1-1-2018

The Digital Classroom in the 21st Century: A Study of K-12 Physical Educators Use of Instructional Technology

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THE DIGITAL CLASSROOM IN THE 21ST CENTURY: A STUDY OF K-12 PHYSICAL EDUCATORS USE OF INSTRUCTIONAL TECHNOLOGY

A dissertation submitted in partial fulfillment

of the requirements

for the degree of

DOCTOR OF EDUCATION

to the faculty of the Department of

ADMINISTRATIVE AND INSTRUCTIONAL LEADERSHIP

of

THE SCHOOL OF EDUCATION

ST. JOHN'S UNIVERSITY

New York

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ABSTRACT

THE DIGITAL CLASSROOM IN THE 21ST CENTURY: A STUDY OF K-12 PHYSICAL EDUCATORS USE OF INSTRUCTIONAL TECHNOLOGY

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This qualitative study focuses on the use and implementation of instructional technology in K-12 physical education classes in suburban school districts on Long Island, New York. Novice (less than three years teaching experience), intermediate (four to fourteen years), and veteran (more than fifteen years) public school educators were interviewed on their knowledge and use of instructional technology in their current teaching methods.

Factors influencing or limiting use of instructional technology among K-12 physical educators was examined. The study includes demographics, such as gender, years of professional teaching experience, instructional technology training, computer proficiency skills, and types of instructional technology used in their teaching practices. Examined in this study was K-12 physical educators' implementation of instructional technology throughout their district's curriculum. Results indicated some challenges with implementing instructional technology which were keeping up to date with changing software and hardware, district budget constraints, participant's training in and use of instructional technology. Benefits and opportunities with implementing instructional technology included enhancing student learning and strengthening teacher effectiveness.

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CHAPTER 1

Introduction

Teacