed, but with different instructional approaches (Mohnsen, 2012).

The perception remains that online learning cannot provide the same quality of instruction as face-to-face formats (Larreamendy-Joerns & Leinhardt, 2006). Concerns about being sedentary while sitting at a computer, the lack of social interaction, and the inability to monitor progress all need to be addressed (Buschner, 2006; Daum & Buschner, 2012). Some research found students experienced delayed feedback, isolation, and vague instructions when taking online courses (Borup, Graham, & Davies, 2013). However, research also showed online learning could be effective with proper methodology (Journell, 2010). Equal access and alternative course delivery were opportunities OLPE provided to students (Adewale, Iban, & Alese, 2012; Rhea, 2011). OLPE has great potential to provide effective PE curriculum, but more research is needed (Kooiman et al., 2017; NASPE, 2007).

Online learning is growing despite the conflicting results of student learning. Both teachers and students were drawn to the digital world and it aligned with everyday life in place of traditional classroom settings (Fullan, 2013). Online learning grew in popularity with students, teachers, administrators, and local officials, but must be used with best practices in mind to reach its full potential. The desire to engage with technology made OLPE attractive to learners, and OLPE allowed teachers to provide

experiences to compel students to choose to be physically active throughout their lifetime (Ennis, 2010). However, without quality OLPE students were at risk of succumbing to the obesity epidemic and associated health disparities (CDC, 2016). With the fast and continuous growth in the number of students taking online classes, including OLPE, best practice must be established.

OLPE needs to be researched until a consensus of best practice is reached regarding teaching strategies for creating quality, meaningful learning experiences for OLPE students (Kooiman et al., 2017). Despite the growing popularity of OLPE, there is an urgent need for a standard of design guided by best practices (Kooiman et al., 2017; Mosier, 2010; R. Smith, Clark, & Blomeyer, 2005; Trent, 2016; Watson, Pape, Murin, Germin, & Vashaw, 2014).

Purpose Statement

The purpose of this qualitative study was to identify and describe the best practices used in the design and development of high school online physical education (OLPE) curricula based on the International Association for K-12 Online Learning (iNACOL) National Standards for Quality Online Courses as reported by OLPE curriculum design experts.

Research Questions

This study sought to answer the following central research question: What are the best practices used in the design and development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses as reported by OLPE curriculum design experts?

Sub-Questions

The study also sought to address the following sub-questions:

1. What are the best practices used in the selection of content for the design and development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

2. What are the best practices for instructional design employed in the development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

3. What are the best practices used in designing student assessments for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

4. What are the best practices used in integrating technology in a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

5. What are the best practices used in evaluating the effectiveness of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

6. What are the best practices used in providing support to teachers and students on a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Significance

The goal of this study was to identify and describe the best practices for OLPE curriculum design. This study helped fill the gap in the literature by providing best

practices for OLPE curriculum designers as well as future researchers and others with an interest in online classes. Online learning is becoming mainstream with school districts offering online courses and some requiring online courses for high school graduation (Brown, 2012). The best practices identified in this study can provide OLPE curriculum designers with a standard for developing OLPE curricula to promote achievement of the national content standards for PE. Improvements to curricula based on best practices would allow students to access the cognitive, physical, emotional, and social parts of a quality PE program. Additionally, differentiated models of instruction and assessment could be identified using online technology tools and resources. The technology literacy gained by students engaged in quality online learning programs could also assist in developing students' 21st century learning skills. The results of this study could also provide guidance for certification of and ongoing professional development for OLPE teachers.

<div align="center">**Definitions**</div>

Expert. A highly trained and competent individual within the specialized area of knowledge related to the target issue (Ludwig, 1997).

Online Instruction. A learning environment in which students utilize a computer or similar device and web-based service to learn and study.

Online Physical Education (OLPE). A term used to describe PE classes delivered through online instruction.

Physical Education (PE). Instruction in the skills and knowledge needed to maintain a physically active, healthy lifestyle.

Delimitations

This study examined the best practices for design and implementation of OLPE. Delimitations of this study were chosen to clarify and narrow the focus of the study. This study was delimited to high school PE curriculum designers. Recommendations for best practices for OLPE were thus determined by a select group of trained and competent persons; specifically, a select number of PE experts.

Organization of the Study

This study is presented in five chapters. Chapter I provided the background of the problem, the statement of the problem, the purpose of the study, the research questions, the delimitations of the study, and the definitions of terms. Chapter II presents the literature related to OLPE and includes a review of face-to-face PE instruction, online instruction, and OLPE instruction. Chapter III reviews the research design of the study and identifies the methods used to conduct the study and collect data. Chapter IV includes the findings of the study. Chapter V consists of a summary of the findings and includes conclusions and recommendations for how high schools and curriculum designers can design and implement OLPE with best practice in place.

CHAPTER II: REVIEW OF THE LITERATURE

Literature containing the words physical education (PE), K-12 online learning, and online physical education (OLPE) was reviewed from conference proceedings, evaluation reports, educational reports, online publications, quantitative and qualitative studies, journal articles, dissertations, and books. Major findings were summarized and then placed into corresponding areas of synthesis. This chapter describes the synthesized findings from the literature review for the three major review areas: PE, K-12 online learning, and OLPE.

The History of Physical Education

Modern PE programs in America developed from the popular, available, and accessible forms present throughout the history of PE, and were greatly influenced by European culture (Gerber, 1971). Although gymnastic exercises and games were part of early PE programs, health, nationalism, militarism, class, gender, and race all shaped PE (Munrow, 1981). PE developed and evolved through various social, religious, economic, and political environments.

In the Mid-Atlantic region in 1743, Benjamin Franklin first wrote his educational philosophy of building academies, and in 1749 opened his first academy in Philadelphia where PE and sports competition were part of the curriculum (U.S. Commissioner of Education, 1902). Franklin was an excellent swimmer and a swim instructor at the academy where students also engaged in bowling and ice skating. Franklin believed in the virtues of PE, and was thought to be the first promoter of PE in America (Lee, 1983).

Early gymnastics came from European influence and were primarily apparatus-based, derived from the German model (Gerber, 1971). In 1825, Round Hill School

introduced gymnastics into its program and a year later Harvard followed (Munrow, 1981). Historically, the Round Hill School was credited as being the first school with mandatory PE in the form of German gymnastics, which became the basis for American PE. In the following 20 years, a large influx of German immigrants helped push the German method of gymnastics, which eventually became the American Gymnastic Union of 1919. The German method was the first to offer teacher training to public schools and teachers of German gymnastics were hired by schools from Milwaukee, Chicago, Davenport, Cleveland, Saint Louis, Denver, Columbus, Dayton, Buffalo, and Indianapolis (Munrow, 1981).

Swedish gymnastics, which involved calisthenics and few apparatuses, was also introduced in American, but not as broadly (W. Smith, 1974). The minimal impact was due in part to the fewer number of Swedish immigrants and their later arrival to America. American women, however, were drawn to Swedish gymnastics and promoted it through private means and teacher training. Practiced more by females than males and in few cities throughout eastern America, Swedish gymnastics never gained the acceptance like that of German gymnastics (W. Smith, 1974).

Before World War II, games began to originate in American education. Originally developed in the United Kingdom, games were popular with private schools for boys of a social middle class that could afford the resources to implement and teach games (Mangan, 1981, 2000). Games were thought to develop obedience, leadership, courage, morality, perseverance, and physical fitness in males (Mangen & Hickey, 2000). Some of these boys later introduced games during their travels to America where the games develop into different forms (Mangan, 1988, 1992, 1998). Females in boarding

schools in Europe also played games to develop the virtues of loyalty, cooperation, smartness, cleanliness, fairness, manners, inner discipline, moderation, self-control, and respect for authority (Hargreaves, 1994). As games in America gained popularity and developed, they contributed to stereotypical gender identity roles. Women's PE in America focused on health, beauty, posture, and movement, whereas, PE focused on physical fitness and strength (Hargreaves, 1994).

In 1885 as universities developed professional associations, a group of early physical educators formed the American Association for the Advancement of Physical Education (AAAPE), which was renamed the American Physical Education Association (APEA) in 1903 (E. Rice, Hutchinson, & Lee, 1969). The association was essential to the development of professional standards and the theoretical basis of PE. However, members differed in their opinions of how to define PE (E. Rice et al., 1969). Many of the founding members were medical doctors so the founding principles of PE were established from the medical field perspective (Lupcho, 1986). By 1889, the American system of gymnastics was shaped for use in American educational institutions by association members who met with William T. Harris, the United States Commissioner of Education at the time (E. Rice et al., 1969). The establishment of AAAPE improved PE and legitimize teaching PE. Early pioneers Dudley Sargen, George Fitz, Luther Guilick, Mary Allen, Delphine Hanna, and Catherine Beecher shaped PE through their promotion and advocacy of specific elements (Gerber, 1971).

The use of gymnastics for physical fitness and education was challenged by sports. Schools and universities developed interscholastic and intercollegiate sport for males during the 19th century, and during the early 20th century, the American public was

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engrossed in athletic competition (Mechikoff & Estes, 2002). During this time, physical fitness exercises became secondary to sport instruction (Lewis, 1969). The transformation of PE began with the *athletics are educational* movement from 1906 to 1916 and the *sports for all movement* from 1917 to 1939, which were promoted by The National Committee on Physical Education and the National Amateur Athletic Federation. Sports and intramural programs were the dominate programs taught in PE by 1930 (Lewis, 1969). This gave rise to huge industries that generated money for their respective institutions. For females, sport was only available through intramurals, but interscholastic and intercollegiate sport was not encouraged (Mechikoff & Estes, 2002). Idealized femininity was in direct opposition with the perceived masculine nature of sport. Opposition to this notion began in the 20th century as more opportunities for school and university female athletes became available (Mechikoff & Estes, 2002).

Prior to 1906, athletics and PE were separate entities within colleges and universities (Lewis, 1969). Many athletics programs were perceived as dubious institutions that fielded teams with students of questionable character. PE and athletics merged at the secondary level, and interest in PE grew. With this growth, more professionals within the field were needed as coaches, athletic directors, and physical educators. This marked the shift in professional preparation in PE from its medical origins to education. During this time, women dominated the numbers as physical educators whereas men dominated in the coaching ranks (Lewis, 1969).

Another challenge to the gymnastics model was *play*. Interest in play aroused between 1890 and 1900 (Dulles, 1965; Hardy, 1982; Sapora & Mitchell, 1961). Herbert Spencer, William James, Karl Groos, G. Stanley Hall, Luther Halsey Gulick, and John

Dewey were all advocates for play in PE, but play had many adversaries in the PE profession (Mechikoff & Estes, 2002). Many believed in the educational superiority of gymnastics. Edward M. Hartwell (1889) thought play was childish and inadequate for PE. As urban neighborhoods became more crowded and playgrounds began to emerge, the general public became interested in play (Hardy, 1982). The Playground Association of America was founded in 1906 with playgrounds built in Boston and New York City while school grounds were opened to the public for recreational use (Dulles, 1965). The general public, government, and PE professionals interest in play continued to grow between 1900 and 1915 (Mechikoff & Estes, 2002). Advocates of gymnastics found themselves fighting for equal time within the PE program as play replaced gymnastics as the dominant method of PE (Hardy, 1982).

In 1926, Clark Hetherington wrote a theoretical position of PE that included social development objectives, which persisted throughout the 20th century (Mechikoff & Estes, 2002). The conceptual structure of this text consisted of five objectives that persist today with few changes:

- Organization of child life as expressed in big muscle or physical training activities

- Development of social adjustment skills based on the customs of society

- Development of latent power and capacities, using the stimulus response theory of psychologist Edward L. Thorndike

- Development of character

- Use of big-muscle and fine motor movements to improve thinking (Mechikoff & Estes, 2002, p. 270).

Hetherington brought credibility to PE by showing how play imparted skills necessary to developing children and youth, an area in which gymnastics was limited (Mechikoff & Estes, 2002). Thomas Wood and Rosalind Cassidy (1927) developed Hetherington's scope of the physical, social, emotional, and intellectual development and published *The New Physical Education: A Program of Naturalized Activities of Education Toward Citizenship,* which became one of the leading PE training texts.

Leading up to and during World War II, the physical and mental fitness of Americans was paramount (Mechikoff & Estes, 2002). Athletic competition and combat sports developed a winner-take-all mentality, which was used to train the millions of soldiers needed in the war and the women needed in industry for wartime commerce. After World War II, the Cold War once again made it necessary to focus on men's fitness to serve in the armed forces. Americans became obsessed with physical fitness and it was rare to find a secondary school or college without a PE requirement (Mechikoff & Estes, 2002).

Programs were gender segregated with women's programs organized around nationally agreed upon goals and outcomes whereas men's programs lacked a common philosophy (Mechikoff & Estes, 2002). When co-ed classes started to appear in the 1950s, they were not openly welcomed. In his 1950 speech at the 55th Annual Convention of the American Association for Health, Physical Education, and Recreation (AAHPER), Dr. Arthur Steinhaus made the following statement:

> If we should delve into philosophy for a moment I think you could see
> how our physical education programs have lost their way sometimes when
> we have emphasized only the lighter activity, particularly for boys and

men. That is the argument I have against coeducational activities. I think

they are wonderful for developing social graces and things connected with

that. But if you want strength in a boy you don't get it when you match

him against a person who is much weaker than he is and to whom he has

to show a certain politeness to boot. (as cited by Spears & Swanson, 1988,

p. 249)

Between 1950 and 1975, competitive sports for men in secondary schools and

colleges became specialized and winning teams demanded the time of year-round

coaches (Mechikoff & Estes, 2002). PE and sport again drifted apart while athletics

became its own entity at many secondary schools and colleges.

PE continued to evolve. Almost a contest itself, PE was a competition between

those who wanted to define, control, and implement it. As social, gender, and national

trends shifted, so too did the history of PE. Today, quality PE programs educate students

about the many forms and benefits of physical movement, including sports and exercise

(National Association for Sport and Physical Education [NASPE], 2010). PE evolved to

encompass content with diverse learning goals far from its early beginnings of German

and Swedish gymnastics.

Physical Education in Schools

From 1885 to 1939, three distinct periods of development occurred that modified

the theoretical framework of PE in schools. Between 1885 and 1900, the balance of

mind, body, and soul dominated beliefs (Kindervater, 1926). Gymnastics exercises were

the pedagogy and anthropometry, the study and measurement of the ideal bodily form,

was the research method. Disease was common during this time and balance between the

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body, mind, and soul was thought necessary for health. During this time, PE first became

a profession (Kindervater, 1926). From 1900 to 1917, sport, play, and games were

legitimized in PE (Lucas & Smith, 1978). However, not all physical educators accepted

sport, play, and games into PE and saw gymnastics and anthropometry as true PE (Lucas

& Smith, 1978). The third period, 1917 to 1930, saw the inclusion of social and

emotional elements (E. Rice et al., 1969). As the understanding of biology and medical

effects on health improved, a shift toward social interaction and behavior were

incorporated. Additionally, society shifted toward a bureaucracy where specialization

and expertise were valued (E. Rice et al., 1969). As these shifts progressed, so did the

availability of job opportunities. Both men and women were employed as gymnasium

directors, physical training instructors, playground leaders, and hygiene teachers

(Lupcho, 1986).

In 1866, California was the first state to pass a law making PE mandatory in

schools (Mechikoff & Estes, 2002). Legislation was written to address young men's

physical ability and health, specific to military defense of American interests (Gerber,

1971). Debate over military drill or gymnastics as the enacted curriculum was eventually

won by gymnastics. Ohio also passed a law in 1892 requiring physical culture be taught

in larger schools in the state, but revised the law in 1904 to include all schools (Gerber,

1971). Other states that passed early laws requiring PE were Louisiana in 1884,

Wisconsin in 1887, and North Dakota in 1899 (Gerber, 1971).

Two differing historical approaches seen in American PE were *education of the*

physical and *education through the physical* (J. Williams, 1930). Jesse Williams (1930),

a leading figure in PE during the late 1800s and early and middle 1900s advocated for

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education through the physical and supported the view of unity of the mind, body, and soul. J. Williams (1930) believed PE was physical fitness and touched on personal relationships, emotional responses, cognitive learning, team-building, and the aesthetics of social and emotional outcomes. During the same time, Charles McCloy (1940), another leading figure in PE, believed education of the physical should be the model for PE. In his book *Philosophical Basis for Physical Education,* McCloy (1940) emphasized the importance of physical characteristics and physical development.

From 1950 to 1975, PE was mandatory in almost every school due to the national security threat the Cold War posed (Mechikoff & Estes, 2002). Middle school and high school students engaged in PE class or competed on athletic teams, and disabled students engaged in adaptive PE in schools throughout the nation (NASPE, 2004). PE programs incorporated multiple bodily activities including sports, lifetime health, fitness activities, developmentally directed play, and games (NASPE, 2004). PE teachers usually had two roles, one as PE teacher and one as coach (Mechikoff & Estes, 2002).

In the late 20th and beginning of the 21st century, American schools favored education of the mind over that of the body. The 2016 United States Report Card on Physical Activity for Children and Youth found approximately half of all U.S. high school students attended at least one PE class per week, with disparities by age and gender (CDC, 2016). Youth Risk Behavior Surveillance System (YRBSS) data from 2015 showed only 29.8% of high school students participated in PE five days a week (CDC, 2016). Given students spent more than half their waking hours at school for 12 years, The Institute of Medicine (2013) suggested schools provided at least 50% of children's daily recommended 60 minutes of moderate-to-vigorous physical activity.

Most states mandate PE for elementary and secondary schools, but 32 states allow waivers or exemptions from PE (CDC, 2016).

Variances in instructional minutes within and among elementary, middle, and high school levels still exist (CDC, 2016). Some states mandate PE minutes aligned with CDC and NASPE minimum recommendations of 150 minutes per week for elementary schools and 225 minutes per week for secondary schools. However, most states lack accountability for time allocation of PE in schools, and implementation of PE minutes, mandated or not, is often left to the discretion of local education officials (CDC, 2016).

A correlation between physical activity and health, academic benefit, and emotional well-being of school-age children was found (HHS, 2008). PE class was often the only place children had to learn knowledge and skills to be physically active and engage in physical activity. PE was endorsed by numerous federal, state, and local health and education agencies (HHS, 2008). The Institute of Medicine (2012) supported strengthening PE in its report *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation*.

Curriculum Models

German and Swedish gymnastics were the first curricula models introduced to schools and promoted through teacher training in the 1800s (Mechikoff & Estes, 2002). Before World War II, games and play replaced gymnastics as the primary curricula in PE, promoting health in an industrial era. During World War II, calisthenics and competitive and combat sports that personified physically fit Americans and developed mental and physical toughness were needed to prepare men for the battlefield and women for the working industry (Mechikoff & Estes, 2002).

Today, a curriculum is a sequential set of lessons for delivering content to students. The PE curriculum provides a sequential and organized framework for teaching physical activity (CDC, 2015). The CDE (2015) put forth its sequencing of learning activities considered critical for developing a high-quality PE curriculum, noting it should:

- Ensure motor skills, physical activity, and fitness assessments are age and developmentally appropriate

- Provide methods of teaching motor and movement skills that ensure basic skills lead to more advanced skills

- Include plans to appropriately monitor, reinforce, and prepare for student learning

A. Chen, Sun, Zhu, and Ennis (2012) found PE classes lasting 45-60 minutes with sport or fitness components expended more calories for middle school students than shorter or longer classes. Kramer and Keller (2008) determined that successful curriculum change required supportive scheduling.

Movement education. From 1916 to 1930, PE curricula sought to define minimum competencies known as essentials that defined motor ability (Mechikoff & Estes, 2002). Many tests developed during this time included running, jumping, throwing, climbing, vaulting, rope climbing, and swimming. In Michigan, New Jersey, and New York, motor ability and physical efficiency testing began in 1914 and The California Decathlon Test began being administered in 1918. Several universities such as the University of California at Berkeley, the University of Oregon, the University of

Illinois, Ohio State University, and Oberlin College developed and administered tests of physical ability in the 1910s and 1920s (Mechikoff & Estes, 2002).

Movement as a model for PE was first introduce in the late 1800s and remained a primary focus of PE (Ables & Bridges, 2010). This was evident from the first two National Standards for K-12 Physical Education:

- Standard 1 – The physically literate individual demonstrates competency in a variety of motor skill and movement patterns

- Standard 2 – The physically literate individual applies knowledge of concepts, principles, strategies, and tactics related to movement and performance (SHAPE America, 2013)

Success with multiple movement patterns was considered fundamental to student's ability in games, sports, and other physical activities (SHAPE America, 2013). These standards focused on students knowing basic movement concepts and their ability to perform basic movement patterns.

Sport education. Sport education was a curriculum model developed in the United States by Daryl Siedentop (Grant, 1992). Siedentop's (2002) sport education model was conceived from his doctoral work during the late 1960s. After initially implementing sport education with elementary teachers around Columbus, Ohio, it was included in a methods text where it gained national and international notoriety (Siedentop, Mand, & Taggart, 1986). It later became its own textbook when Siedentop first published *Sport Education* in 1994.

Unlike the short sport units typically taught in PE class, sport education sought to provide a complete sport experience to "educate students to be players in the fullest sense

and to help them develop as competent, literate, and enthusiastic sportspeople"
(Siedentop, 1994, p. 4). To that end, recreational and competitive sports experiences
were simulated during PE classes. Six elements were identified to create authentic
simulations:

1. Activities were arranged in seasonal formats with units of work that extended 18-20 sessions, well beyond the more traditional blocks of 4-6 lessons

2. Affiliation was emphasized through establishing and maintaining working groups/teams for the duration of seasons (students remained on the same teams), and teams were small to promote maximum participation

3. Formal competition was enabled using modified arrangements in terms of team size, rules, and equipment (e.g., 2-on-2 or 3-on-3), and was interspersed with student-led and teacher-led practices

4. Records were kept forming the basis of individual and group attainment, including keeping league points for wins/losses, rewarding fair play, showing support for others, and maintaining personal bests (e.g., batting average, shot percentage, shots on goal, match scores)

5. Seasons concluded with a culminating event resembling a typical major sporting event (e.g., World Series, World Cup, Commonwealth Games) to promote the points of organization, competition, and festivity

6. Festivity was emphasized to mark the occasion of sport that could be achieved using team names, team uniforms, announcements, and spectators (Siedentop, 1994)

Students rotated through the roles of player, captain, coach, equipment manager, timer, and umpire to support each other as they "help and learn from each other and carry out the assigned roles to the benefit of their team" (Siedentop & Kinchin, 2003, p. 10).

The primary philosophy of sport education was that content knowledge and application increased due to longer units of instruction (Siedentop, 1994). PE teachers adopting this curriculum model needed to carefully consider the sequence and planning, which was radically different than most PE curriculum models (Siedentop, 1994). Research indicated extended units of instruction were not detrimental to PE programs (Alexander, Taggart, & Thorpe, 1996), but rather increased practice time and recall of knowledge (Qualification and Curriculum Authority, 2002).

Unit selection was teacher-driven and Siedentop (1994) advised teachers to select a sport they were familiar with and could implement with a high level of fidelity. Equipment, facilities, school mandates, equity, and inclusion were considered within the research as affecting the selection of sports (Brock, Rovegno, & Oliver, 2009; Penney, Clarke, Quill, & Kinchin, 2002). Although team invasion games (e.g., basketball, football, soccer) were the dominant choice for the sport education model (Mesquita, Farias, & Hastie, 2012; Penney et al., 2002;), many other sports were also seen throughout the literature: cycling (Sinelnikov, Hastie, Chance, & Schneulle, 2005); netball (Clarke & Quill, 2003); softball (Bennett & Hastie, 1997); dance (Graves & Townsend, 2000); rugby (Kinchin, Wardle, Roderick, & Sprosen, 2004); badminton (Brunton, 2003); volleyball (Araujo, Mesquita, Hastie, & Pereira, 2016; Kinchin, 2001); swimming/aquatics (Sciverner & Penney, 2005); outdoor and adventurous activities

(Penney & Wilkie, 2005); table tennis (Buchanan & Barrow, 2016); track and field (Pereira et al., 2015); and weight lifting (Pritchard, McCollum, & Hansen, 2014).

Most of the studies of sport education were qualitative with few quantitative studies. Many focused on student preference of sport education in comparison to other curriculum models (Alexander, Taggart, & Edland, 1993; Brunton, 2003; Carlson & Hastie, 1997; Grant, 1992; Hastie, 1998a, 1998b; Kinchin., 2002). Other studies focused on teacher perceived benefits of the sport education model, including increases in the number of students who dressed out for class, attendance, and participation during class (Alexander et al., 1993; Kinchin, 2003; Wahl-Alexander & Curtner-Smith, 2015; Wallhead, Garn, Vidoni, & Youngberg, 2013).

Teamwork and being part of a team were seen throughout studies on sport education, with students enjoying being part of a team, having teammates, being with friends, getting to know new teammates, comradery, and working through differences (Clarke & Quill, 2003; Harvey, Kirk, & O'Donovan, 2014; Hastie, 1996, 1998a; Kinchin, 2001; Wallhead et al., 2014). Many studies showed student acknowledgement of longer units of instruction increased play time, learning time, depth of knowledge, and social interaction (Alexander et al., 1996; Brunton, 2003; Carlson & Hastie, 1997; Grant et al., 1992; Kinchin & O'Sullivan, 2003; Kinchin et al., 2004; Wallhead et al., 2013). Several studies highlighted the social dynamic of the model that enabled students to take ownership of their learning through peer teaching, encouragement, and support from peers (Carlson & Hastie, 1997; Grant, Trendinnick, & Hodge, 1992; Hastie, 1996; Kinchin, 1997). Development of lower skilled students was noted by Hastie (1998c) through small team play over an extended period. Although social aspects of sport

education were seen throughout the literature, few looked at the development of competence in a sport education. Of the studies reviewed, most found positive teacher and student interviews (Buchanan & Barrow, 2016; Carlson & Hastie, 1997; Grant, 1992; Harvey et al., 2014; Hastie, 1998a; Kinchin, 2003; Ormond, DeMarco, Smith, & Fischer, 1995). However, little research was completed on the effectiveness of students developing motor skills or fitness using this model (Parker & Curtner-Smith, 2005; Wallhead & O'Sullivan, 2005), but Mesquita et al. (2012) concluded that skill levels for the sport could be improved through the sport education model.

A few studies focused on equity and inclusion in the sport model and found positive features, such as reduced dominance of players and co-ed teams (Y. Chen & Curtner-Smith, 2015; Hastie, 1998a, 1998b; O'Donovan, 2003). However, others found negative features such as dominance of players, students feeling left out, and ridicule (Alexander et al., 1996; Curnow & Macdonald, 1995; Hastie, 1998a; Kinchin, Penney, & Clarke, 2001; Kinchin et al., 2004; Parker & Curtner-Smith, 2012). Although more research is needed, the literature revealed sport education had significant impact on PE curricula.

Fitness education. Students who engaged in a fitness education curriculum focused on development and maintenance of individual fitness. The science of health-related fitness was used to explain why students needed to be active to maintain physical fitness (Institute of Medicine, 2013). Cardiorespiratory fitness, muscular strength and endurance, and flexibility were the health-related components forming the conceptual framework of fitness education. Several studies showed PE curricula including fitness activities increased the amount of time children spent in moderate to vigorous physical

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activity (Lonsdale et al., 2013). Several fitness education curricula exist for secondary

PE, including:

- Fitness for Life: Middle School (Corbin, LeMasurier, & Lambdin, 2007)

- Personal Fitness for You (Stokes & Schultz, 2002)

- Get Active! Get Fit! (Stokes & Schultz, 2009)

- Personal Fitness: Looking Good, Feeling Good (C. Williams, 2005)

- Foundations of Fitness (Rainey & Murray, 2005)

The goal of these curricula was to promote lifetime health. This stemmed from

the idea that teaching students how to participate in regular exercise and physical activity

helped them achieve a health-enhancing level of fitness.

Although more research is needed, fitness education had a significant impact on

PE curricula. Many studies in this area compared curricula with and without fitness

education components. In a study on 15 elementary schools, students participating in a

fitness education curriculum were more motivated to engage in physical activities and

expended the same number of calories as students engaged in non-fitness education

curricula (A. Chen, Martin, Ennis, & Sun, 2008). Longitudinal data from the same study

found students exposed to the fitness education curricula continued their knowledge

growth in the science of exercise (Sun, 2012).

NASPE (2012), now SHAPE America, recommended fitness education be

incorporated into existing PE curricula. The *Framework for Fitness Education in

Physical Education* developed by NASPE (2012) includes components to be embedded

in all instructional units, shown in Table 1.

Table 1

Components of the NASPE Framework for Fitness Education

Concept	Specific Components
Technique: Demonstrate competency in techniques needed to perform a variety of moderate to vigorous physical activities.	● Technique in developing cardiovascular fitness. ● Technique when developing muscle strength and endurance activities. ● Technique in developing flexibility. ● Safety techniques.
Knowledge: Demonstrate understanding of fitness concepts, principles, strategies, and individual differences needed to participate and maintain a health-enhancing level of fitness.	● Benefits of physical activity/dangers of physical inactivity. ● Basic anatomy and physiology. ● Physiologic responses to physical activity. ● Components of health-related fitness. ● Training principles (overload, specificity, progression) and workout elements. ● Application of the Frequency Intensity Time Type principle. Factors that influence physical activity choices.
Physical activity: Participate regularly in fitness-enhancing physical activity.	● Physical activity participation (e.g., aerobic, muscle strength and endurance, bone strength, flexibility, enjoyment/social/personal meaning). ● Create an individualized physical activity plan. ● Self-monitor physical activity and adhere to a physical activity plan.
Health-related fitness: Achieve and maintain a health-enhancing level of health-related fitness.	● Physical fitness assessment (including self-assessment) and analysis. ● Setting goals and create a fitness improvement plan. ● Work to improve fitness components. ● Self-monitor and adjust plan. ● Achieve goals.
Responsible personal and social behaviors: Exhibit responsible personal and social behaviors in physical activity settings.	● Social interaction/respecting differences. ● Self-management. ● Personal strategies to manage body weight. ● Stress management.
Values and advocates: Value	● Value physical activity.

fitness-enhancing physical activity for disease prevention, enjoyment, challenge, self-expression, self-efficacy, and/or social interaction and allocate energies toward the production of healthy environments.	● Advocacy. ● Fitness careers. ● Occupational fitness needs.
Nutrition: Strive to maintain healthy diet through knowledge, planning, and regular monitoring.	● Basic nutrition and benefits of a healthy diet. ● Healthy diet recommendations. ● Diet assessment. ● Plan and maintain a healthy diet.
Consumerism: Access and evaluate fitness information, facilities, products, and services.	● Differentiate between fact and fiction regarding fitness products. ● Make good decisions about consumer products (NASPE, 2012).

Fitness Assessments

Anthropometry, the study and measurement of the ideal body form popular in the

19th century, became the model for tests of physical efficiency developed between 1916

and 1930 (Rogers, 1927). During this time, the two reasons for physical ability testing

were (1) "to create a measurement tool that could classify students according to ability"

and (2) "to predict future achievement" (Mechikoff & Estes, 2002, p. 273). Frederick

Rand Rogers and David Kingsley Brace were acknowledged leaders in the testing and

measurement of PE during this time (Mechikoff & Estes, 2002). Rogers believed

strength was the main predictor of physical ability and developed a Strength Index to

quantify strength and rank individuals for equality in competitive team games (Mechikoff

& Estes, 2002). Rogers (1927) assumed a direct correlation between muscle strength and

student health.

Fitness assessments, such as the Fitnessgram used in the Presidential Youth

Fitness Program, apply criterion-referenced data to determine health-related fitness

(Institute of Medicine, 2013). Today, fitness assessments provide students current fitness

levels to develop a personal fitness or exercise program, motivate students to achieve a

minimum standard of health-related fitness, and reveal potential future health problems

(Institute of Medicine, 2013). Teachers could also use the data to assess and modify their

current curriculum to allow students to make fitness gains. Ultimately, students should

understand the importance of staying physically active throughout their lifespan (NASPE,

2012). However, NASPE (2010) also noted fitness assessments should be confidential

and only shared with students and their parents/guardians. Table presents practices

deemed appropriate and inappropriate by NASPE (2010).

Table 2

NASPE Appropriate and Inappropriate Practices Related to Fitness Testing in Schools

Appropriate Practice	Inappropriate Practice
In elementary school, motor skills are the focus of instruction, with health-related fitness components integrated into the curriculum and lessons focused on fitness education.	Health-related fitness is rarely integrated into instruction. Students fail to understand the benefits of health-related fitness and know little about how to develop a fitness plan.
Fitness testing is used to set individual goals as part of fitness education. At the secondary level, students use fitness test data to design and apply a personal fitness plan.	Fitness testing is conducted without meaningful understanding, interpretation, and application.
Physical educators use fitness assessment as part of an ongoing process to help students understand, enjoy, improve, and maintain their physical fitness and well-being (e.g., students set fitness goals for improvement that are revisited during the school year).	Physical educators use fitness test results to assign a grade.
Children are physically prepared to participate in fitness testing.	Children are required to participate in fitness testing without proper preparation.

Quality Physical Education Programs

Quality PE programs are needed for children and adolescents (NASPE & AHA, 2012; SHAPE America et al., 2016). The U.S. federal government found that quality PE was part of the solution to the obesity crisis (U.S. Department of Education, 2010). High-quality PE programs require appropriate action in four main areas: curriculum, policies and environment, instruction, and student assessment (CDC, 2015). To ensure an equitable education, all students should have access to a well-designed, standards-based PE curriculum (SHAPE America, 2015). The CDC (2015) stated the following policy and environmental actions support high-quality PE:

- Adequate instructional time (at least 150 minutes per week for elementary students and 225 minutes per week for middle and high school students)

- Classes taught by qualified PE specialists

- Reasonable class sizes

- Proper equipment and facilities

The CDC (2015) stated the following instructional strategies supported high-quality PE:

- Inclusion of all students

- Adaptations for students with disabilities

- Opportunities to be physically active most of the class time

- Well-designed lessons

- Out-of-school assignments to support learning

- Not using physical activity as punishment

The CDC (2015) stated student assessment within a high-quality PE program included:

- The appropriate use of physical activity and fitness assessment tools

- Ongoing opportunities for students to conduct self-assessments and practice self-monitoring of physical activity

- Communication with students and parents about assessment results

- Clarity concerning the elements used for determining a grading or student proficiency system

Information showing PE programs resulted in gainful change in student health outcomes was lacking (Trout & Graber, 2009). This lack of information in large part was

due to the inconsistent delivery of PE programs across the nation (Cawley et al., 2006).

Today, PE in the United States is a menagerie of differing curricula with funding gaps

and a lack of quality programs (Rink, 1993). In 2001, NASPE released the *Shape of the*

Nation Report (SONR). All states in the nation responded to the survey, which showed

only 37% of states required a full year of high school PE (NASPE, 2001). Some of this

was driven by schools needing to balance core and noncore subjects to avoid

noncompliance under No Child Left Behind; noncore classes lost teaching staff and

experienced increased class sizes as a result. The U.S. Government Accountability

Office (GAO) report *K-12 Education: School-Based Physical Education and Sports*

Programs (GAO, 2012) also found budget cuts and inadequate facilities impacted PE

programs.

     Standards. Standards and grade level outcomes for PE were developed by

national professional organizations such as SHAPE American (formerly NASPE) or state

education agencies (Institute of Medicine, 2013). Given the great diversity in policies

and standards across the country, no centralized curriculum for PE exists (CDC, 2015).

As such, PE classes presented many forms and structures, such as movement education,

sport education, and fitness education (Mechikoff & Estes, 2002).

     High-quality PE curricula should be based on the National Standards for K-12

Physical Education (SHAPE America, 2013)*,* which described what physically literate

individuals should know and be able to do, including:

- Learn the skills necessary to participate in a variety of physical activities
- Know the implications and the benefits of involvement in various types of
  physical activities

- Participate regularly in physical activity

- Be physically fit

- Value physical activity and its contributions to a healthful lifestyle

All states, except Iowa, adopted the National Standards for K-12 Physical Education or developed their own PE standards (Institute of Medicine, 2013). The *Essential Components of Physical Education* (SHAPE America, 2015) stated curricula should be based on national or state standards, and should be reviewed and updated regularly. However, student achievement of standards was unclear because there is no accountability (Institute of Medicine, 2013). A seminal study by Hensley and East (1989) found PE teachers based assessment on indicators other than learning outcomes such as participation (96%), effort (88%), attitude (76%), sportsmanship (75%), dressing out (72%), improvement (68%), attendance (58%), observation of skills (58%), knowledge tests (46%), skills tests (45 %), potential (25%), and homework (11%).

Online Instruction

Online learning was defined by Powell, Watson, et al. (2015) as "a full course education experience in which instruction takes place primarily over the internet, using an online delivery system to provide access to course content. It may be accessed from multiple settings (in school and/or out of school buildings" (p. 5). Online learning is evolving with changes in practices, advances in technology and devices, and updates to state policies. As a relatively new field, few literature reviews of K-12 online learning were published (Barbour & Reeves, 2009; Cavanaugh et al., 2009; Means et al., 2010; J. Rice, 2006). Regardless, district and school implementation of online learning increased

as options become more affordable, curriculum and technology improved, and teachers became more skilled users and implementers of online instruction.

Hundreds of thousands of students attended full-time online schools that provided their entire education (Gemin, Pape, Vashaw, & Watson, 2015; Watson et al., 2015). About 20% of these students were homeschooled, whereas others were attending online schools "because they have medical or behavioral issues, are engaged in a time-consuming pursuit such as arts or sports, or have not been academically successful in a physical school and are seeking a different mode of instruction" (Powell, Watson et al., 2015, p. 13). Most of these online schools were charter schools, but some were district-run within defined boundaries (Powell, Watson et al., 2015).

Millions of students simultaneously took supplemental online courses while attending school (Gemin et al., 2015; Powell, Watson et al., 2015). School support for online courses varied from school supplied rooms, computers, and mentors, to students taking an online course from home with no support (Gemin et al., 2015; Powell, Watson et al., 2015).

Growth of Online Education

The expansion of online schools in the United States was driven by national policy incentives to expand educational opportunity, teacher shortages, overcrowded schools, and access to alternative education routes (Natale, 2011). The longest standing online K-12 schools are between 15 and 20 years old, including Laurel Springs online private school established in the early 1990s, Virtual High School established in the mid-1990s, Florida Virtual School established in 1996, and the Monte Vista Online Academy established in 1997 (Powell, Watson et al., 2015). Twenty-five states had state-run

virtual schools operating in 2014-2015 (Powell, Watson et al., 2015). Traditional public schools were the largest providers of K-12 education and the largest users of online learning, with nearly all school districts using it at some level (Gemin et al., 2015; Powell, Watson et al., 2015).

Full-time online charter schools served approximately 275,000 students in 25 states during the 2014-15 school year, with approximately 175,000 enrolled in K12 Inc or Connections Academy (Powell, Watson et al., 2015). These two virtual schools accounted for 3% of the student population in these states. California Virtual Academies and California Connections Academies provided classes for approximately 18,000 K-12 students during the 2014-15 school year (Powell, Watson et al., 2015).

Most full-time online charter schools serve all grade levels, but high school students are served at higher rates (Gemin et al., 2015; Powell, Watson et al., 2015). Growth in full-time charter schools was relatively slow, with students and families citing reasons of not attending such as deep beliefs in face-to-face instruction, the inability of parents to serve as a learning coach in the home, and the increase in district-offered online programs (Powell, Watson et al., 2015).

Other online school options are also emerging. Catholic, Jewish, other religions, and nonsectarian/independent groups created several online private schools (Powell, Watson et al., 2015). Much of the online adoption for private and independent schools was driven by foundations and nonprofits that provided the necessary training and resources to interested schools (Powell, Watson et al., 2015). Some state and private universities also began operating online high schools. Most online high schools possessed the same basic characteristics:

- Accredited high schools that directly granted high school diplomas

- Enrolled students directly in the online high school programs without school or district involvement

- Provided both full-time and supplemental online course options

- Students paid tuition for courses (developers received no state funding for student enrollments)

- Gifted and high-performing students were targeted and credit recovery programs were not offered (Powell, Watson et al., 2015).

Online Instructional Practices

Online charter schools usually served all grade levels, but methods of instruction varied depending on the grade level (Powell, Watson et al., 2015). As Powell, Watson et al. (2015) noted,

Collectively these schools serve all grade levels, but methods of instruction vary significantly between grade levels. Younger students spend less time online and use more print materials, and use a parent or other learning coach for help. Older students spend more time online, use fewer print materials, and communicate mostly with their teacher online. Even for schools that operate physical learning centers, most communication between teachers and students is online (both synchronous and asynchronous) or by telephone. (p. 43)

State agency involvement in online learning varied from those actively involved to those with minimal involvement (Gemin et al., 2015; Powell, Watson et al., 2015). When state agencies were minimally involved, school districts in those states tended to

have significant local control (Powell, Watson et al., 2015). State agencies actively

involved in online learning provided review and approval of the courses provided.

Standards for review varied greatly among state agencies from rigorous review processes

to simply completing applications to gain approval, and length of approval varied from

annual renewals to upwards of five years between renewals (Powell, Watson et al., 2015).

Some states also used standards for quality online programs and online course design

developed by the International Association for K-12 Online Learning (iNACOL) and

Quality Matters, which were used to evaluate online course provider options

(Archambault, Kennedy, & Freidhoff, 2016).

　　　　Various products and services were developed to assist states, districts, schools,

and other online school providers to establish and sustain high-quality online programs.

Comprehensive products and services for online learning were easiest for schools or

districts to implement because they reduced the number of vendors needed and negating

the need to integrate multiple products into a single learning experience (Powell, Watson

et al., 2015). Figure 1 presents the different types of vendor products and services

available.

Types of vendor products and services

Instructional management & tracking	Instructional content
Learning management systems (LMS)	Full online & blended curricula
Learning platforms	Individual courses
Adaptive learning	Lessons & exercises
Data analytics	Assessments
Services	**Tools to manage student data & admin**
Professional development	Student information system (SIS)
Online course teachers	Classroom management
Customization	Registration
Implementation	

Figure 1. Types of online vendor products and services. Source: Powell, Watson et al., 2015.

Instructional content. Schools often used online courses, content, tools, and services from a multitude of suppliers (Powell, Watson et al., 2015). Most of the content for online courses was developed by education publishers or content providers/developers, which were typically for-profit companies. Content options included full online curricula, online courses, and digital content (Powell, Watson et al., 2015). Schools could buy content directly from vendors, education publishers, content providers/developers, or intermediates (Gemin et al., 2015; Powell, Watson et al., 2015).

Traditional education publishers now offer various digital products to sustain their companies as the demand for print materials declined (Powell, Watson et al., 2015). They began as traditional textbook and educational materials publishers, but now carry digital products and services in every educational category. In contrast, online content

providers and developers started their companies with the development and delivery of digital content as the primary objective. Most of these companies were start-ups within the last 20 years with a focus on online and digital content (Powell, Watson et al., 2015).

Intermediates also supplied online learning content and related services, but were specific to a state or major region within a state (Powell, Watson et al., 2015). This allowed them to focus on specialized content or specific needs identified by the state that were usually not marketable to national vendors. Intermediates tended to be public education entities directly involved with the state education agency (Powell, Watson et al., 2015).

At the national level, online course usage was quickly dominated by the core subject areas of language arts, math, science, and social studies (Powell, Watson et al., 2015). Figure 2 present the percentage of online course enrollments by subject area.
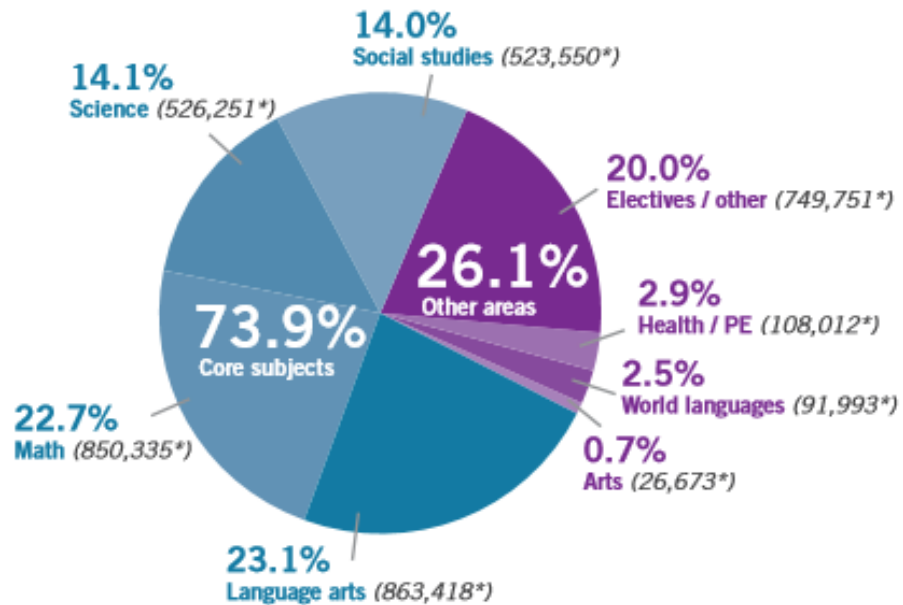
Figure 2. Online course enrollments by subject area. Source: Powell, Watson et al., 2015.

A need exists to evaluate the quality and comprehensiveness of both online courses and course providers (Archambault et al., 2016). Additionally, districts should ensure online courses align with the high-quality, face-to-face version offered in the district. To facilitate transparency, Archambault et al., (2016) offered the following recommendations:

- The school should report the name of the company, organization, or district providing the actual content and online instructor for the online course

- The state should report both the number of enrollments served by online course providers and student performance for each provider. Where possible, additional information, such as AP exam pass rates, should accompany this information

- In addition to schools reporting data on online enrollments, online course providers should provide similar data directly to the state

Instructional design. Evaluating the quality of online courses against the standards was done using rubrics developed by state and professional organizations (Barbour, 2013; Cavanaugh et al., 2009; Mosier, 2010; Picciano & Seaman, 2010). Although these resources were used to evaluate the quality of online courses, there was no unifying criteria for determining the quality of online courses (Mosier, 2010; R. Smith et al., 2005; Watson et al., 2014). iNACOL (2011) developed five K-12 online course design standards (Table 3).

Table 3

INACOL National Standards for Quality Online Courses

Standard	Description
Content	The course provides online learners with multiple ways of engaging with learning experiences that promote their mastery of content and are aligned with state or national content standards.
Instructional Design	The course uses learning activities that engage students in active learning; provides students with multiple learning paths to master; the content is based on student needs; and provides ample opportunities for interaction and communication- student to student, student to instructor, and instructor to student.
Student Assessment	The course uses multiple strategies and activities to assess student readiness for and progress in course content and provides students with feedback on their progress.
Technology	The course takes full advantage of a variety of technology tools, has a user-friendly interface, and meets accessibility standards for interoperability and access for learners with special needs.
Course Evaluation and Support	The course is evaluated regularly for effectiveness, using a variety of assessment strategies, and the findings are used as a basis for improvement. The course is kept up to date, both in content and in the application of new research on course design and technologies. Online instructors and their students are prepared to teach and learn in an online environment and are provided support during the course.

Sparse research explored the design of online courses (Barbour, 2013; Cavanaugh et al., 2009). Online courses used many instructional design techniques to develop units, lessons, instructional activities, and assessments (Carnahan & Mensch, 2014; Huett, Moller, Foshay, & Coleman, 2008; Kranch, 2008). For online schools to be effective, they must meet curriculum standards (iNACOL, 2011), but little research analyzed K-12 online curriculum and standards alignment (Barbour, 2013). O'Dweyer, Carey, and Kleiman (2007) found an online algebra curriculum provided an effective online course

when aligned to the content standards. However, Trent (2016) found revisions were needed to OLPE guidelines to provide evidence of alignment.

District size could affect implementation of online learning. Small districts tended to use online learning, but had difficulty in its delivery and/or internet bandwidth capability (Powell, Watson et al., 2015). For smaller districts, online learning was an important resource to supplement the smaller number of courses offered by the district. Small and mid-size districts were unlikely to create their own courses, and often relied on third-party suppliers of courses and teachers (Powell, Watson et al., 2015). Large districts with more resources often created their own courses and hosted their own learning management systems (Powell, Watson et al., 2015).

Technology. The United States spends $10.2 billion dollars on K-12 hardware, and $380 million on K-12 learning management systems and platforms (Powell, Watson et al., 2015). However, schools and districts continued experiencing challenges related to technology access such as the number of devices available, lack of bandwidth, and troubleshooting technical issues that teachers did not have the expertise to handle (Sterrett, Ohlson, & Miller, 2016). Families also faced challenges such as unreliable or inconsistent internet access (Sterrett et al., 2016).

The push for the Common Core State Standards and the associated online assessments increased the number of devices and internet access available to students (Gemin et al., 2015; Powell, Watson et al., 2015). Access provided teachers opportunities to explore and use online content. Recently, the Common Core State Standards dominated teacher professional development, slowing the shift to online learning and instruction (Powell, Watson et al., 2015). Common standards would provide

a platform for development and management of online courses used across multiple states (Archambault, 2016; Powell, Watson et al., 2015), but teachers need professional development specific to technology integration required to align designated learning targets and to prevent technology from becoming a distraction (Sterrett et al., 2016).

Recent concerns suggested online courses simply replicated face-to-face classes without leveraging technological advances, specifically, the lack of applying Universal Design for Learning (UDL) and differentiated instruction to reach a range of learners (Meier, 2016). Technology standards were developed to guide online course design; however, no research was found to support the use of the standards in the development of online courses (ISTE 2007; 2008; Powell, Watson et al., 2014).

Effectiveness of online education. Most research for online learning focused on cognitive achievement outcomes (Barbour & Reeves, 2009; Cavanaugh et al., 2009; Corry & Stella, 2012; Means et al., 2010; K. Rice, 2009). Constant monitoring and analysis of online courses, and assessment of student learning, are needed to ensure the success of online courses (Martin & Ndoye, 2016). The U.S. Department of Education (Means et al., 2009) released a meta-analysis of literature that found students in online learning environments performed better than those receiving face-to-face instruction. Additional studies explored how students enrolled in online courses compared to traditional students in terms of achievement on standardized tests. A 2004 meta-analysis of 15 studies published between 1989-2004 found virtual instruction was as good or better than face-to-face instruction (Cavanaugh, Gillan, Kromrey, & Blomeyer, 2004). The Michigan K-12 Virtual Learning Effectiveness Report 2014-2015 noted a correlation

between the number of online course choices and a decrease in online course completion rates and student retention (Freidhoff, 2016).

Student-centered. Online options provide flexibility to meet student needs. Furthermore, online options help schools address access and equity issues. Reasons for students taking online courses included accessing courses not offered at the school, earning credit needed to graduate, better-meeting student learning styles, making-up failed credits needed to graduate, and alleviating scheduling conflicts (Archambault et al., 2016; Powell, Roberts, & Patrick, 2015; Powell, Watson et al., 2015; Worthen & Patrick, 2014). Similarly, schools used online learning as a solution for both student needs and school challenges such as scheduling conflicts; limited availability of highly qualified teachers in certain subjects, particularly Advanced Placement; limited seating for hard-to-find courses, especially in rural or inner-city schools; offering electives and other accelerated options for college-bound students; offering flexibility for athletes, homebound students, those in the arts, dropouts, and pregnant or incarcerated students; providing credit recovery programs for at-risk students; and providing solutions for small class sizes and emergency shortfalls in teachers (Archambault et al., 2016; Powell, Watson et al., 2015; Worthen & Patrick, 2014).

Technology used in online courses can scaffold student learning. Scaffolding came in a variety of forms, from increasing engagement and providing alternate learning strategies, to taking away supports to allow students to master material. The Zone of Proximal Development (ZPD) underpinned some of the ideas of constructivism (Vygotsky, 1978). Vygotsky believed when a student was at the ZPD for a task, providing the appropriate scaffolding gave the student a boost to achieve the task.

Potential Challenges

Online education is not without opposition or challenges. Although in its infancy, current issues of student success and online course quality require attention (Archambault et al., 2016). Lack of rigor and quality remain of concern, as does student accountability. In addition, district responsibly remains unclear for those students enrolled in one or two courses that split district boundaries and uncertainty exists for teachers in evaluation of their online students (Archambault et al., 2016).

Student accountability. As online learning moves to traditional schools and districts, it will be evaluated by the overall school accountability frameworks (Patrick, Myers, Silverstein, Brown, & Watson, 2015; Powell, Watson et al., 2015). Providing numerous online course options for students created concerns of accountability once a student enrolled in an online course offered by an outside entity (Archambault et al., 2016; Bailey et al., 2014). Online charter schools are required to administer state assessments to students and grade against a state's performance framework, but private online entities do not have such requirements calling into question how they would be held accountable for student learning (Powell, Watson et al., 2015). This leaves a need to align responsibilities for each entity involved to ensure student success (Archambault et al., 2016).

Equity in educational opportunity. Online learning is a high-quality alternative to face-to-face education (Natale, 2011). Course access programs avail students the ability to enroll in one or more online courses from educational providers outside their district (Archambault et al., 2016; Bailey et al., 2014). Access to online courses through public education funds is slowly increasing, and five states currently require students to

complete an online course as a graduation requirement: Alabama, Arkansas, Florida, Michigan, and Virginia (Powell, Watson, et al., 2015). However, large gaps in online courses and school access continue to exist (Archambault et al., 2016; Powell, Watson et al., 2015).

Student support structures are critical to ensure student success in online courses. In high school, online learning was often used for remediation rather than acceleration (Archambault et al., 2016; Bailey et al., 2014). The use of mentors to help struggling students was identified as a best practice for online courses, along with support for mentors through professional development (Archambault et al., 2016).

Teaching challenges. Online teachers were considered a critical factor to the effectiveness of online instruction, providing interaction, helping with course understanding, and supporting students (Meier, 2016). K-12 schools often showed teachers technology, but rarely provided direct professional development on how to teach with technology. Teachers needed additional support to engage students in building knowledge, with Meier (2016) noting, "we know much more about how to insert technology into curriculum as a generic topic and about software that affects student learning than we do about the teacher's role in using technology to mediate students' learning" (p. 15). Additionally, online teachers needed support to encourage meaningful dialogue among students, using and teaching with specific technology applications, and learning about emerging technologies (Meier, 2016).

Some online teachers who worked for public entities such as Florida Virtual School, The Virtual High School, or Connections, taught students in multiple states (Powell, Watson et al., 2015). For teachers who instruct across states, multiple licensing

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was required and presented another barrier. States maintain individual requirements and guidelines for teaching, yet online teachers who instruct across multiple states concurrently bear the burden of ascertaining licenses from multiple states, making it more difficult for schools to recruit qualified teachers (Powell, Watson et al., 2015).

Online Physical Education

Along with the growth of online schools came the development of OLPE. OLPE has been offered for little more than a decade (Daum & Buschner, 2014; Mosier, 2012). Prior to 2006, little was known about OLPE except for random news articles that praised or ridiculed it (Balona, 2003; Brooks, 2003; Cerabino, 2004; Gussow, 2002; Whritenour, Voss, & Vogt, 2006).

Current State of Online Physical Education

OLPE is an accepted option for high school students to meet PE and graduation requirements in most states (Mosier, 2012; NASPE & AHA, 2012; SHAPE America et al., 2016). Nationally, 2.9% of online course usage was in health and PE in 2014-15 (Powell, Watson et al., 2015). Currently, 31 states allow high school PE credits to be earned through OLPE formats (SHAPE America et al., 2016). Of these, only 17 require OLPE courses to be instructed by a state-certified PE teacher (Daum & Buschner, 2014). Daum and Buschner (2012) found numerous online PE courses failed to meet national standards for learning and physical activity guidelines, noting OPLE should include the standards and benchmarks found in traditional in-school PE with only the delivery of instruction differing. Most OLPE courses did not meet the national guidelines for secondary schools with at least 225 minutes of PE per week, and some courses required no physical activity (Daum & Buschner, 2012).

A 2016 qualitative case study examined the perceptions of traditional high school PE students and OLPE students about their knowledge of PE cognitive concepts, motivation to engage in physical activity, and the impact of their PE knowledge on their motivation to engage in PE (DeCarlo, 2016). The study presented the following five conclusions:

1. OLPE students perceived a slightly higher level of heart-related fitness than the traditional PE group

2. All participants perceived they possessed enough heart-related fitness to be physically fit

3. Traditional PE students perceived themselves as having a higher level of motivation to engage in physical activity compared to OLPE students

4. High school students perceived their heart-related fitness levels positively impacted their motivation levels to engage in physical activity and would continue to do so in the future

5. Intrinsic regulation in individuals could be independent of their heart-related fitness levels, but in internally controlled individuals, there was a positive relationship in their perceived heart-related fitness levels and perceived motivation levels to engage in physical activity (DeCarlo, 2016)

Relationship to Content Standards

Per SHAPE America (2014), the primary goal of PE is to "develop physically literate individuals who have the knowledge, skills and confidence to enjoy a lifetime of healthful physical activity" (p. 1). For OLPE courses to be considered quality programs, they must meet national or state PE standards (SHAPE America, 2014). Most states

adopted the national standards or modeled their own standards after the national standards, which were thought of as the gold standard for K-12 PE (Daum & Buschner, 2014).

Research

OLPE was researched less than other online subjects (Barbour, 2013; Daum & Buschner, 2012; Mosier, 2012; Trent, 2016). Although criteria and benchmarks exist to analyze and assess OLPE courses, there were no overarching criteria for determining quality and no research that validated the use of online evaluation instruments (Mosier, 2010; NASPE, 2007; R. Smith et al., 2005; Trent, 2016; Watson et al., 2014). Therefore, a need for research to validate OLPE evaluation instruments exists (Trent, 2016).

More research is needed regarding student achievement and outcomes in OLPE. Few studies compared psychomotor and cognitive outcomes between online and traditional face-to-face PE courses (Daum & Buschner, 2014). No studies were found in this review focused on motor skill development. Daum & Buschner (2012, 2014) reported most OLPE courses were fitness-based and focused on the cognitive domain with little focus on motor skills or the affective domain. Florida Virtual School (FLVS) was the first to offer OLPE and offered a plethora or information regarding OLPE course design (Mosier, 2010; Mosier & Lynn, 2012). Mosier and Lynn (2012) stated OLPE courses offered at FLVS used a fitness curriculum. Futrell (2009) and L. Williams (2013) both interviewed OLPE teachers and concurred OLPE courses followed a fitness curriculum. Justification of quality and accountability is necessary to ensure curricula are designed with best practices to meet standards (Daum & Buschner, 2014; Mohnsen, 2012; Mosier, 2012).

Online Course Development

Sparse knowledge was available specific to design of OLPE courses (Buschner, 2006; Mohnsen, 2012; Mosier, 2012). The *NASPE Initial Guidelines for Online Physical Education* (2007) quickly became antiquated with the rapid advancement of technology and technology implementation in education. Trent (2016) found "revisions to the guidelines are necessary to better capture evidence of alignment to further promote quality, optimal student learning and best practice in single district virtual personal fitness environments" (p. 7). A search of existing literature on OLPE yielded few studies using the NASPE guidelines. Those who did included Mosier and Lynn (2012) and Trent (2016). Currently, the NASPE guidelines are the single accepted framework to evaluate OLPE courses (Mosier & Lynn, 2012; NASPE, 2007). Trent (2016) recommended the inclusion of a rubric and rating scale to offer additional detail specific to meeting individual guidelines.

Summary

OLPE is a rapidly growing option for high school students to earn graduation credits. But PE, either face-to-face or online, is only as good as the quality of the program designed and developed. Online education is in its infancy with concerns to rigor, quality, and accountability. From the literature review presented, limited research exists on OLPE or K-12 virtual learning design and development. It was concluded an urgent need exists for standards of design, guided by best practice, that is currently lacking in OLPE curricula.

CHAPTER III: METHODOLOGY

This chapter outlines the research design and methods used. The purpose statement and research questions are presented to provide a foundation for the study. A qualitative phenomenological approach was used to explore and describe the best practices for development of high school OLPE. Chapter III includes the research design, description of the population and sample along with the criteria used for selection, an explanation of the data collection and data analysis process, and the limitations of the study.

Purpose Statement

The purpose of this qualitative study was to identify and describe the best practices used in the design and development of high school online physical education (OLPE) curricula based on the International Association for K-12 Online Learning (iNACOL; 2011) National Standards for Quality Online Courses as reported by OLPE curriculum design experts.

Research Questions

This study sought to answer the following central research question: What are the best practices used in the design and development of a high school OLPE curriculum based on the iNACOL (2011) National Standards for Quality Online Courses as reported by OLPE curriculum design experts?

Sub-Questions

The study also sought to address the following sub-questions:

1. What are the best practices used in the selection of content for the design and development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

2. What are the best practices for instructional design employed in the development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

3. What are the best practices used in designing student assessments for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

4. What are the best practices used in integrating technology in a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

5. What are the best practices used in evaluating the effectiveness of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

6. What are the best practices used in providing support to teachers and students on a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Research Design

The study used a qualitative phenomenological research design. For this study, semi-structured interviews were conducted with PE curriculum design experts to identify best practices for the design and development of high school OLPE curricula.

Several reasons provided the rationale of choosing a qualitative phenomenological research design. According to Patton (2015), qualitative research differed from quantitative research in that data were collected through fieldwork, in-depth interviews, participant observation, and document analysis. Researchers utilized naturalistic inquiry to enter real-world settings to observe natural occurrences in an attempt to understand and make meaning of what was experienced (Creswell, 2013; McMillan & Schumacher, 2010; Patton, 2015). The researcher typically collected these data in narrative form compared to numeric data gathered in quantitative methods. The data must be analyzed via informed judgement to identify major and minor themes as expressed by study participants (Patton, 2015).

Qualitative methodology was used and determined to be an appropriate approach for this study, which sought to identify best practices for the design and development of high school OLPE. Nationally only 2.9% of online courses covered health and PE, although that number was expected to increase (Powell, Watson et al., 2015). Multiple qualitative approaches were considered. A Delphi study, which is composed of a panel of experts participating in three rounds of feedback, was also considered as a potential methodology. However, to obtain data to address the research questions, a phenomenological approach was the most appropriate because the research questions lent

themselves to narrative responses and sought to understand the lived experiences of PE design experts (Patton, 2015).

The specific qualitative approach used in this study was phenomenology. Phenomenology consists of exploring the meaning of a lived experience among human beings (McMillan & Schumacher, 2010; Patton, 2015). In addition, according to Patton (2015), phenomenology assumes "an essence or essences to shared experience. These essences are the core meanings mutually understood through a phenomenon commonly experienced" (p. 116). The phenomenon under study was the experiences of PE curriculum design experts in designing and developing PE curricula for online formats. Their shared experiences provided insight into the best practices for the development of OLPE curricula across the nation. These experiences were documented and collected through semi-structured interviews, which provided an abundant resource of information regarding the phenomena studied.

Identification of the specific research problem began the research process, followed by an extensive review of literature. After review, a purpose statement and research questions were developed to guide and focus of the study. These factors influenced the selection of the overall research design and methodology. The methodology utilized provided the most credible answers to the research questions proposed and delineated the process for collecting and analyzing data. Results were presented after data analysis and common themes were identified. The interpretations of the study's findings were then used as a basis for the conclusions presented.

Population

"A population is a group of elements (people, objects, or events) that share common characteristics and meet specific criteria for which the researcher intends to generalize the results of the research" (McMillan & Schumacher, 2010, p. 129). The population for this study was composed of high school OLPE design or development experts throughout the United States. A relatively small group of acknowledged experts exist on the design and development of high school OLPE. Prior to 2006, little was known about OLPE except for random news articles that praised or ridiculed it (Balona, 2003; Brooks, 2003; Cerabino, 2004; Gussow, 2002; Whritenour et al., 2006).

OLPE is an accepted option for high school students to meet PE and graduation requirements (Mosier, 2012; NASPE & AHA, 2012; SHAPE America et al., 2016). Nationally 2.9% of online course usage is in health and PE (Powell, Watson et al., 2015). Currently, 31 states allow high school PE credits to be earned through online formats (SHAPE American et al., 2016).

Sample

A sample consists of a small group drawn from a larger population to which the researcher intends to generalize findings (Patton, 2015). For qualitative research, a smaller sample size was used to capture and analyze rich, narrative detail that otherwise would not be noted within quantitative research (Patton, 2015). This approach produces a greater depth of understanding regarding the population, but reduces the generalizability due to the small sample size (McMillan & Schumacher, 2010; Patton, 2015). The sample for this study consisted of 13 OPLE curriculum design experts.

In selecting the participants for the study, a purposive criterion sampling method was employed. Purposeful sampling entails strategically selecting study participants who can provide rich, narrative information or experiences of the phenomena under examination to provide further insight rather than empirical generalization (Patton, 2015). Scheele (1975) defined experts as those with an applicable specialty or relevant experience in an area, in this case, OLPE curriculum design and development. On the design and development of OLPE, a relatively small group of acknowledged experts exist, whose knowledge and opinions are the only real guide to best practices about the issue of concern. Therefore, a large survey population would not be appropriate.

Specific criteria showing relevant experience for the sample population were defined for the study. Experts needed to meet at least two of the following criteria:

1. Five or more years teaching experience or college faculty with major in PE or kinesiology

2. Author or co-author of an article, book, or national document focusing on the design or development of high school OLPE, or invited speaker at a conference on the topic of design or development of high school OLPE

3. A minimum of two years of experience in high school OLPE, or designed or developed high school OLPE curriculum

Instrumentation

In qualitative research, the researcher is the main instrument that drives inquiry (Creswell, 2013; Patton, 2015). For this study, the researcher served as the main instrument and utilized semi-structured, in-depth interviews to collect data. As the researcher is the main instrument, it is essential that any potential bias be addressed to

strengthen validity (Creswell, 2013). The researcher worked to convey a neutral viewpoint while interviewing participants. The research was the primary presence for data collection process, which was a significant component of the study. Thus, the researcher's background is disclosed in this study to allow the reader to identify and infer any potential bias brought to the study.

Researcher Background

The researcher had experiential knowledge in the field of PE, teaching both traditionally and online. In years past that experience was considered something that limited bias, but not so today (Creswell, 2007; Janesick, 2004; Silverman, 2005). The researcher's lived experiences in online teaching enhanced the study and proved to be a source for insight and validity checks. As a former OLPE teacher and curriculum designer, her role was considered significant as an instrument and resource for the study. Patton (2015) referenced Howard S. Becker, a leading qualitative researcher, in stating the researcher's direct participation in and observation of the phenomenon could be one of the most significant and comprehensive types of research strategies. It was believed the researcher's knowledge and experience with the content area improved the interviewing process, rather than providing additional bias.

Interviews

Open-ended interview questions in a semi-structure format were used for this study. Semi-structured interviews consisted of developing a pre-determined interview script in which each interviewee was asked the same questions in the same order, but allowed the researcher to ask follow-up questions based on participant responses (Creswell, 2013; Patton, 2015). The strengths of this instrument format were that it

allowed for study participants to address the same questions for comparison and facilitated organization and analysis of data (McMillan & Schumacher, 2010).

The researcher developed an interview script (Appendix B) of six primary questions based on the iNACOL (2011) National Standards for Quality Online Courses. Each item addressed one of six the research questions and aligned with the purpose of the study. Probing, follow-up questions were also incorporated into the interview script to enhance the interview process and obtain additional details. The interview script questions were based on the study's literature review, which assisted in identifying the specific questions to ask each study participant.

Validity

As described by McMillan and Schumacher (2010), validity "refers to the degree of congruence between the explanations of the phenomena and the realities of the world" (p. 330). Validity within qualitative research consists of both the researcher and participants agreeing upon interpretations of data collected and their meanings (McMillan & Schumacher, 2010). Validity was established for this study via participant language, recorded interviews, interpersonal validity, and a pilot test of the interview script.

Participant language consists of utilizing easy to understand terms, and participants in this study were given a list of term definitions to ensure mutual understanding of terminology. All interviews were audio recorded and transcribed to ensure proper documentation of literal statements and quotations from study participants. To strengthen the accuracy and validity of data collected, participants were provided an opportunity to review their individual interview transcript to identify any discrepancies, which the researcher noted and rectified.

Interpersonal validity consists of the researcher's ability to relate meaningfully and effectively with the participants of the study (Patton, 2015). This included creating activities conducive to interpersonal dynamics and establishing buy-in among study participants (King & Stevahn, 2013). The researcher for this study fostered interpersonal validity by engaging with members of the sample population before conducting the interviews. This established the rapport needed to enhance a valid inquiry process and ensure collaboration among participants.

A pilot test of the interview questions was conducted using an expert who matched the criteria of the sample population. A pilot test strengthens study validity in that mock interviews help the researcher use the procedures as planned for the actual study, but the chosen respondents have an opportunity to provide feedback about the clarity of the questions asked, intent, and interviewing technique (McMillan & Schumacher, 2010). The researcher also had an opportunity to observe the respondents' behavior and reactions to the interview script and adjust as necessary. The practice and feedback from the pilot test was incorporated into the actual interviews for the study.

Reliability

Reliability in research was defined as consistency of results, which could be attained via standardization of data collection (McMillan & Schumacher, 2010; Patton, 2015). The researcher strengthened internal reliability by personally interviewing all study participants using a standard interview script and audio recording all responses. Again, definitions of study terms were provided to all participants prior to the interview to ensure mutual understanding and avoid confusion that could lead to differing interpretations of the interview questions.

The degree to which a study can be replicated in the future and produce equivalent results is known as external reliability (Zohrabi, 2013). The purpose and focus of this qualitative study was not to replicate its findings, but to gain a deeper understanding of the lived experiences of the sample group. As such, external reliability was less of a concern for this research.

To increase the reliability of the findings, multiple data sources and data collection methods were used to allow for triangulation of the findings. Triangulation consists of the "convergence of findings across data via multiple inquiry methods such as in-depth interviews and direct participant observations" (McMillan & Schumacher, 2010, p. 379). This study utilized in-depth interviews as its primary method of inquiry and included the review of artifacts to identify recurring patterns or themes across data.

To provide quality control for the study as well as evaluate the researcher's subjectivity and perspective toward the research collected, intercoder reliability was also used. Intercoder reliability involves using the assistance of individuals not familiar with the researcher or research itself to provide an independent perspective and come to the same conclusions (Lombard, Snyder-Duch, & Bracken, 2004). Lombard et al. (2004) stated intercoder reliability was crucial for content analysis as without it, validity could be challenged. The coders could reference specific queries regarding the research, such as "Do findings show meaningful parallelism across data sources?" or "Were coding checks made, and did they show adequate agreement?" (Miles & Huberman, 1994, p. 278).

Lombard et al. (2004) stressed that above all, it was critical to "calculate and report intercoder reliability" (p. 3). The external coder for this study was a university

faculty member who held a doctorate in kinesiology and designed and taught high school OLPE. The intercoder reliability process involved: establishing appropriate indices and tools to be used by the coders for analysis; setting acceptable minimum levels of reliability for the indices used; assessing reliability via a formal pilot test; selecting the appropriate procedure for utilizing the results of the reliability sample and incorporating into the full sample; and ensuring all results were clearly and accurately reported.

Themes were selected for the reliability test. The same NVIVO data and themes were given to the peer researcher, who then reviewed the data to ensure validity of the themes identified by the researcher. The data were coded using the NVIVO software in terms of the themes. The coding results of the researcher and peer researcher were then compared to ascertain congruency. A minimum of 80% agreement was established regarding the frequency of coded data before the launch of the reliability sample. The results were then reported in a transparent and clear manner for future researchers to review.

Data Collection

The primary data collection method for this study was in-depth interviews. As stated by Patton (2015), "We interview people to find out from them those things we cannot directly observe and to understand what we've observed" (p. 426). The purpose of this study was to identify instructional design best practices used in the design and development of high school OLPE curricula as reported by PE curriculum design experts. The selected data collection method of interviews aligned with the study's purpose statement and provided rich data to address the research questions.

Brandman University's Institutional Review Board (BUIRB) approved the study's

design and interview scripts before the commencement of data collection. Once

approved, an email was sent to the sample subjects with the following information: an

invitation to participate, an informational letter (Appendix C), a research *Participant's*

Bill of Rights (Appendix A), and an informed consent form (Appendix D). More

specifically, the email invitation included (a) an introduction regarding the researcher,

including contact information; (b) a brief overview of the study and its purpose; (c) the

time commitment needed to participate in the study; (d) the fact that participation was

strictly voluntary; and (e), the informed consent form. In addition, a separate consent

form was provided for granting permission for the oral interviews to be audio recorded

and an option to indicate whether the participant wished to review the transcript of the

interview at another time following the event.

All data collected during this study were protected to ensure the privacy of study

participants. Only the researcher knew the identities of study participants.

Confidentiality of all information obtained was provided by the researcher to participants

before all recorded interviews. Any identifiable information mentioned by study

participants during the recorded interview process was later replaced with de-identified

labels. The recorded audio files were stored on a password-protected laptop, and only the

researcher had access to the data. Once the audio files were completely transcribed, the

files were destroyed.

Interview Procedures

The interview procedures followed the same format for all participants. First, an

email was sent to study participants one week before the scheduled interview date to

confirm the date and time. Attachments to this email in PDF form included: (a)

Brandman University's *Participant's Bill of Rights* (Appendix A), (b) the informed

consent form (Appendix D), and (c) an outline of the interview questions to be asked

(Appendix B).

The researcher made every effort to accommodate each of the study participants'

preferences for specific date and time for which the interview would take place. The

researcher followed the same procedure for each interview as outlined in the interview

script (Appendix B). The researcher introduced herself to every study participant and

then reviewed the purpose of the study and consent form paperwork. Time was allotted

for participant questions. Additionally, the researcher reminded participants their

responses were confidentiality, they were free to terminate the interview process at any

time, and they could decline to answer any question. The interview commenced and was

recorded with Adobe Connect audio recorder.

After all interviews were conducted and recorded, the audio files were transcribed

into electronic documents. The researcher reviewed the transcribed documents to ensure

accuracy. To further strengthen the validity of the transcripts, the study participants who

requested to review their audio transcription were sent an email with their specific file.

Any edits received from study participants were documented and corrected by the

researcher.

Artifact Collection

The researcher collected artifacts to add to the qualitative data and strengthen the

validity of the findings. Artifacts could consist of organizational documents and relics

that show an internal or group perspective (McMillan & Schumacher, 2010). The

gathering of documents and relics are useful because they can be reviewed quickly to

obtain information that can drive the need for inquiry (Patton, 2015). Artifact sources

and samples used for this study are listed in Table 4.

Table 4

Sample of Artifacts Collected

Source	Sample Artifacts
Curricula	Lesson plans, rubrics, worksheets, textbooks, assessments
Websites	LMS, IWT, video, audio, technology integration
Teacher Resources	Handbooks, resource guides, professional development modules, pacing guides
Student Resources	Orientations, videos, remediation documents, libraries, websites, syllabi

Note: These are examples of artifacts collected and not an exhaustive list.

Data Analysis

This qualitative study employed inductive analysis, the most commonly used

method of analysis in qualitative research (McMillan & Schumacher, 2010; Patton,

2015). As explained by Patton (2015), inductive analysis consists of "discovering

patterns, themes, and categories in one's data" (p. 542). It was especially relevant when

attempting to discover new themes, patterns, and categories, as in the case of this specific

qualitative study regarding OLPE. The process could be visualized as a funnel in which

data were collected from various sources and then generalized into different themes or

identified patterns (Creswell 2013; McMillan & Schumacher, 2010; Patton, 2015). This

contrasted with deductive analysis, in which a predetermined hypothesis was made and

data were collected to prove or disprove it (McMillan & Schumacher, 2010). Though

findings may vary across qualitative studies that utilize inductive analysis, a common

protocol must be followed: (a) data are collected and documented, (b) the coding process

ensues and data are categorized, (c) patterns and themes are identified and legitimized, and (d) the resulting findings are displayed (Creswell, 2013; McMillan & Schumacher, 2010; Patton, 2015).

Qualitative data analysis cannot commence unless the data were first properly collected and documented. Throughout the process of data collection, themes and patterns can emerge as the researcher commences with the inquiry process (McMillan &Schumacher, 2010; Patton, 2015). It was noted that qualitative research design contrasted to quantitative designs as the data collection process could be fluid and the researcher could modify the instrument if needed as new patterns and themes emerged (Patton, 2015). The instrument for this study was a semi-structured interview script.

It was critical to ensure the interview data were documented verbatim to improve accuracy and to provide for quality checks (McMillan & Schumacher, 2010; Patton, 2015). Interviews were collected and documented with Adobe Connect audio recordings, along with notes taken by the researcher during the interview process. Notetaking during interviewing allowed the researcher to observe and document non-verbal communication and refine interview and probing questions (McMillan & Schumacher, 2010; Patton, 2015). The data were then transcribed and reviewed to eliminate any transcription error.

After the data were transcribed, the coding and categorization process began. The coding process began with preliminary reviews of the data to identify segments, which usually consisted of one to three sentences that contained an essential idea or piece of information relevant to the study. The data were segmented, and the segments were analyzed to identify specific codes. Codes are words or phrases that give meaning to segments of data (Patton, 2015). The codes in this study were driven and developed by

the qualitative data collected. The next step in the process involved using NVivo qualitative software, in which the codes (or nodes as referenced by the software) were applied to the transcribed data. NVivo allowed the researcher to analyze the codes produced by the data for categorization. The researcher reviewed the codes multiple times to verify accuracy and identify any uncoded text that could result in new codes.

Identifying and legitimizing themes or categories commenced after the data were properly coded. The action of identifying themes was the "first level of induction by the researcher" (McMillan & Schumacher, 2010, p. 377). Codes with similar meaning were grouped together to identify themes and classified as major or minor in significance. Following the establishment of themes, the researcher initiated the identification of patterns. McMillan and Schumacher (2010) pointed out that "in searching for patterns, researchers try to understand the complex links among various aspects of people's situations, mental processes, beliefs, and actions" (p. 378). The process was iterative as the researcher scrutinized the data, checking emerging patterns to verify convergence and divergence among themes. It was a lengthy and involved process to thoroughly review the data, ensuring all sources were depleted and no new patterns could be identified due to redundancy.

As stated by Patton (2015), "visualization rules" (p. 608). Qualitative data analysis findings can have their results conveyed in a more meaningful manner dependent upon the method of display utilized (Patton, 2015). This study incorporated the use of tables, figures, and diagrams to properly depict the study's findings for ease of understanding and proper presentation.

Limitations

The limitations of the study were those characteristics of design or methodology that set parameters on the application or interpretation of the results of the study—that is, the constraints on generalizability and utility of findings resulting from the design or method that establish internal and external validity. The most obvious limitation was the ability to draw descriptive or inferential conclusions from sample data about a larger group.

Qualitative inquiry endeavors to produce the most credible research possible in alignment with a study's purpose (Creswell, 2013; McMillan & Schumacher, 2010). This study aimed to adhere to this standard; however, it was important to note inherent limitations of the study to provide transparency to the reader. As such, the following limitations were identified for this study:

1. This study was limited in that its qualitative phenomenological design required a small sample size. Thus, findings cannot be generalized to a larger population (McMillan & Schumacher, 2010; Patton, 2015).

2. It was also constrained via its semi-structured interview format in that the interview questions could not be changed dramatically once implemented.

3. In addition, by using an interview format, the study's data were susceptible to human bias such as participants withholding information or providing false details of events.

To strengthen the quality of research, the following safeguards were built into the study to address its inherent limitations:

1. Triangulation of data from multiple sources instead of using only interview

data

2. The researcher's knowledge of OLPE through first-hand experience and a
   similar professional background as those of the study participants

3. The use of external, independent coder to establish a lack of bias and to
   provide overall quality control for intercoder reliability

Summary

This chapter presented a summary of the study's methodology. The purpose statement and research questions were presented to serve as a foundation for the study. The selected research design was reviewed, along with the study's population and sample. Next, the data collection and analysis procedures were described, as well as addressing the study's limitations and safeguards. Chapter IV reviews and presents the data collected during this research study.

CHAPTER IV: RESEARCH, DATA COLLECTION, AND FINDINGS

This phenomenological study identified and described best practices for the design and development of high school online physical education (OLPE). Chapter IV described the qualitative data obtained through interviews with OLPE design experts and the collection of artifacts. This chapter begins with a review of the purpose statement, research questions, population, sample, and methodology used in the study. The data collected from the qualitative interviews addressed the central research question and six sub-questions. The qualitative data are presented in narrative format including direct quotes from the interviewees. Chapter IV concluded with a presentation of the data and a summary of the findings.

Purpose Statement

The purpose of this qualitative study was to identify and describe the best practices used in the design and development of high school OLPE curricula based on the International Association for K-12 Online Learning (iNACOL) National Standards for Quality Online Courses as reported by OLPE curriculum design experts.

Research Questions

This study sought to answer the following central research question: What are the best practices used in the design and development of high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses as reported by OLPE curriculum design experts? The study also addressed six sub-questions:

1. What are the best practices used in the selection of content for the design and development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

2. What are the best practices for instructional design employed in the development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

3. What are the best practices used in designing student assessments for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

4. What are the best practices used in integrating technology in a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

5. What are the best practices used in evaluating the effectiveness of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

6. What are the best practices used in providing support to teachers and students for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Methodology

This qualitative study employed a phenomenological approach to identify best practices for the design and development of high school OLPE curricula. Data were collected through in-depth interviews and a review of artifacts. An interview script developed utilizing the iNACOL (2006) National Standards for Quality Online Courses was used to maintain consistency across study participants. All interviews were conducted using Adobe Connect and transcribed by the researcher. The researcher reviewed recorded interviews in conjunction with corresponding transcripts to verify

transcribed content accuracy. In addition, the researcher collected artifacts regarding best practice for high school OLPE and removed any personal identifiers to ensure anonymity.

To identify emerging themes, an inductive analysis of qualitative data, was employed. Preliminary review of the data identified segments that contained essential ideas relevant to the study. Once the data were segmented, specific codes were assigned to each segment, reflecting a relevant idea and giving meaning to that segment. The researcher reviewed the codes multiple times to verify accuracy and to further identify any potential new codes. Once completed, the researcher categorized codes, based on the theoretical framework, and triangulated data from multiple sources to validate codes and categories.

Population and Sample

The population for this study was high school OLPE design or development experts in the United States. A relatively small group of acknowledged experts in design and development of high school OLPE exist. Nationally, health and OLPE represented 2.9% of online courses (Watson et al., 2015) and just 31 states allowed credits to be earned through OLPE formats (SHAPE America et al., 2016).

The sample for this study consisted of 13 OLPE curriculum design experts across 13 states. This study utilized purposeful and convenience sampling to identify experts. To be characterized as an expert, potential participants needed to meet at least two of the following criteria:

1. Five or more years teaching experience or college faculty with a major in physical education (PE) or kinesiology

2. Author or co-author of an article, book, or national document focused on the design or development of high school OLPE, or invited speaker at a conference on the topic of design or development of high school OLPE

3. Minimum two years experience in high school OLPE, or previously designed or developed a high school OLPE curriculum

Demographic Data

All 13 participants for the qualitative interviews were identified as experts in PE/kinesiology and online curriculum design and development, and met the study criteria as shown in Table 5. Seven of the experts were male and six were female; all participants had five or more years of teaching experience, and all had designed or developed high school OLPE curricula.

Table 5

Criteria Selection for OLPE Curriculum Design and Development Experts

	5 or more years teaching experience	Author or Co-author of an article, book, or national document	Minimum 2 years experience
Participant 1	✓	✓	✓
Participant 2	✓		✓
Participant 3	✓	✓	✓
Participant 4	✓	✓	✓
Participant 5	✓		✓
Participant 6	✓	✓	✓
Participant 7	✓		✓
Participant 8	✓	✓	✓
Participant 9	✓		✓
Participant 10	✓		✓
Participant 11	✓	✓	✓
Participant 12	✓	✓	✓
Participant 13	✓	✓	✓

Presentation and Analysis of Data

Data in this chapter were obtained from interviews with 13 high school OLPE curriculum experts. Post interview transcripts were coded where 21 themes emerged. Most participants mentioned all the themes during the interviews, as shown in Table 6.

Table 6

Themes Identified from the Study

	Theme	Frequency	Sources
SubQ1	1. Inclusion of academic content standards and assessments	178	28
	2. Inclusion of a course overview and introduction	154	26
	3. Inclusion of current, accurate, and bias-free content	153	24
	4. Inclusion of instructor resources	125	20
SubQ2	5. Inclusion of a variety of instructional and assessment methods	172	27
	6. Inclusion of meaningful and authentic learning	165	24
	7. Inclusion of instructor-student and student-student interactions	96	18
	8. Inclusion of student tools and resources	94	26
SubQ3	9. Inclusion of assessments aligned to course objectives	148	28
	10. Inclusion of ongoing formative assessments	132	22
	11. Inclusion of summative assessments	114	22
SubQ4	12. Instructor access to content within the LMS	123	20
	13. Clear and consistent navigation throughout the course	120	20
	14. Provision of technology requirements prior to course start	96	17
	15. Use of universal design principals to provide access to all students	80	17
SubQ5	16. Multiple ways to assess course effectiveness	75	13
	17. Frequent course updates	71	17
	18. Provision of highly qualified instructors	62	13
SubQ6	19. Inclusion of professional development	96	15
	20. Inclusion of technical support	84	16
	21. Inclusion of a student orientation	75	13

Data Results for Research Sub-Question 1

Research sub-question 1 asked, "What are the best practices used in the selection of content for the design and development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?" The iNACOL (2011) National Standards for Quality Online Courses described quality content as providing engaging learning activities allowing students to work toward mastery of the content standards. From data collected, four major themes emerged: (a) inclusion of academic content standards and assessments, (b) inclusion of a course overview and introduction, (c) inclusion of current, accurate, and bias-free content, and (d) inclusion of instructor resources. Table 7 displays the themes, frequencies, and number of sources noting the theme. All 13 participants mentioned each theme.

Table 7

Frequency of Themes and Sources for Research Sub-Question 1

Theme	Frequency	Sources
1. Inclusion of academic content standards and assessments	178	28
2. Inclusion of a course overview and introduction	154	26
3. Inclusion of current, accurate, and bias-free content	153	24
4. Inclusion of instructor resources	125	20

Theme 1: Inclusion of Academic Content Standards and Assessments

Experts interviewed during this study considered inclusion of academic content standards and assessments a best practice in the design of high school OLPE curricula, which aligned with iNACOL standards. All 13 participants discussed methods used to align content and assessments to national or state academic standards. The theme of inclusion of academic content standards and assessments had the highest frequency with 178 references from 28 different sources.

Participants shared how they aligned content to state or national standards. For online courses to emulate face-to-face courses, participants detailed specific methods used to meet the highest standards of quality design and alignment with standards. Participant 7 stated, "We are starting off by looking at the national standards and outcomes because that's the basis for many of the state standards and outcomes." Participant 2 also confirmed, "We established correlations with SHAPE America Physical Education Standards." The review of artifacts showed eight of the learning management systems had state or national standards embedded, and six teacher handbooks included learning objectives and assessments aligned with state or national standards.

Participants also discussed how they matched requirements of the standards to what students did in the classroom. Participant 9 stated, "We let students know not one-size-fits-all and so there are different options to improve your fitness." The concept of choice allowed curriculum designers to read and interpret standards in such a way that led to relevant curricula for the student. Participant 5 further suggested student voice and choice was important in choosing activities aligned with the standards, saying, "We knew we needed to create something standards-based, designed for a kid that they would not normally participate, and that gave flexibility for those students who had kind of desires or hobbies, physical activity outside the norm." In addition, participants shared the need for continuous review to ensure the learning experiences aligned to the standards. Participant 9 shared reverse course design helped with alignment and focus, adding:

We start by identifying our course goals and learning objectives so we
design a structured and engaging course. So, what we want to do

essentially is backward design where we want to look at the outcome so

that students walk away from high school with skills. The knowledge we

want them to have in this case is specific to their ability to manage their

own fitness.

Further, Participant 7 stressed the importance of standards alignment in meeting

targeted objectives, commenting:

It is all aligned by the standards, so they basically have all the objectives

that also match, and we go through synchronous and asynchronous lessons

and are able to hit those targeted objectives. And then ultimately assess

and make sure that they satisfy all the benchmarks within the national

standards.

Although numerous other examples were available, Participant 7 clearly

highlighted academic content standards and assessment was a best practice in OLPE.

Carefully written course objectives aligned with standards provided students a roadmap

that explained where they were going in the course and what to expect once finished.

Course learning objectives provided alignment of critical course components, such as

student assessments, instructional materials, course activities, and course technology.

Theme 2: Inclusion of a Course Overview and Introduction

One best practice in design of high school OLPE content was inclusion of a

course overview and introduction. The iNACOL (2011) National Standards for Quality

Online Courses stated course overviews should clarify learning objectives and

expectations, and introduce the activities, materials, time commitments, and other

relevant information. All 13 participants included a course overview and introduction in

high school OLPE courses they designed. The theme of inclusion of a course overview and introduction had the second highest frequency with 154 references 26 sources.

Unanimously, participants noted a need for course overviews and introductions to ensure students understood the requirements necessary to succeed. Course overviews and introductions were typically accomplished through live orientation sessions via web conferencing tools or video recordings. Participant 11 shared how orientations were used to help students become comfortable with the online environment, saying, "I share a little bit about how to move about the course, how to start, the goals and objectives, where to begin the introduction section, and the course materials." Participant 7 confirmed orientations familiarized students with the online environment, stating, "My expectations are the whole first week of our classes are just orientation where no work is assigned, but students are supposed to familiarize themselves with the syllabus, the goals and objectives, expectations, and content in general." Participant 2 shared how to deconstruct the orientation, commenting "I would break apart the sections…and my students would go with me and I would guide them, help then on how to use the platform, how does it work, how to submit, and where they can find their grades." This systematic planning created a positive learning environment where students felt supported and learned about the learning management system (LMS), the technology platform used to submit assignments, communicate with other students, and access course materials.

In addition, welcome messages as an orientation were used for students. Both written and video welcome messages were employed by participants. Four participants shared introductory videos. Participant 11 described a course video easily set expectations as compared to explanations on the first day of a face-to-face class, saying,

"I can provide an introductory video message to share…I share a little bit about how they move about the course, where the introduction section is, where the course materials are." Participant 13 explained introductory videos helped students associate a name to a face, which built rapport.

Eight participants referenced inclusion of a schedule within the course overview, and nine schedules were reviewed either through the LMS or using a webpage containing a hyperlink to the course schedule. Participant 1 explained the course schedule provided a roadmap, including time commitment to complete the class, and noted the schedule "basically outlines what the student has to do on each particular date from day one of the semester going all the way through the final exam." In addition, Participant 13 explained schedules were an integral part of the orientation, noting, "The course schedule is reviewed during the orientation so students can manage their time and track their progress."

Participants provided multiple examples where students familiarized themselves with the technology and requirements prior to the start of an online course, further highlighting the inclusion of a course overview and introduction as a best practice. Students who had not taken an online course could be unprepared for the unique environment of online learning; therefore, to ensure student success, an initial course overview or orientation was required (iNACOL, 2011). Before courses started, online orientations offered multiple benefits for students that included a sense of online learning, performance requirements, and course information.

Theme 3: Inclusion of Current, Accurate, and Bias-Free Content

An additional best practice in the design of high school OLPE content was inclusion of current, accurate, and bias-free content. The iNACOL (2011) National Standards for Quality Online Courses highlighted importance of current, accurate, and bias-free content, as did all 13 participants. The inclusion of current, accurate, and bias-free content theme was third highest in frequency with 153 references across 24 sources.

Participants discussed methods used to design courses that provided equal educational opportunities for students from diverse racial, ethnic, social class, and cultural groups incorporating picture and video representation of various students within the curriculum. Participant 1 explained, "Whenever there are photos or videos in the course, there's a representation of all ethnic, racial, and social groups." Participant 5 shared just how students related to pictures and videos in the curriculum, saying:

> One of the things that we really try to do is our photographs and videos. We try to get as diverse models as possible in terms of race, male, female, different body types, all those things. We want to make sure that somewhere in the course a student is going to see a student example that looks like them.

Moreover, participants discussed types of physical activities included in the curriculum that provided equal and diverse educational opportunities. The individualized format of online learning was emphasized by providing various types of activities and focusing on student wants and needs. For example, Participant 6 explained use of non-traditional physical activity, sharing:

I generally suggest something that levels the playing field. We generally

think of tennis as a Caucasian sport or basketball as an African American

sport, so I suggest "Hey let's do circus arts or let's do yoga" where

everybody doesn't have a background in this.

Participant 11 further commented on diverse and inclusive activities such as

"hiking, outdoor activities, aquatic activities." Whereas, Participant 8 discussed student

choice of physical activity, saying, "The other thing is we let them choose the activities

that they love." All these strategies provided students equal opportunities to participate

regardless of their developmental level or ability.

Inclusion and diversity were evident in the artifacts reviewed. The LMS pages,

textbooks, and websites that housed student lessons were representative of all genders

and racial and ethnic backgrounds. Multiple types of physical activities were included

through multiple format presentations, including electronic formats, apps, and videos that

provided choice for student participation.

Participants also discussed the importance of current and accurate course content.

The electronic format of OLPE curricula allowed for continuous updating and upgrading.

Participant 3 mentioned updates were "on a five-year cycle, and this is where we can add

crucial new information." Participant 5 talked about monthly updates "because we are

always trying to see how can we be more focused…more contemporary. The cool thing

about the LMS is you can keep 70% of what's on there and pull out something that is

antiquated." Participant 9 talked about how current research effects curriculum updates:

Researchers are making the case that there is a correlation between grip

strength and standing broad jump results and power in general. So, we

wanted to make that change in our curriculum. And when we change that

content in one place, we also have to realize that it changes test questions,

all the assignments, and so forth. The thing is with an online product, we

are able to do it more smoothly.

As the above examples showed, participants included examples of diversity,

equity, inclusion, and content knowledge to remain current, accurate, and bias-free. By

modifying the content, learning activities, outcomes, and environments, OLPE content

met the needs of diverse learners. To remain relevant, online courses must be continually

revised and improved, especially when new, emerging, and evolving technologies are

introduced.

Theme 4: Inclusion of Instructor Resources

A best practice in the design high school OLPE curricula was the inclusion of

instructor resources. The iNACOL (2011) National Standards for Quality Online

Courses highlighted the need for instructor resources with every lesson, which was

echoed by all 13 participants. This theme had the fourth highest frequency with 125

references from 20 sources.

All the participants discussed the resources they made available to teachers

throughout each course. Participant 10 explained, "Many of the formative assessments

are built into the course. Same with the lessons, logs, self-assessments, videos…We also

include a syllabus and suggestions on how to use the course within the system."

Participant 3 noted teachers were shown where resources were and how they could be

modified to meet teacher needs, saying, "We are providing information on where they

can find the materials that meet what they want to do. They can modify all of the

materials in the online course."

Just as many OLPE curricula had introductory videos, participants also explained

how they used video as a teacher resource. Participant 6 described how video was used

to explain components within the curriculum:

It's not just here is the physical education content and the lessons and

assignments. But, here is how to use some of the other software programs

that you will be asked to use as part of this curriculum. So, here are some

videos on how to use those particular programs.

Teacher resources were also made available through webpages or portals.

Participants explained how teacher resources were organized and stored electronically for

ease of access and convenience. Participant 1 explained, "We have what we call our

faculty room where our teachers can go in and there are resources for standards alignment

or videos to assist them with certain parts of the course." Participant 9 also shared, "We

have a teacher resource portal on our webpage with multiple tools, videos, links."

Participants provided access to teacher handbooks, resource guides, professional

development modules, and pacing guides. These resources allowed teachers to select

tools to learn about and integrate into their teaching. Many of these resources focused on

online collaboration tools, presentation software, linked devices, course management

tools, smartphones, and apps.

Providing resources to teachers was a best practice in OLPE curriculum design.

Quality resources supported teaching and reduced teacher workload by providing easy

access. Ideally, these resources were tailored specifically to the curriculum. Resources

provided to teachers should be comparable to face-to-face courses, as well as special

supports created for the online environment.

Data Results for Research Sub-Question 2

The second research sub-question asked, "What are the best practices for

instructional design employed in the development of a high school OLPE curriculum

based on the iNACOL National Standards for Quality Online Courses?" The iNACOL

(2011) National Standards for Quality Online Courses described quality instructional

design as using engaging learning activities that met student needs, was differentiated,

offered multiple methods of showing mastery, and was interactive. In analyzing the data

collected, four major themes related to the sub-question 2 emerged: (a) inclusion of a

variety of instructional and assessment methods, (b) inclusion of meaningful and

authentic learning, (c) inclusion of instructor-student and student-student interaction, and

(d) inclusion of student tools and resources. Table 8 displays the four themes that

emerged, along with their frequency of occurrence across sources.

Table 8

Frequency of Themes and Sources for Research Sub-Question 2

Theme	Frequency	Sources
5. Inclusion of a variety of instructional and assessment methods	172	27
6. Inclusion of meaningful and authentic learning	165	24
7. Inclusion of instructor-student and student-student interaction	96	18
8. Inclusion of student tools and resources	94	26

Theme 5: Inclusion of a Variety of Instructional and Assessment Methods

A best practice in instructional design for high school OLPE was inclusion of a

variety of instructional and assessment methods. The iNACOL (2011) National

Standards for Quality Online Courses recommended multiple learning activities,

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assessments, and tools to help students master course content. All 13 participants discussed the inclusion of a variety of instructional and assessment methods within high school OLPE courses they designed. This theme had the highest frequency with 172 references across 27 sources.

All 13 participants stressed the importance of student choice as a means of providing a variety of instructional and assessment methods. Participants talked about engaging students through choice. Participant 8 explained how student interest increased engagement, and Participant 1 described how students engaged in learning of their choice, stating:

> With some of the different projects that we have, students have a choice in what they can do for projects. If a student has a particular strength in something or you know they feel very strongly about something, they have the opportunity to pursue that. Or they want to avoid something because of some issue they've had in the past, then they have the chance to avoid that by doing the project a different way.

These types of instructional activities provide progressions that allowed students to build on previously learned content and skills by focusing on lifetime activities. Participant 5 discussed how student interests, learning styles, rates of learning, and other personalized learning factors were considered. Student goal setting was also mentioned as a means of providing a variety of instructional and assessment methods. Participant 7 stressed, "They have to set their own goals." Students take ownership of their learning according to Participant 6, who commented:

If one person just wants to learn how to juggle, then that's available to that

person. Or if that's the only thing that person can do the entire time then

that's fine. I built it into the curriculum here's what you're looking for

because not everybody might pick that up. But that's what that person's

goal is, to juggle, and so that's built on what goal did they want. And they

set their own goals.

Participant 9 elaborated on how learning was much more meaningful for students

when they were personally involved, sharing:

We would talk about strengths and weaknesses and what their goals are.

They're setting goals based on their own measurements rather than some

arbitrary example, and it personalizes it more for them. Are you

competitive or more cooperative? We try to let students know not one-

size-fits-all and so there are different options to improve your fitness.

Hopefully we can engage students that way rather than the model of

everybody's going to be playing basketball whether you like it or not.

Because when we look at the high school level, we really want to get the

kids excited about physical activity not dreading the thought of it.

Participants described multiple types of assessment. Participant 2 mentioned

students chose how they wanted to prove their learning, saying, "It was wide open and

they could make PowerPoints or movies expressing what they had learned over time."

Participant 3 added how projects provided multiple ways students could demonstrate

what they learned, "We encourage project-based learning and we encourage teachers to

assign students to do projects create a video, a PowerPoint, do a survey a variety of things

like that." Participant 8 discussed the importance of differentiation of assessment, adding, "Sometimes it could be that I want to provide more differentiation in an option for demonstrating mastery of the content when needed so they [students] have some choices as well." Participant 1 explained how assessments were based on student levels of fitness:

> Students can choose the ability on how they want to workout. For example, if a student is obese, they may be able to walk for 20 minutes and get their heart rate up to about 135 with no problem. We may have a student that's a cross country runner that really has to push themselves to get their heart rate to 135 for 20 minutes or longer. So, they have the ability to work within the things they're doing at their fitness levels.

Nine of the participants provided access to lessons and assessments within the LMS or webpages that showed multiple types of physical activities students could choose to engage in to achieve learning goals. Students were provided multiple opportunities to engage in activities such as online lessons, apps for smartphones, exergaming online and through gaming counsels, and local community offerings. Multiple types of assessment were also noted, including journaling and exercise monitoring devices.

These examples of programs that used student choice based upon prior knowledge, fitness, and backgrounds showed how providing a variety of instructional and assessment methods was a best practice. Assessment choices provided students with multiple opportunities to share what they learned, and varied instructional methods recognized learners as individuals in pursuit of common learning goals. The use of

online instruction with personalized tools also provided effective individualization when paired with varied instructional and assessment methods.

Theme 6: Inclusion of Meaningful and Authentic Learning

A best practice in instructional design for high school OLPE was the inclusion of meaningful and authentic learning. The iNACOL (2011) National Standards for Quality Online Courses indicated learning activities and assessments should push students toward understanding and application, not just memorization. All 13 participants discussed the inclusion of meaningful and authentic learning within high school OLPE courses. This theme had the second highest frequency for sub-question 2 with 165 references across 24 data sources.

All 13 participants discussed how they included meaningful and authentic learning that emphasized critical-thinking and problem-solving. Participant 10 explained how activities focused on higher-order learning levels:

> I definitely want to include assignments and exercises that would have
> them go beyond what year was basketball invented, you know the silly
> questions, and focus on application of content and understanding,
> analyzing content. Those things we want to do as much as possible. Look
> at Bloom's Taxonomy and make sure that we have a good mix moving
> from the lower-level to the higher-level to continually challenge students.

The addition of supplemental resources, external activities, and supplemental applications to increase critical-thinking and problem-solving were noted by participants. Participant 7 observed the structure and organization within the LMS provided ease of access to supplemental resources, saying "The LMS has all the content uploaded, and

then for each specific unit there are external links and resources students can either

follow or download. They do a great job with content, with external resources for

students to check."

Participants also discussed how technology tools were integrated to enhance the

effectiveness of the curriculum. With the addition of supplemental resources, the

curriculum was organized to maximize opportunities for students to learn and be

physically active. Participant 2 explained how students were challenged and therefore

engaged when using technology tools:

They had to track their nutrition and fitness the entire semester. So, for

the physical activity, physical education, there was 18 weeks of physical

fitness that they had to do. We used to use heart rate monitors with the

strap, but then I developed a whole new section for the fitness component

using free apps and smart phones. And they had to turn in a video clip of

them working out. They had to show components of every part of fitness.

Overall growth and inclusion of more standards and cross-curricular components

were also noted to enhance meaningful learning. Participant 3 stressed the importance of

providing equal representation of standards:

Over the years, the courses that are associated with the curriculum have

evolved. We have drawn in more and more content related to standard

five, diversity and personal and social responsibility. And standards one

and two skill learning as opposed to just fitness, health, and wellness.

Participant 11 also discussed the inclusion of extra content for high achieving students:

There is extra bonus content related to icons in the text. In the latest edition, we added three additional modules and these relate to things you would do after learning the base content. There's a chapter on careers, one on leadership and things like that. There's information on skill learning and biomechanics.

Participant 4 explained how through the inclusion of strategies, tactics, exercise science, biomechanical analysis, and fitness concepts authentic learning took place within the online curriculum:

We basically had 7 units. Pre-assessment is Unit 1. They do fitness testing beginning and end of the course. And then the second unit they go into designing an exercise program so they learn about how to create an exercise program for themselves. Then we cover cardiovascular fitness and we talked about flexibility training in the next unit. Kinesiology and resistance training and then we go over strength training. And then they finish with creating their post assessment fitness test that they do in the class. Within each of those units there are a few assignments that help build their knowledge about those specific topics.

Participant 5 included cross-curricular components to provide greater opportunities for learning:

They have activities related to the standards, and then we moved toward creating similar lessons with more of a focus on English, writing through

the curriculum, and connections where we can. We've added more contemporary fitness articles, and health-related articles that connect to the standards and objectives.

Participant 13 explained how students had to analyze and synthesize information through writing and not just activity tracking, saying, "Just tweaking the log, providing them with directions about what activity, what to write down for their activity, what to explain. You know, just putting going to the gym is not enough, and we need more information." Including multiple levels and ways of participation in activities was also noted in the interviews. Participant 6 described how students could engage with the curriculum no matter what their beginning skill level while still being appropriately challenged and engaged:

> You can always build up for those that are getting it… within every task, here's how to make it easier. Here's how to make it more difficult. There's always more tasks that can be learned. What you're doing first before you move on to the next task.

Engaging virtually and in real time activities with the local community was also noted within the content. Participant 1 explained how virtual field trips were used to help student engage in environments they might not otherwise access:

> We offer virtual field trips and I did one I created this past Spring. Not just for our state, but for students across the country who had access to this virtual field trip that I had when I took them through the Health Sciences Human Performance Department on the University campus. We had some interviews with some students and professors in the department about

exercise science or allied health degrees and options for what they could

do with those degrees and those careers. We showed them around the

campus a bit, and we got positive feedback for student career ideas and

some college-bound degree ideas if they were interested in that field of

physical activity or human performance or allied health.

Participant 7 elaborated on how activities extended experiences from class

activity lessons to community and family activities promoting a physically active

lifestyle:

I share with the students some tips and suggestions about going to the

local YMCA. Finding your YMCA, you know they give a three-day free

pass. Sometimes we ask them to look up their community offerings.

What's going on for a fitness activity or sometimes we talk about I saw

this 5K walk, walk-run is going on in your neighborhood, or in your city.

Do you want to try something like that? Do you want to look into that?

So, for fitness based resources we just try to maybe sometimes ask them or

if we find out something share a little bit about what's going on in their

community.

Through these types of learning experiences students become wise consumers of

the fitness and wellness industries. Participant 10 explained alignment of course content

with local businesses that provided physical activity opportunities:

If you took the physical education class, then you had to participate in

certain activities. I had set up at a bowling alley that they had to go and

for the semester for that module they had to go and bowl four times at the

bowling alley, and the bowling alley would sign a verification that they came.

Ten of the participants provided access to their LMS and websites that encouraged students to engage in higher-order movement and learning activities. Multiple links were noted that provided students with apps, videos, and community engagement opportunities. These were all aligned with learning objectives and provided students with options to show mastery of learning.

These examples showed how using a variety of authentic and meaningful learning experiences was a best practice. When adequately challenged, students put more time and effort into their learning. Activities should focus on higher-order learning levels, promote reflective learning, and align with and measure course goals and objectives.

Theme 7: Inclusion of Instructor-Student and Student-Student Interaction

A best practice in instructional design for high school OLPE was the inclusion of instructor-student and student-student interaction. The iNACOL (2011) National Standards for Quality Online Courses stated learning activities should include opportunities for interactions between the instructors and students, and among students. All 13 participants discussed the inclusion of instructor-student and student-student interaction within high school OLPE courses they designed. This theme had the third highest frequency with 96 references across 18 sources.

Participants emphasized the importance of the teacher in providing feedback and intentionally designed activities to teach communication. Participant 1 stated, "In the online environment, communication has got to be key. I think that from a curriculum standpoint, you have to vary the modes of communication." Live class sessions and

discussion boards were noted as ways to incorporate communication skills in the curriculum and increase interaction. Participant 3 explained, "Some people use discussion boards and things like that to allow interaction." Participant 2 added, "I scheduled live meetings. We used Adobe Connect for students to have face-to-face time on the computer." Participant 10 elaborated on how students were involved in dialog, debate, writing, and problem-solving, as well as higher-order thinking, sharing, "The discussions were situational sometimes depending upon the topic, but a student would post their discussion and every student has to read each other's post and make a comment." Participant 4 explained how interaction was used within the course in a way that enhanced and balanced lecture content:

> We have discussion question assignments throughout the course. In our
> discussion questions for a student to get credit, they must answer the
> prompt and they also need to go and respond to another student who has
> posted. That is a great way for students to interact within the course.
> Participant 6 explained how discussions allowed students to apply their learning

and practice the material:

> When you're doing a discussion board, they have discussions as a part of
> their grade, and they need to be able to discuss with you as well ask
> questions that they might have. That's using higher cognitive thinking and
> inclusion of all so that they can understand and think-pair-share with
> somebody else and get somebody else's thinking. They can talk about that
> as a class, so they learn to communicate with one another and share each
> other's ideas.

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Participant 7 added how interactive activities were varied to maintain student engagement and interest:

They will grab their microphones and chat back and forth. They can do private chat also, but the nice thing about that is we can see what they say. And then on the Whiteboard they can always write down an answer and then comment on one another's responses. You can put them in private rooms and then they can work in partnerships. That is one thing, we really try to get our students to engage with one another. Just trying to practice that positive communication even though it's online is really important for all of us.

Participant 13 confirmed the ability to foster communication in the online environment:

A lot of interaction can be provided, even more interactions then in a traditional class setting when you've got your own personal access to your teacher whenever you need her. We have discussion post assignment in all the classes, so they interact with each other on discussion posts and they are required to usually not only make their post, but to reply to a couple of other people. They interact that way and through discussion items as well.

These examples of how intentionally designed activities allowed students and teachers to work together and engage in more activities than just listening showed how the inclusion of instructor-student and student-student interaction was a best practice. Course activities and opportunities for interaction were critical to student success in the

online environment. The online students benefited from frequent and meaningful opportunities to engage with content, with other students, and with the instructor.

Theme 8: The inclusion of student tools and resources

A best practice in instructional design for high school OLPE was the inclusion of student tools and resources. The iNACOL (2011) National Standards for Quality Online Courses noted student should have access to tools and supplemental resources to extend learning. All 13 participants discussed the inclusion of student tools and resources within high school OLPE courses they designed. This theme had the fourth highest frequency, with 94 references across 24 sources.

Participants mentioned various digital tools and resources for students. As explained by Participant 11, students interacted with a variety of media sources, videos, and recordings. Participants discussed the ability of video to engage students in content by providing visuals for activity performance and assessment. Participant 2 explained video was used to demonstrate various physical activities for students, saying, "We have a lot of videos embedded in the student resources showing them how to do the fitness test." Participant 12 confirmed, "Now a lot of times videos are being asked to be included that explain specifically how to do things. To accompany whatever instruction." Video was also used as a means of analysis and assessment for students to show mastery of physical activity, as explained by Participant 1, "Some of them deal with other content where they have to upload a video. For example, they need to demonstrate two muscular strength exercises and talk about the muscles they are exercising." Participant 5 agreed, adding, "They had to turn in a video clip of them working out." Use of computer and

web-based applications and video together was also noted by participants. Participant 6 explained how video was used to instruct students on the use of computer applications:

Videos are being included that explain specifically how to do things to accompany instruction. For example, some of the assignments may have them creating a spreadsheet. Students may not know how to, so to explain how to do it, here's a video. I will include a video of how to create a spreadsheet. It's not even just here's the physical education content and the lessons and assignments and that sort, but here now is how to use some of the other software programs that you will be asked to use as part of this curriculum.

Webpages designed exclusively for housing student resources were also mentioned by participants. Participant 3 explained the importance of the student website being useful and being a hub specifically for students:

We have all the vocabulary terms that are highlighted in bold in the electronic and online text, which are presented on the student resources website in English and Spanish. We have a student resources section of the webpage where students can go to see those, and there are videos there. There is extra bonus content related to icons in the text.

The LMS was referred to by participants as a primary tool for access and interaction with the curriculum. Participant 3 mentioned the need for a well-designed and efficient system that takes advantage of online learning tools, sharing, "Really the presentation of the content is where you see the most technology in the course that I am currently teaching, and just the fancy presentation of engaging content and activities."

Participant 6 explained how the LMS was evolving as online learning became more popular:

They introduce them to Blackboard or whatever the LMS is. Generally, I find that the schools are using Blackboard more…But I know there are more learning management systems popping up because this type of learning is becoming more popular.

In addition, Participant 9 added how course designers were specifically altering the LMS to meet the needs of OLPE:

We just purchased a new delivery platform that we are customizing for our purposes, and it's really built around an online course model. It has an instructor dashboard, student dashboard, and the ability for the instructor to push out assignments and assessments and so on to the students. The students will then be able to read the content, view videos, and do the interactives.

Six participants provided access to their LMS for review. Blackboard was popular, along with customized systems designed specifically to house specific OLPE curricula. Blackboard shells were also noted to have added enhancements to allow for student interaction and teacher access to the shell.

Computing devices and applications were also identified as learning resources for students. Participants noted that for students to take advantage of the various technologies offered in the online environment, they needed the skills to use various tools and applications. Participant 9 stated the need to specifically teach and require students to use computer applications, noting, "Here is how to use some of the other software

programs that you will be asked to use as part of this curriculum. Here's how you use Excel. Here's how to use Word." Participant 10 confirmed students needed to use computer applications within the course, adding, "Every student in our district has access to Office 365 so they can access Word and do any of the document things they need to within the course."

The use of activity monitoring and tracking devices was also noted as a tool for students. Participants most often referenced heart-rate monitors for student use in tracking their activity data. Participant 1 explained, "Because our students do have workouts that they have to complete as part of their grade, we provide them with heart rate monitors." Participant 2 confirmed, "We use heart rate monitors to evaluate activity." Participant 8 described how monitors provided instant feedback to students, sharing, "they can see their heart rate going up and they understand what happens to their heart when they are working out." Participant 9 elaborated on how the durability of monitors allowed options for student activity, noting, "We also have heart rate monitors that are waterproof, so if somebody wants to swim they have that option." Participant 13 added, "There were none of the waterproof equipment there for swimmers to use if they wanted to use swimming for their workouts, so we got those right away." Participant 13 added that students had to know how to use the heart rate monitor and how to use the applications associated with uploading the data from the monitor to the online environment, saying, "They get their heart-rate equipment, and they go and establish an account so that they can upload their fitness workout to the website." Participant 3 agreed, adding, "They should have a heart rate monitor that works and they should be able to understand how they need to get that data from a workout into their account, and

what they need to do from that point." Participant 10 elaborated, "We use heart rate monitors. I have it set up where students have an account and they upload their information and it is sent to me in a report by email."

The integration of technology as a topic within the OLPE curriculum was also noted by participants. Participant 3 explained:

We have features throughout the textbook called fitness technology, which help students learn about the use of technology including how to use the web. It gives content information, heart rate monitors, pedometers, activity monitors, how to use the Fitnessgram online, things like that. We have sections on those devices and we explain them and discuss them. We offer a chance to use output from these devices in monitoring their program.

In addition, Participant 6 added how technology devices in general provided motivation and feedback to students engaging in physical activity:

My feeling is the more information a student can get about what their body is doing, then the better they're going to be learning about a particular topic, their bodies. What their bodies are doing now, in the future, and so on. When they have them use a pedometer, heart rate monitor, you name it, I love putting it in there. And a lot of students now have their phones with them and there are free step apps they can use. There are a lot of free apps.

Ten of the participants provided access to their LMS or websites that provided information and links to supplemental apps, smart aerobic equipment, and activity and

heart rate monitors. Apps focused on fun and fitness, videos, assessments and evaluation, Google applications, active gaming, and augmented and virtual reality. Smart aerobic equipment such as treadmills, rowers, bikes, and step machines allowed users to track and share data were also noted. Various information on activity and heart rate monitors were also provided.

Live classroom sessions were also noted as a resource for students. This classroom setup was like a traditional face-to-face class where the instructor and students met in a physical classroom at a designated time. Participants identified varied platforms for live classroom sessions. Participant 5 stated, "We were using Adobe Connect for live classes." Participant 4 added, "What we do is we use Class Connect with our systems. I teach live to students using Blackboard Connect." In addition, Participant 8 explained:

> We have some student connect sessions. Every week or every other week
>
> I meet with the students and have an online session available for them
>
> where they have the link. They can go into my class and I will have some
>
> slides ready for them and we will go over some content together.

Participant 7 also stressed the importance of being able to record live sessions for students unable to attend the live session, as well as providing a resource for all students, saying, "When I'm teaching my live sessions, they have their course content open so they're following along. Or they're in one of those external resource links. We record our live sessions and students can go back and watch the recordings." Participant 5 agreed, noting, "We put the recording in the class so they can watch or listen to it later, and I will direct them to that on occasion."

These examples of how resource integration enhanced the concepts important to developing a physically educated individual showed how the inclusion of student tools and resources was a best practice. As technology tools and systems evolve and get integrated into OLPE curricula, individual student needs and desires drive how they achieve goals and objectives. Teachers were shifting their focus to student-centered approaches that supported the development of 21st century learning skills.

Data Results for Research Sub-Question 3

The third research sub-question asked, "What are the best practices used in designing student assessments for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?" The iNACOL (2011) National Standards for Quality Online Courses described quality student assessment as providing multiple options and opportunities for students to demonstrate progress, and for instructors to provided regular feedback. In analyzing the data, the researcher found three major themes related to the sub-question 3: (a) inclusion of course assessments aligned to course objectives, (b) inclusion of ongoing formative assessments, and (c) inclusion of summative assessments. Table 9 displays the three themes that emerged along with the frequency and number of sources noting that theme. All 13 participants mentioned these three themes.

Table 9

Frequency of Themes and Sources for Research Sub-Question 3

Theme	Frequency	Sources
9. Inclusion of course assessments aligned to course objectives	148	28
10. Inclusion of ongoing formative assessments	132	22
11. Inclusion of summative assessments	114	22

Theme 9: Inclusion of Course Assessments Aligned to Course Objectives

A best practice in the design of student assessments for high school OLPE was the inclusion of course assessments aligned to course objectives. The iNACOL (2011) National Standards for Quality Online Courses stated student assessment should be aligned with the course goals and objectives. All 13 participants discussed the inclusion of course assessments aligned to course objectives within high school OLPE courses. This theme had the highest frequency for sub-question 3 with 148 references across 28 different sources.

All participants described how assessments constituted an ongoing and integral part of the learning process for students. Participant 4 explained the importance of the assessments being closely aligned with the student learning objectives. Participant 6 elaborated on aligning assessments to identified criteria within the course goals and standards:

> What I do is for all the lessons, there is only one standard that's being addressed and there is an assessment piece for both the teacher to give and for the student to take. And to make a complete curriculum, I do at least 10 lessons so each standard is addressed twice. They have two assessments per lesson and each lesson will address that one…Sometimes they will be cognitive or a combination where they have to think and then write. I like everything to be an authentic assessment. Basically, I stay away from the true-false, multiple choice kinds of things. I really am "let's do portfolios. Let's really monitor student learning and see what they've learned."

Participant 10 emphasized the importance of authentic assessment with consistency in organization and structure:

Each lesson that I create has some way that the teacher is monitoring them, and then every lesson the student has to produce something on their learning of that lesson…and it's always an authentic assessment piece.

Participant 8 mentioned the various types of assessments used throughout the course:

They have assignments related to the content. They have discussion posts that we assess them on to check for understanding. The written assignments are rigorous. And then they have quizzes and then they have a midterm and a final exam. And those are pretty rigorous assignments throughout the course. In every unit in every chapter they have some sort of quiz or task and they've got a couple of different written assignment to demonstrate their proficiency or understanding about the content.

Participants talked about using assessment as part of an ongoing process of helping students understand, enjoy, improve, or maintain their physical fitness. Participant 2 explained self-assessment promoted student ownership of learning, saying "One of the things I definitely want to do with each of our sections of the curriculum is have students do some sort of self-assessment. And then use what they do there to help them through the content."

Participant 9 explained how providing immediate feedback through technology tools embedded in the LMS helped students to correct errors:

One of the things that we are working to design within our courses is

plenty of opportunities for students to get feedback automatically. You

know taking a quiz and getting an automatic score or pointing students to

some place in the curriculum that can give them more information if

they're having a challenge. Or perhaps if the student is doing really well,

there might be an opportunity for them to extend their learning with some

additional challenges on the same concept.

These examples of assessing all domains (cognitive, affective, and physical) using

a variety of assessment techniques showed how inclusion of course assessments aligned

to course objectives was a best practice. Authentic assessment was especially important

in the online environment to keep students engaged and actively learning. Through

active learning, students were doing activities within the course content to enhance their

understanding of the topic.

Theme 10: Inclusion of Ongoing Formative Assessments

A best practice in the design of student assessments for high school OLPE was the

inclusion of ongoing formative assessments. The iNACOL (2011) National Standards for

Quality Online Courses stated course should include a variety of formative assessments

to monitor progress and ensure student learning. All 13 participants discussed the

inclusion of ongoing formative assessments within high school OLPE courses. This

theme had the second highest frequency with 148 references across 22 sources.

Participants explained how they used a variety of continuous, formative

assessments. Participant 12 explained how formative assessments were included within

the LMS, saying, "Many of the formative assessment will be built right into the course.

Same with worksheets, logs, self-assessment, videos, a lot of integration into the course itself." Participant 1 explained the various formative assessments offered to students within the LMS and as supplemental actives:

> There are also quizzes as they go through the modules. There's six or eight sections within each module depending on which one you're in. Each one of those has a quiz and then we also have gone in and put some extra assignments in for students to do. For example, some of them deal with written things like calculating target heart rate.

Participants also shared how rubrics were included and shared with the students. Participant 3 elaborated on how both assessments within the LMS and rubrics for skill performance were used for formative assessment:

> The formative assessments the students do are scored automatically and the score is given to the instructor for consideration for grading or other purposes. There are also teacher observation assessments definitely included. Rubrics for the teacher. And say it's going to be a weight training unit and the bench press is going to be one of the assessments, then the teacher is provided the rubric to share with the student and they would be able to score based on that.

Participants also discussed the use of logs to detail what students were learning, the activities they are engaging in, their thoughts and feelings about the topic, and the core ideas or concepts. Participant 4 explained the use of fitness logs for formative assessment:

There are 12 weeks in a semester that they have to complete a fitness log.

And for the fitness log, the minimum requirements are that they complete

three hours minimum of physical activity and at a minimum on three

different days. On these fitness logs, they also set a weekly goal at the

beginning of the week where they try to improve. At the end of the week

there is a scale from 1 to 10 and they will rate themselves as to whether

they achieved their goal or not and they will also write a short summary on

the bottom of their fitness log explaining what activities they did that

week, how the week went, etcetera, etcetera. It's kind of a journaling

piece on each of the fitness logs.

Participants acknowledged the use of formative assessment to check for cognitive

understanding. Participant 10 explained the use of technology tools for formative

assessment to provide insight into student learning and create an action plan moving

forward:

I use Kahoot as a formative assessment for my sake and as a way for

students to review. For instance, my students have a final exam this week

so we did a Kahoot in our live class session as a review, and that also

helps me know whether I need to reteach some topic. When you get done

with a Kahoot session, it summarizes the data in an Excel document that

will show you which questions students didn't get right and if you see

there's an abundance of students missing a specific question, that's a big

red flag that I need to re-teach this material.

These examples of formative assessments that monitor student development and provide them with feedback showed how the inclusion of ongoing formative assessments was a best practice. One of the benefits of using formative assessment integrated with online learning systems and tools was that teachers could quickly modify the learning strategies to meet the individual needs of the learners, and remedy issues during the learning process. Customization of activities, assessments, and curriculum helped improve student comprehension.

Theme 11: Inclusion of Summative Assessments

A best practice in the design of student assessments for high school OLPE is inclusion of summative assessments. The iNACOL (2011) National Standards for Quality Online Courses stated summative assessments were a necessary structure in online courses. All 13 participants discussed the inclusion of summative assessments within high school OLPE courses. This theme had the third highest frequency with 114 references across 22 data sources.

Participants discussed including a mix of summative assessments into OLPE courses. Participant 1 explained how they included summative assessments within the curriculum, noting, "There are two main modules, so those main modules they do have a module test at the end as a summative assessment." Participant 10 elaborated on the use of summative assessments to evaluate motor skill development, saying, "We include summative assessments to measure if a student understands motor skills during specific activities." Participant 13 explained how summative assessments were used during specific timeframes within the course, sharing, "There are the portfolio assignments. That's the fitness portfolio part; it really builds throughout the entire term with a pre-test

and then the midpoint check and then the final summative at the very end of the semester." Participant 2 added, "It was wide open and they could make PowerPoints or movies expressing what they had learned over time."

Student choice was also used to measure attainment of goals and objectives. As illustrated by Participant 12, "I provide choice in the summative assessment. Here is another way to show you have mastered it." Participant 8 confirmed the use of multiple forms of summative assessment, saying, "I want to provide more differentiation in options for demonstrating mastery of the content."

Ten participants provided access to their LMS and websites that housed differentiated summative evaluations. Students could meet mastery of learning objectives in multiple ways. Various technology tools provided students with access to developing movies, portfolios, and electronic presentations as some of the ways students could be assessed.

These examples of varied summative assessment strategies and tools that determined whether a student achieved the learning objectives and reached the desired level of proficiency at the end of the course showed how the inclusion of summative assessments was a best practice. Students had different learning needs that required varied learning materials and activities to obtain information effectively. As such, it was essential to offer them a variety of assessment options.

Data Results for Research Sub-Question 4

The fourth research sub-question asked, "What are the best practices used in integrating technology in a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?" The iNACOL (2011) National Standards for

Quality Online Courses described quality technology integration as taking advantage of current, user-friendly technologies accessible to students with special needs. In analyzing the data collected, the researcher found three major themes related to the sub-question 4: (a) instructor access to content within the LMS, (b) clear and consistent navigation throughout the course, (c) provision of technology requirements prior to course start, and (d) use universal design principals to provide access to all students. Table 10 displays the four themes which emerged from the data along with their frequency and sources. All 13 participants mentioned these four themes.

Table 10

Frequency of Themes and Sources for Research Sub-Question 4

Theme	Frequency	Sources
12. Instructors access to content within the LMS	123	20
13. Clear and consistent navigation throughout the course	120	20
14. Provision of technology requirements prior to course start	96	17
15. Use of universal design principals	80	17

Theme 12: Instructors Access to Content within the LMS

A best practice used in integrating technology into high school OLPE curriculum was providing instructors the ability to manipulate content within the LMS. The iNACOL (2011) National Standards for Quality Online Courses stated teachers should be able to add to the content to extend learning opportunities. All 13 participants discussed the inclusion of instructor access to content within the LMS within high school OLPE courses. This theme had the highest frequency for sub-question 4 with 123 references across 20 data sources.

Participants explained how course architecture permitted teachers to add content, activities, and assignments to the curriculum. Teachers were only limited by their own technology fluency when it came to manipulating components of the LMS. As explained by Participant 1:

Because we purchased the course, we have the ability to make changes ourselves. There are certain things that I have the technology ability to do. There are some things where you start getting really heavy into HTML, and those certain things I must get help with. But as long as I come up with, "hey I want this to go here," then I can get that done.

Using communication tools offered by the LMS, teachers also used live sessions to present course materials of their choosing. Participant 7 explained how teachers presented content using live session tools, noting, "Much of the material is presented in our live sessions, and is decided by or developed by the instructor." Participants also explained how they made changes to keep the curriculum current and relevant. Participant 2 stated how content formats changed, adding, "I can change, manipulate the content. If there was something new that came through or changed, I would change it." Participant 5 confirmed the ability to change content to keep it relevant, sharing, "We have just this year purchased the LMS. It's always being changed, which is nice because we keep it current." Participant 13 added, "If new research comes out or…I wanted to create an infographic to support the instruction of part of the content area, I can create that infographic and insert it into part of the course."

Six participants provided access to their LMS, which showed teachers to able to manipulate content. Four of these participants had a specifically designed LMS to house

their OLPE curricula. All six participants also had secondary technology systems such as physical activity monitoring, heart-rate monitoring, or web conferencing tools.

These examples of teacher curriculum enhancement that extend learning opportunities showed how providing instructors the ability to manipulate content within the LMS was a best practice. The LMS allowed teachers to use various teaching models, deliver personalized learning, and engage and connect students. Many LMS solutions could be widely customized and integrated with teacher components to meet the needs of students. Teachers could provide a unique and tailored learning experience.

Theme 13: Clear and Consistent Navigation Throughout the Course

A best practice used in integrating technology into a high school OLPE curriculum was providing students clear and consistent navigation throughout the course. The iNACOL (2011) National Standards for Quality Online Courses stated the navigating the technology should consistent and predictable. All 13 participants discussed the inclusion of clear and consistent navigation throughout the course within high school OLPE courses. This theme had the second highest frequency for the sub-questions, with 120 references from 20 different sources.

Participants discussed how the graphic interface and architecture of the LMS was designed. Participant 8 commented on the integration of technology features that made the LMS easy for OLPE students to navigate:

Really the presentation of the content is where you see the most

technology. The presentation of engaging content and activities with

interactives that require students to do more than read. As a user, the

content, the technology used to create that kind of content, and thorough

online assignments as they move through the material, that's amazing.

In addition, Participant 7 elaborated about how students access material online so

they see what they need to learn and their progress:

The technology we use to help them move around the course is great for

them. Seeing their overall grade and a grade book, and the grade book

online is a super technology and this planner for them where it takes them

right to the assignments that they need to do day-by-day. We have this

great tool, a pace guide. I've got the planner for the calendar, which

follows the pace guide.

Participants discussed how courses made use of the capabilities of the online

medium. The LMS allowed a variety of learning materials to be uploaded for students to

access. For example, Participant 9 explained it was important for curriculum designers to

consider how instructors and students would use the LMS.

These examples of utilizing an attractive design and digital learning tools showed

how providing students clear and consistent navigation throughout the course was a best

practice. Successful implementation of a LMS meant teachers and students were excited

to use it. Continuous updates to the LMS also provided frequent enhancements that

allowed students to acquaint themselves with each new functionality. This closely

resembled student interactions with their personal electronic devices and what they might

encounter more frequently in higher education and the workforce.

Theme 14: Provision of Technology Requirements Prior to Course Start

A best practice used in integrating technology into a high school OLPE curriculum was providing students technology requirements prior to course start. The iNACOL (2011) National Standards for Quality Online Courses stated technology requirements should be identified prior to students starting the course. All 13 participants discussed providing technology requirements prior to course start for high school OLPE courses. This theme had the third highest frequency for sub-question 4 with 96 references across 17 data sources.

Ensuring students had access to devices and the internet prior to the start of the course was identified by all 13 participants. Participant 4 stated how computers were provided to low-income students, noting "Every student is required to have access to the internet and a computer, and if they meet the criteria for low-income, then we loan them a computer to use." Participant 2 confirmed the practice of providing computers for students to use for OLPE courses, sharing, "Schools would check out a laptop for the students to use." Participant 7 explained that printers were also issued to students to use for OLPE courses, saying, "What we do if students cannot afford certain technology like a printer or a laptop is we will actually send that to them."

An internet connection was also necessary for students participating in OLPE as described by Participant 5:

> We actually provide the Chromebook for a student who doesn't have one. They need to have access to the internet. We share with them "you have a responsibility to have access, and if you don't have access at home, then

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you need to spend enough hours using the labs where you can have

access." We tell them that at the orientation and we follow up as needed.

Participant 8 elaborated on the necessity of both computer and internet access for

successful participation in OLPE courses:

We have a list of the technology requirements that we send when students

sign up for the class. We have clear introductory information about what

level of internet access students need and what tools students need. They

offer the students the ability to check out a computer, so they offer some

extra resources for someone who is in need.

Prerequisite skills for computing concepts and applications were also identified by

participants. Participant 13 explained students needed to be familiar with the LMS,

sharing, "We spend time up front helping students navigate the online world."

Participant 6 confirmed, "We first have to teach them how to use the software before we

can teach our content. We teach them how to do that, how to use Blackboard for their

class." In addition, Participant 10 noted, "There is a general orientation to the online

system that happens first with an administrator who gets kids comfortable with the

technology." Participant 1 explained how students needed electronic activity tracking

devices and know how to use them, adding, "They get trained exactly on how they're

going to use equipment and how it all works. They should feel comfortable, and should

have equipment, a heart rate monitor."

These examples of providing access and requirements for hardware, browsers,

software, and prerequisite skills showed how providing students technology requirements

prior to course start was a best practice. OLPE required the development of new

computer skills as students learned to navigate different platforms and programs. The skills students learned in OLPE translated to higher education and eventually professions.

Theme 15: Use of Universal Design Principals

A best practice used in integrating technology into a high school OLPE curriculum was using universal design principals to provide access to all students. The iNACOL (2011) National Standards for Quality Online Courses stated course materials should be accessible to all students. All 13 participants discussed using universal design principals to provide access to all students within high school OLPE courses. This theme had the fourth highest frequency for sub-question 4 with 80 references from 17 sources.

Participants discussed how considering a few design elements enhanced access and usability greatly. When considered in advance, access became standard practice as described by Participant 4, "I feel that this system is tailored toward the student with disabilities." In addition, all participants explained inclusion of closed captioning and proper font styles in providing access to students. Participant 1 explained how audio was used in conjunction with text, noting, "Within our course we have read speaker where the student can click on the read speaker and it will read the screen to them." Participant 3 added how accessibility was also provided for second language learners, sharing, "We have audio of all the terms and definitions in English and Spanish." In addition, Participant 10 explained the importance of text and background elements in accessibility, sharing, "There is a particular font to use for people who are visually impaired and for the hearing impaired, all of the videos have closed captioning." Participant 9 confirmed, "There are rules and terms of what the software needs to be able to do. Everything from the color of the screen to having various audio and visual controls."

All 13 participants also discussed adapting physical activities to provide access for all students. Participant 11 explained how activities appropriate to student ability were used along with appropriate technology tools:

Another thing with the workouts is that we can take students in wheelchairs and with other disabilities and rather than having to worry about strapping the chest band on them to try to get a heart rate, which is very cumbersome and difficult for that student, they can use a wrist work heart rate monitor instead. And they can still monitor their heart rate.

Adapting activity to student ability was seen in OLPE, as Participant 5 described, "We are adaptable. It's great because it doesn't matter what prescriptive document, 504, or IEP, we've been able to have the teacher accommodate and make sure we're in line with what they can do." Participant 6 stated the importance of adapting activity by providing multiple activities and teacher resources for adaptation:

There are adjustments in the activities that all students can participate in. I give a guide to the teachers that if there is a student in the class with whatever the disability, whether it be a visual impairment or whatever hearing impairment, that these are some of the things to think about and do for that particular student while in an online environment.

Participants also discussed how they considered FERPA in course design to ensure student confidentiality. Participant 13 explained the importance of FERPA compliance in maintaining student confidentiality, sharing, "FERPA is something that we are aware of and it is important, and we do not want any student information…getting out there. We are putting safeguards into that so it is very important." Participant 4 added

how FERPA compliance provided fair and equitable opportunities to learn, noting, "We want to make sure we are protecting our families and our students by protecting student and family rights, and making sure that the students have a fair education and an opportunity to learn in a non-discriminatory environment."

These examples of inclusion of accessible instructional materials and adapted physical activity showed how using universal design principals to provide access to all students was a best practice. Implementing the principles of universal design in OLPE courses meant anticipating the diversity of students who may enroll. OLPE courses used varied assignments and physical activity, flexible options, and regular interactions facilitated by technology tools, which made information and learning accessible to students.

Data Results for Research Sub-Question 5

The fifth research sub-question asked, "What are the best practices used in evaluating the effectiveness of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?" The iNACOL (2011) National Standards for Quality Online Courses described the need to evaluate courses and use findings to improve the course. In analyzing the data, the researcher found three major themes related to sub-question 5: (a) multiple ways to assess course effectiveness, (b) frequent course updates, and (c) provision of highly qualified instructors. Table 11 displays the three themes that emerged along with their frequency and the number of data sources that mentioned the theme.

Table 11

Frequency of Themes and Sources for Research Sub-Question 5

Theme	Frequency	Sources
16. Multiple ways to assess course effectiveness	75	13
17. Frequent course updates	71	17
18. Provision of highly qualified instructors	62	13

Theme 16: Multiple Ways to Assess Course Effectiveness

A best practice in the design of a high school OLPE curriculum was providing users multiple ways to assess course effectiveness. The iNACOL (2011) National Standards for Quality Online Courses indicated courses should be evaluated by students, instructors, content experts, and external reviewers. All 13 participants discussed providing multiple ways to assess the effectiveness of high school OLPE courses. This theme had the highest frequency for sub-question 5 with 75 references from 13 sources.

All 13 participants explained how they used student and instructor evaluations to measure and validate the learning effectiveness of their online courses. Many curriculum designers relied on student formative feedback as confirmed by Participant 2 who shared "Students evaluate the course during the last module." Participant 10 added the importance of timely and consistent student feedback focused on student learning experiences, saying, "One goal that we have is to put a student evaluation piece in each of the modules so students can talk about each individual module as opposed to waiting until the end of the course." Participant 1 explained the importance of both teacher and student perceptions, sharing, "I do student surveys and I also do teacher surveys, so they feel like the course is delivering what we need to our students for them to be successful."

Participant 6 stated the importance of teacher feedback in providing course updates for accuracy and functionality:

> I know the schools have teacher evaluations and course evaluation tools
> that are usually about the teacher. I ask for information about the course
> itself so I can improve the course. I want to know from the students, from
> the teachers. Usually the teachers will contact me. I'm glad to know what
> works, but I really want to know what's not working.

In addition, Participant 5 explained how teacher experts and outside reviewers were used to evaluate course effectiveness, commenting, "We have a curriculum council so the course gets evaluated through the curriculum council." Participant 8 added the importance of feedback from teachers, students, and parents, saying, "We utilize parent and student feedback each semester, and teacher feedback annually."

Course assessments considered interactions between teacher and students, students and students, and students and the LMS, all of which created artifacts that could be analyzed. Participant 9 explained the importance of using student artifacts and student achievement data to evaluate course effectiveness:

> What we are able to do is use metrics that look at things like how did
> students progress, how long did it take them to go through the course, how
> did they do in terms of their assessments, what were their scores, what
> questions were often missed, which ones are always correct. With those
> types of metrics, we will be able to run and do an analysis…And this will
> all be deidentified data so there will not be anything there that could

expose student information other than the general data that we will be able

to look at and we will use that to continually fine tune the course.

These examples of using a combination of student, instructor, parent, and artifact data to evaluate course effectiveness showed how providing users multiple ways to assess course effectiveness was a best practice. Assessing quality of OLPE courses provided learning and teaching experiences that were rewarding, rich, and meaningful. Better and meaningful experiences increased student learning by capitalizing on the motivations, preferences, and habits of students.

Theme 17: Frequent Course Updates

A best practice used in designing a high school OLPE curriculum was providing frequent course updates. The iNACOL (2011) National Standards for Quality Online Courses stated courses should be updated annually to ensure content was relevant and current. All 13 participants discussed providing frequent course updates for high school OLPE courses. This theme had the second highest frequency for sub-question 5 with 71 references from 17 data sources.

All 13 participants discussed the importance of regular course updates to keep their courses relevant and visually attractive to students. Content developers provided updates at scheduled times and when needed to remain current. Participant 3 explained, "Typically updates are on a five-year cycle and what we've done are edition updates. That is what we call a copyright update, and this is where we can add crucial new information." Many OLPE designers now performed numerous updates on a continuous basis, as stated by Participant 5, "Unless we make real substantial changes, our course gets updated about every month."

Updates were also provided based upon evaluation feedback provided by teachers and students. Participant 1 explained, "We make adjustments between each semester and that's just based on teacher and student feedback. Sometimes it's very minor and sometimes it could be a major adjustment." Participant 6 confirmed the use of updates based on feedback, sharing, "Every semester I do an update and send it to whoever sends me feedback."

The criteria for making updates and changes varied depending on current needs, functionality, and teacher input, as explained by Participant 8:

I mean modifying and providing tweaks here and there I think they do pretty easily and as needed. Especially if teachers catch something that is maybe wrong or incorrect or something in that direction. Or in the content itself, we are absolutely welcome to submit the information, and I think they are definitely receptive to that and make the changes as needed.

These examples highlighted how providing frequent course updates was a best practice in OLPE. Information was outdated quickly, and as a result OLPE courses needed to be updated regularly. Design trends and elements also became outdated. Learners equated outdated designs to mean the content was also old. OLPE courses needed to change and evolve as technology, best practices, and policies evolved.

Theme 18: Provision of Highly Qualified Instructors

A best practice used in evaluating the effectiveness of high school OLPE curriculum was providing highly qualified instructors. The iNACOL (2011) National Standards for Quality Online Courses referred to the Elementary and Secondary Education Act (ESEA) for defining a highly qualified teacher. All 13 participants

discussed the need for highly qualified instructors for high school OLPE courses. This

theme had the third highest frequency for sub-question 5 with 62 references from 13 data

sources.

All 13 participants described qualified teachers as having a teaching credential

and specialization in PE. Participant 1 stated, "They have to certified in [the state] and

have certification for physical education. They have to have a teaching certificate."

Participant 2 explained, "You have to be certified in physical education." In addition,

Participant 9 added:

> We would certainly hope they would be a certified physical education
>
> with a teacher license in that particular state. Now we know each of the
>
> 50 states has slightly different requirements for what is considered a
>
> qualified physical education teacher, but certainly we are supportive of the
>
> folks teaching this should be qualified as a physical education teacher as
>
> defined by the state.

Participants acknowledged OLPE teachers needed skills to effectively teach

online, and professional development necessary to acquire and update those skills.

Participant 12 described needing additional training in delivering online courses, noting,

"School districts should offer in-service for online certification." Participant 11

explained how their program currently had a mandatory training for online teachers,

saying, "We also have a teacher training program they have to go through." Participant 3

recommended content courses as part of a teacher training program, sharing, "I would say

not only should they have a physical education degree and be a certified teacher, but you

want them to have classes in the content and methodologies to be online teachers." In addition, Participant 13 stated:

> I think a person should have a teacher certification and have a degree in physical education, and preferably they should have come through a curriculum that has a class designed to teach the content, including information on how to use technology and how to teach on the internet.

Although there were numerous other examples, Participant 13 clearly highlighted how providing highly qualified instructors was a best practice. Good OLPE courses required good OLPE teachers. Just as every student deserves a highly qualified teacher in face-to-face classroom settings, so does every student in OLPE. Providing teachers specifically trained to take advantage of the online environment would provide today's generation of students with significate use of technology in their OLPE learning.

Data Results for Research Sub-Question 6

The sixth research sub-question asked, "What are the best practices used in providing support to teachers and students for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?" The iNACOL (2011) National Standards for Quality Online Courses described the importance of teacher and student preparation and support for an online learning environment. In analyzing the data collected, the researcher found three major themes related to sub-question 5: (a) inclusion of professional development, (b) inclusion of technical support, and (c) inclusion of a student orientation. Table 12 displays the three themes that emerged from the data along with their frequency and the number of data sources mentioning that theme.

Table 12

Frequency of Themes and Sources for Research Sub-Question 6

Theme	Frequency	Sources
19. Inclusion of professional development for teachers	96	15
20. Inclusion of technical support	84	16
21. Inclusion of a student orientation	75	13

Theme 19: Inclusion of Professional Development

A best practice used in providing support to high school OLPE students and teachers was inclusion of professional development for teachers. The iNACOL (2011) National Standards for Quality Online Courses recommended professional development for instructors focused on content and technology tools. All 13 participants discussed the inclusion of professional development for teachers within high school OLPE courses. This theme had the highest frequency for sub-question 6 with 96 references from 15 sources.

Participants explained the use of professional development to ensure effective use of the LMS and instructional media. Participant 9 explained, "We know that there is going to be a learning curve for teachers and it will be important for them to learn and understand the online environment." Participant 5 added, "We've brought experts every time we introduce an online tool. We get the staff trained just so they're comfortable with what the tool is and how they can use it."

Participants identified multiple types of professional development to provide teachers with strategies for effective online course delivery. Participant 2 stated, "They pay for us to go to the [state] technology conference, which was awesome, and they paid our way to go and visit other online schools to see their setup." A professional

development program complemented by the help of mentoring also empowered teachers to become more effective in the online environment. As stated by Participant 7, "Our first year we were given mentor teachers, which is so helpful. We have learning coaches as well that are assigned, and that's just supposed to give us different tips and tricks for online teaching." Ongoing professional development was made available so teachers could be trained in new methods. Participant 1 described:

We have the online faculty room where the teachers can go in and they can find resources that are pertinent to delivering and teaching the classes. We also do one face-to-face faculty meeting each year, and we brought in some experts from different areas. If they didn't feel they were very competent using Blackboard Collaborate, they could go to the Collaborate session and learn more about that.

By providing effective professional development in multiple forms and on a continuous basis, teaches become effective in 21st century skills. Participant 8 explained:

We need professional development for our certification. That's really important and of course school in the online environment provides a lot of professional development. Sometimes content and then sometimes about technology tools and resources to use to help enhance your course, to help enhance your grading, to help enhance things that are related to the online environment. You get to pick and choose the ones to go to.

Although there are numerous other examples, Participant 8's response clearly highlighted how inclusion of professional development was a best practice. Quality teaching depended upon a strong support system. OLPE teachers must adapt to new

demands and acquire new skills. Professional development was key to ensuring teachers provided effective instruction in the constantly evolving online environment.

Theme 20: Inclusion of Technical Support

A best practice in providing support to high school OLPE students and teachers was inclusion of technical support. The iNACOL (2011) National Standards for Quality Online Courses stated technical support should always be available. All 13 participants discussed the inclusion of technical support for high school OLPE courses. This theme had the second highest frequency for sub-question 6, with 84 references across 16 data sources.

Participants identified various forms of technical assistance offered. Many participants identified information technology (IT) departments that provided technical assistance. Participant 4 described the various types of technical assistance provided, noting:

> We have a system where I can call tech support and it's available 24 hours a day7 days a week if I have any tech issues, and we also have a point person with my program that I can email and ask questions to if there is a problem.

Individuals within the school district were also noted as experts who provided technical support. As explained by Participant 5, "We have one person at the district who can answer most questions, but we also have a designated person from the LMS." In addition, Participant 1 shared how the district and course developer shared in providing technical support:

Our district has their own technical support section where if they're

having problems with their laptop or connection or something like that,

they can go there. But if the teacher is having an issue in Blackboard or

having an issue accessing something that should be available within the

course, then I'm usually their first call.

Participant 9 added:

We provide technical support for the product. Anything that would be an

issue or not understanding, do you know how to use your interface for

example or for the teacher to run a report or print out a report or so on and

so forth. We have a toll-free number that can be called. We also have an

email system where you can get tech support.

Although there were numerous other examples, Participant 9's response clearly

highlighted the inclusion of technical support as a best practice. Teachers could receive

assistance when they run into technical difficulties and barriers, and develop

independence and a reduced need for support. By reducing technical difficulties and

barriers through support mechanisms, teachers were free to focus on the task of utilizing

the online learning environments.

Theme 21: Inclusion of a Student Orientation

A best practice in providing support to high school OLPE students and teachers

was the inclusion of a student orientation. The iNACOL (2011) National Standards for

Quality Online Courses recommended students participant in an orientation session prior

to beginning the coursework. All 13 participants discussed the inclusion of a student

orientation for high school OLPE courses. This theme had the third highest frequency for sub-question 6 with 75 references across 13 data sources.

Participants identified student orientations as a way to abate teacher time spent dealing with technical and time management issues. Participant 2 stated, "We provide and orientation module." Participant 1 explained:

Orientation is really important, especially for the newer students and the younger students that we get because we do get some students that transition to us between middle school and their first year of high school. And I think a lot of the time they register for an online course not really knowing what to expect. I do think the orientation helps.

In addition, Participant 4 shared how the orientation described the experience of learning online and what students needed to manage successfully:

Orientation is the most important piece of this. I think of it just like in a brick-and-mortar class. When I teach in a brick-and-mortar, the first 2 or 3 weeks are the most important piece of making sure that your classes run smoothly. You need to set the guidelines. You need to set the expectations. You need to show students how the systems work. Same thing in online, you need to go over the expectation of the course…I think the orientation at the beginning is very important.

Although there were numerous other examples, Participant 4's response clearly highlighted student orientation as a best practice. Online learning presents unique challenges. Students are at risk of failing or dropping out of OLPE courses because they are insufficiently prepared for the special challenges and unfamiliar format of online

learning. Ensuring success in OLPE requires initial student preparation. Orientation

activities promote student success through opportunities to learn and practice the skills

necessary to succeed in the online learning environment.

CHAPTER V: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

High school online physical education (OLPE) is a rapidly growing option for students to earn graduation credits (Mosier, 2012; NASPE & AHA, 2012; SHAPE America et al., 2016). Limited research exists on high school OLPE virtual learning design and development (Barbour, 2013; Cavanaugh et al., 2009; Trent, 2016). Therefore, this study focused on discovering best practices in the design and development of high school OLPE curricula. This chapter presents a summary of the research. It begins by restating the purpose and research questions, followed by a description of the methodology, population, and sample. The major finding for each research question are presented, and unexpected finding are identified and explored. The researcher draws conclusion based on the key findings and outlines implications for action. The chapter ends with recommendations for further research and concluding remarks and reflections regarding the study.

Purpose Statement

The purpose of this qualitative study was to identify and describe the best practices used in the design and development of a high school OLPE curriculum based on the International Association for K-12 Online Learning (iNACOL, 2011) National Standards for Quality Online Courses as reported by OLPE curriculum design experts.

Research Questions

This study sought to answer the following central research question: What are the best practices used in the design and development of a high school OLPE curriculum based on the iNACOL (2011) National Standards for Quality Online Courses as reported by OLPE curriculum design experts? Six sub-questions guided the study:

1. What are the best practices used in the selection of content for the design and development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

2. What are the best practices for instructional design employed in the development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

3. What are the best practices used in designing student assessments for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

4. What are the best practices used in integrating technology in a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

5. What are the best practices used in evaluating the effectiveness of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

6. What are the best practices used in providing support to teachers and students of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Major Findings

Research Sub-Question 1

What are the best practices used in the selection of content for the design and development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Finding 1. Inclusion of academic content standards and assessments; a course overview and introduction; current, accurate, and bias-free content; and instructor resources were best practices in the selection of content for the design and development of a high school OLPE curriculum. Best practices were listed in order of greatest frequency. Both SHAPE America (2015) and the Institute of Medicine (2013) policy statements supported this finding, indicating physical education (PE) curricula should be based on national or state standards. However, no participant described any single best practice as being more important than another. It was evident participants felt when designing and delivering online learning content, course developers must aim to provide solutions as or more effective than equivalent traditional learning opportunities in terms of accomplishing learning outcomes. This also supported the assertion from Archambault et al. (2016) that districts needed to offer online courses with the same level of quality as the traditional face-to-face courses.

OLPE curricula offered continuously accessible materials with text, audio, and video components that could be instantly and regularly updated, which was not normally found in traditional PE programs. Large class sizes and the lack of classroom access in face-to-face PE created barriers to the use of these curricular elements unless a flipped method of instruction was used. OPLE students also learned to use technology tools and resources provided through the learning management system (LMS), which allowed teachers to provide students with specific feedback and collaborate through web conferencing tools. The time constraints and lack of technology infrastructure and devices made this difficult in face-to-face PE classes.

Research Sub-Question 2

What are the best practices for instructional design employed in the development of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Finding 2. Inclusion of a variety of instructional and assessment methods, meaningful and authentic learning, instructor-student and student-student interaction, and student tools and resources were best practices for instructional design employed in the development of a high school OLPE curriculum. Participants emphasized serving online students meant student and teacher support systems, resource strategies, and assessments needed to be developed and implemented to provide the fundamental infrastructure to generate student success. Archambault et al. (2016) also supported this finding, stating online options provided flexibility to meet student needs and helped schools address access and equity issues.

Student choice within OLPE curriculum was achieved through integration of technology tools such as apps for smart phones, exergaming, and YouTube channels, which provided multiple ways of learning and tracking physical activity. Differentiated assessments provided students multiple ways of showing content mastery and provided student choice by using technology tools such as videos, computer applications, and activity and heart-rate monitors. Intentionally designed activities using web-conferencing tools, blogs, and discussion boards engaged students in speaking, writing, thinking, and evaluating topics with their classmates. Virtual fieldtrips and activity classes provided students with access that could be prohibitive due to proximity or price, and community partnering provided students access to local physical activity opportunities.

Research Sub-Question 3

What are the best practices used in designing student assessments for a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Finding 3. Inclusion of course assessments aligned to course objectives, ongoing formative assessments, and summative assessments were best practices in designing student assessments for high school OLPE curricula. Participants outlined the process of assessment as not beginning with technology, but with the thoughtful consideration of educational goals and desired outcomes. Through this process, technology tools were aligned to assessments. This finding supported the need for student assessment inclusive of pre-assessments and formative assessments within a high-quality PE program as stated by the CDC (2015) and SHAPE America (2012).

Various and multiple technology tools were integrated into the formative and summative assessments, including electronic quizzes and tests, discussion boards, electronic portfolios, computer applications, and videos. This provided students with the ability to self-asses, set goals based on self-assessment, and show mastery of learning objectives through differentiated assessments. This also provided teachers with the ability to quickly and efficiently monitor student mastery of course goals and objectives.

Research Sub-Question 4

What are the best practices used in integrating technology in a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Finding 4. Providing instructors the ability to manipulate content within the LMS, creating clear and consistent navigation throughout the course, stating technology

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requirements prior to course start, and using universal design principals to provide access to all students were best practices used in integrating technology in high school OLPE curricula. Participants highlighted how the quality of learning came down to the caliber of instructional activities, the teachers, and the processes being conducted. Technologies assisted educators to leverage learning theories in new ways and create experiences far more comprehensive than those in traditional face-to-face classes. Means et al. (2009) supported this finding in their meta-analysis of literature, which found students in online learning environments performed better than those receiving face-to face instruction.

Research Sub-Question 5

What are the best practices used in evaluating the effectiveness of a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

Finding 5. Multiple ways to assess course effectiveness, course updates, and highly qualified instructors were best practices used in evaluating the effectiveness of high school OLPE curricula. Participants explained no matter what methods were used to obtain feedback, all constituencies wanted to know their voices were heard. Martin and Ndoye (2016) concurred with this finding, stating constant monitoring and analysis of online courses was needed to ensure success. Participants also noted the use of analytics to drive decisions related to program development, infrastructure needs, and support systems.

Research Sub-Question 6

What are the best practices used in providing support to teachers and students on a high school OLPE curriculum based on the iNACOL National Standards for Quality Online Courses?

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Finding 6. The inclusion of professional development, technical support, and a student orientation were best practices used in providing support to teachers and students of high school OLPE. Participants explained teachers should expect to be fully supported in their online teaching endeavors, as they assumed a significant role in learning new technologies and pedagogies, providing high-quality instruction, and demanding excellence form themselves as online instructors. Sterret et al. (2016) concurred with this finding professional development was required for teachers to integrate technology. Participants described teachers who received initial training and ongoing professional development opportunities and support could provide high-quality online instruction, engage students more effectively, and maximize learning outcomes.

Participants also explained the importance of engaging students with the course and fellow students before and during program coursework, and an initial orientation being essential to success. Archambault et al. (2016) also supported this finding, stating student support systems and community engagement increased student retention and satisfaction.

Conclusions

This study identified the best practices used in the design and development of high school OLPE curriculum based on the iNACOL National Standards for Quality Online courses as reported by OLPE curriculum design experts. Based on the literature review and the research findings, the following conclusions were drawn.

Conclusion 1

Based on the finding that inclusion of academic content standards, a course overview and introduction; current, accurate, and bias-free content; and instructor

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resources were best practices in the selection of content for the design and development of high school OLPE curriculum, it was concluded OLPE programs could provide programs equivalent to traditional face-to-face PE classes. It was acknowledged in the literature evaluation of the quality and comprehensiveness of online courses and course providers was required, and should be equivalent to evaluation of face-to-face PE courses (Archambault et al., 2016, Barbour, 2013; Cavanaugh et al., 2009; Mosier, 2010; Picciano & Seaman, 2010). Through alignment with standards and providing student and teacher tools, students were provided for as effectively and often better than in a traditional face-to-face PE course.

Conclusion 2

Based on the finding that inclusion of a variety of instructional and assessment methods, meaningful and authentic learning, instructor-student and student-student interactions, and student tools and resources were best practices for instructional design of high school OLPE curricula, it was concluded OLPE programs could be tailored to meet each student's individual needs. Online delivery broadened the high school marketplace to include various students unwilling, unable, or uninterested in engaging in a traditional format of study. Also, students needed and must be provided individualized programs to meet their unique fitness goals. Meier (2016) agreed leveraging UDL and differentiated instruction broadened the range of learners in online courses.

Conclusion 3

Based on the finding that inclusion of course assessments aligned to course objectives, ongoing formative assessments, and summative assessments were best practices in the design of student assessments for high school OLPE curricula, it was

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concluded more frequent and varied assessments improved student engagement and more rapidly evaluated the pace of learning in OLPE courses. Student voice and choice, and multiple ways of showing mastery of content had students finding their work to be relevant, engaging, and fun. Additionally, students chose online courses to better meet their individualized learning styles (Archambault et al., 2016, Powell, Roberts & Patrick, 2015; Watson et al., 2015; Worthen & Patrick, 2014).

Conclusion 4

Based on the finding that providing instructors the ability to manipulate content within the LMS, offering clear and consistent navigation throughout the course, stating student technology requirements prior to course start, and using universal design principles to provide access to all students were best practices used in integrating technology in high school OLPE curricula, it was concluded students develop new computer skills not available in current face-to-face PE programs, which better prepared them to be 21st century learners. Today's technology-enabled education provided students with instantaneous, reliable, high-quality opportunities for immersive interaction, content development and collaboration, information display and sharing, and graphical, visual, textual, and verbal communication. Natale (2011) also concluded online learning was a high-quality alternative to face-to-face education.

Using an LMS that allowed teacher access, they could provide a unique and tailored learning experience continuously modified to remain current and relevant for students. The architecture of the LMS provided students with an immersive experience in technology through interaction with tools and resources such as interactive text, webpages, computer applications, and video not found in face-to-face high school PE

courses. Using universal design principles within the LMS architecture and throughout the uploaded and linked content, and adapted physical activity, provided access to a diverse student population.

Conclusion 5

Based on the finding that providing multiple ways to assess course effectiveness, regular course updates, and highly qualified instructors were pest practices used in evaluating the effectiveness of a high school OLPE curriculum, it was concluded OLPE courses offered the current tools and media reflective of 21st century learning. In online education, every aspect of instruction, communication, interaction, and assessment relied on digital technologies. Fullan (2013) also noted students and teachers were drawn to an online environment aligned with technology instead of the traditional classroom. The combination of tools, techniques, and approaches created an immersive, engaging experience for students. In OLPE, it was important to ensure teachers had digital fluency so technology was not an intrusive set of new tasks infringing on the content.

Conclusion 6

Based on the finding that inclusion of professional development, technical support, and a student orientation were best practices used in providing support to teachers and students of high school OLPE, it was concluded technology used in OLPE curricula made it possible for instructors to create exciting ways to engage students that were more effective than a traditional face-to-face PE course. The purposeful selection, application, and support of technology must be carefully managed and thoughtfully and completely implemented in ways driven by student-centered concepts and teaching practices. Teacher quality and instruction drove the online environment, which required

significant resources in the areas of instructional design, instructional technology, technical support, and training (Watson et al., 2015).

Implications for Action

The results from this study supported the importance of best practices in the design and development of high school OLPE. Based on the review of literature and the interview data, the following actions were recommended:

1. It is recommended developers of OLPE curricula continuously evaluate and modify the curricula to address national and state standards, guidelines, and best practices. Online courses require the cooperation of program planners, teachers, instructional designers, and instructional technologists, as well as a thorough review of current standards and specifications. Every instructional goal and any related activities should be reviewed, and appropriate online tools and techniques should be identified to meet each stated outcome. It is reasonable to expect online learning tools will rapidly change and the LMS will need continuous updating to incorporate these changes. Integration of new and developing health and activity technologies (e.g., wearable devices, smart exercise equipment) should also be included as appropriate.

2. An appropriate class size with a reasonable student to teacher ratio of 1:45 should be maintained to provide opportunities for (1) individualized learning and assessment, (2) instructor-student interactions, and (3) consistent feedback to the student. SHAPE America (2012) recommended the size of PE classes should be consistent with those of other subject areas, approximately 1:35 at high school, for safe and effective instruction. This was necessary to avoid

common challenges seen in face-to-face PE classes with large class sizes, which prevented differentiated opportunities for diverse students and timely feedback to students.

3. OLPE courses should include interactive exercises designed to help students learn in interesting and intuitive ways by integrating assessments and learning tools. Student success and advancements in technology are now linked to districts embracing and offering online options. A variety of electronic tools designed to augment online learning and keep online learners engaged exist. Engaged students work willingly and approach assignments as something that matters to them personally.

4. Course developers should seek partnerships with technology experts to ensure online courses take advantage of new developments that increase the capacity to learn. Although classrooms may be like those 100 years ago, the online world is not static and reinvents itself continuously. These ever-evolving innovations constantly revolutionize the relationship between students and knowledge. OLPE should stay current with what students experience with their personal technology devices. Integrating these devices into the curriculum through the development of apps and providing live exercises classes within the course will provide students with more options for differentiated learning and assessment.

5. Schools should provide an annual budget for innovation and creativity in curriculum development that includes compensation for time, software, and hardware. Technology tools and systems do not accomplish much until they

are combined in purposeful ways to become comprehensive educational environments. These tools need to be identified, created, and supported by talented individuals who deeply understand the nature and focus of the school itself and the instructional goals of its teachers and students. Course and curriculum designers must be prepared for the rising costs of technology and staff to keep up with the demands and expectations of students and teachers in this environment. These opportunities should include more options to use personal technology devices.

6. Instructors should be trained twice a year to adapt, change, and update online teaching tools and resources. Even expert teachers may be unfamiliar with online systems and approaches. For optimal training to be available for teachers, a significant team of trainers who themselves are constantly engaged in their own ongoing education must be available.

Recommendations for Further Research

The literature regarding best practice for the design and development of OLPE curricula remains sparse and requires further research. Based on the findings and limitations from this study, the following recommendations for further research were suggested:

1. As literature regarding best practice for the design and development of high school OLPE curriculum is sparse, conduct a similar study utilizing a quantitative method to further validate this study's findings.

2. This study focused on best practices for the design and development of high school OLPE curriculum. Many participants also designed curricula for high

school online health. Expanding the study to include best practice for the

design and development of high school online health curricula would allow

for the comparison of best practices among curriculum design experts.

3. During the study, participants referenced the skills necessary to teach OLPE.

    A study researching required skills for OLPE teachers would be helpful to

    teacher educators and education policymakers.

4. A study exploring pretest and posttest fitness-related assessments and

    cognitive assessments could compare face-to-face and OLPE courses to

    examine whether standards and benchmarks were met.

5. Participants discussed the ability of OLPE to individualize education for

    students. A study of how OLPE created equitable learning opportunities for

    all students would also be beneficial.

6. Participants discussed how OLPE could take advantage of the learner's desire

    to engage with technology. A study should be conducted examining how

    OLPE was delivered and if it increased student success in achieving 21st

    century skills.

7. Participants discussed the use of videos to assess student mastery of physical

    movements and skill concepts. A study should be done to compare student

    mastery of these concepts using videos as compared to teacher observations in

    equivalent face-to-face classes.

8. Fitness trackers are being used to assess student physical performance in high

    school OLPE. A study comparing OLPE courses that do and do not use these

devices, and whether these devices help students achieve health enhancing levels of physical activity, would be beneficial.

Concluding Remarks and Reflections

OLPE is still in its early phases of evolution. Individuals and structures continually emerge to engage efforts and extend the reach of high school education, providing new opportunities for student learning, technology integration, and teaching. As OLPE matures, expectations for quality education, content, and teachers increase as well.

OLPE is currently evolving from experimentation to a mainstream course for high school. From its dubious and sporadic start on the academic periphery, it is now moving to the forefront of educational opportunity. Now is the time to establish a full array of best practices so district leaders, teachers, students, and the public will embrace OLPE as integral to academics.

At this critical point in time, the goal of this study was to identify the range of best practice in the design and development of high school OLPE, going beyond merely what was happening now, but focusing on standards, aspirations, and principles essential far into the foreseeable future. Few participants in this study would feel assured their OLPE courses, curricula, or programs already reached a sustainable, comprehensive state of excellence. These current best practices suggested aspirations necessary to make OLPE worthy of the highest ideals of high school learning. Moving further into the 21st century, OLPE will need to define more explicitly the role of technology in the learning environment.

Identifying these best practices was an attempt to infuse idealism into a budding and dynamic field of education, OLPE. By acknowledging the first design experts of OLPE, the field can assume its rightful place in what makes high schools excellent, respected, and essential to their communities.

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APPENDICES

APPENDIX A – PARTICIPANT BILL OF RIGHTS

BRANDMAN
University Chapman University System

BRANDMAN UNIVERSITY INSTITUTIONAL REVIEW BOARD

Research Participant's Bill of Rights

Any person who is requested to consent to participate as a subject in an experiment, or who is requested to consent on behalf of another, has the following rights:

1. To be told what the study is attempting to discover.

2. To be told what will happen in the study and whether any of the procedures, drugs or devices are different from what would be used in standard practice.

3. To be told about the risks, side effects or discomforts of the things that may happen to him/her.

4. To be told if he/she can expect any benefit from participating and, if so, what the benefits might be.

5. To be told what other choices he/she has and how they may be better or worse than being in the study.

6. To be allowed to ask any questions concerning the study both before agreeing to be involved and during the course of the study.

7. To be told what sort of medical treatment is available if any complications arise.

8. To refuse to participate at all before or after the study is started without any adverse effects.

9. To receive a copy of the signed and dated consent form.

10. To be free of pressures when considering whether he/she wishes to agree to be in the study.

If at any time you have questions regarding a research study, you should ask the researchers to answer them. You also may contact the Brandman University Institutional Review Board, which is concerned with the protection of volunteers in research projects. The Brandman University Institutional Review Board may be contacted either by telephoning the Office of Academic Affairs at (949) 341-9937 or by writing to the Vice Chancellor of Academic Affairs, Brandman University, 16355 Laguna Canyon Road, Irvine, CA, 92618.

Brandman University IRB   Adopted   November 2013

Discovering the Best Practices for Design and Development of High School OLPE: A
Phenomenological Study

Thank you for meeting with me. You are free to decide not to participate in this study or
to withdraw at any time.
(Turn on audio recorder)

Thanks for agreeing to be interviewed for this research project. I'm hopeful that the
information you share with me will help provide information that provides insight into
the best practices for design and development of high school OLPE. To understand your
experience designing and developing OLPE, I need to know about the best practices you
use in the design and development of OLPE. I have a set of questions to guide our
conversation. I want to understand your experiences, and thoughts about your design and
development process, and factors that may have affected your best practice choices. Do
you have any questions about what I've said or about the purpose of the interview?

Interview Questions:

Content
- How do you determine the content to include in the design and development of
  your high school OLPE course/curriculum?
    - Follow ups: How do you align your curriculum to state or national
      standards; why did you select those standards?
    - How do you determine goals and objectives?
    - Why is communication an important part of the curriculum?
    - How do you determine learning resources to include?
    - How are students introduced to the course?
    - How are course requirements made clear to students?
    - How do students contact the instructor?
    - How do parents contact the instructor?
    - How do students engage with the curriculum?
    - How do you create equal educational opportunities for students from
      diverse racial, ethnic, social-class and cultural groups?
    - Why is it important to keep your content current?
    - How are privacy policies posted?
    - How are instructor resources included?
    - Why is it important for instructors to have built in assessments with access
      to answers, explanations, and/or rubrics?

Instructional Design
- How do you choose instructional design elements to include in the design and
  development of your high school OLPE course/curriculum?
    - How are learning activities are determined?
    - Why is it important to understand student needs?

- How is the course organized?
- How are activities selected?
- Why is/are remediation or alternative assignments important?
- Why are enrichment activities important?
- How are opportunities for interaction provided?
- How are students engaged in higher-order thinking?
- Why is course adaptability important?
- How are reading and mathematical requirements determined to be grade-level appropriate?
- How do teachers and students interact?
- Why is feedback important?
- How do students interact with other students?
- How are supplemental tools and resources selected?

Student Assessment
- How are students assessed?
  - How are evaluation strategies aligned to course goals and objectives?
  - How are formative and summative assessments selected?
  - How often are students assessed?
  - Why is self-monitoring important?
  - Why is instructor flexibility important for student assessment?
  - Why are grading rubrics important?
  - How are grading policies selected?

Technology
- How is technology used or integrated?
  - How do instructors modify content within the LMS?
  - How are differing schedules or calendars accommodated?
  - How is the course navigation selected?
  - How is media selected?
  - How are technology requirements provided to students?
  - How are required technology skills provided to students?
  - Why is interoperability important?
  - Why is copyright important?
  - How is the course/curriculum accessible to disabled students?
  - Why is FERPA important?

Course Evaluation
- How is the course/curriculum evaluated for effectiveness?
  - How often is the course evaluated?
  - Who evaluates the course?
  - How often is the course updated?
  - Why are highly qualified teachers important?

Support
- What support is provided to teachers and students to access the

course/curriculum?
- How are the skills teachers must have determined?
- Why is professional development important?
- Why is it important for instructors to understand learning in the online environment?
- How is technical support provided?
- What skills must students have to access the course/curriculum?
- Why is orientation important for students?

APPENDIX C – INVITATION TO PARTICIPATE

Date

Dear Physical Education Expert,

I am a doctoral candidate in Brandman University's Doctorate of Education in Organizational Leadership program in the School of Education. I am conducting a phenomenological study which will identify and describe the best practices used in the design and development of high school OLPE curriculum based on the International Association for K-12 Online Learning (iNACOL) National Standards for Quality Online Courses as reported by online physical education curriculum design experts.

I am asking for your assistance in the study by participating in an interview which will take approximately 90 minutes and will be setup at a time and location convenient for you. If you agree to participate in the interview, you can be assured that it will be completely confidential. No names will be attached to any notes or records from the interview. All information will remain in locked files, accessible only to the researchers. No employer will have access to the interview information. You will be free to stop the interview and withdraw from the study at any time. You are also encouraged to ask any questions that will help you understand how this study will be performed and/or how it will affect you.

The research investigator, Marie Crosby, is available at mcrosby@brandman.edu or by phone at 310-309-7352, to answer any questions or concerns you may have. Your participation would be greatly appreciated.

Sincerely,

Marie Crosby
Doctoral Candidate, Ed.D.
36389 Verbena Rd.
Lake Elsinore, CA 92532

APPENDIX D – INFORMED CONSENT FORM

INFORMED CONSENT

INFORMATION ABOUT: The best practices for the design and development of high school online physical education.

RESPONSIBLE INVESTIGATOR: Marie Crosby

PURPOSE OF STUDY: You are being asked to participate in a research study conducted by Marie Crosby, a doctoral student from the School of Education at Brandman University. The purpose of study is to identify and describe the best practices used in the design and development of high school OLPE curriculum based on the International Association for K-12 Online Learning (iNACOL) National Standards for Quality Online Courses as reported by online physical education curriculum design experts.

Your participation in this study is voluntary and will include an interview with the identified student investigator. The interview will take approximately 90 minutes to complete and will be scheduled at a time and location of your convenience. The interview questions will pertain to your perceptions and your responses will be confidential. Each participant will have an identifying code and names will not be used in data analysis. The results of this study will be used for scholarly purposes only.

I understand that:
1. The researcher will protect my confidentiality by keeping the identifying codes safe-guarded in a locked file drawer or password protected digital file to which the researcher will have sole access.
2. My participation in this research study is voluntary. I may decide to not participate in the study and I can withdraw at any time. I can also decide not to answer particular questions during the interview if I so choose. Also, the investigator may stop the study at any time.
3. If I have any questions or concerns about the research, please feel free to contact Marie Crosby at mcrosby@brandman.edu or by phone at 310-309-7352; or Dr. Tamerin Capellino (Chair) at capellin@brancman.edu
4. No information that identifies me will be released without my separate consent and all identifiable information will be protected to the limits allowed by law. If the study design or the use of the data is to be changed, I will be so informed and consent re-obtained. There are minimal risks associated with participating in this research.
5. If I have any questions, comments, or concerns about the study or the informed consent process, I may write or call the Office of the Vice Chancellor of Academic Affairs, Brandman University, at 16355 Laguna Canyon Road, Irvine, CA 92618, (949) 341-7641.

I acknowledge that I have received a copy of this form and the "Research Participant's Bill of Rights." I have read the above and understand it and hereby consent to the procedure(s) set forth.

_____   Date:_____
Signature of Participant or Responsible Party

_____   Date:_____
Signature of Principal Investigator, Marie Crosby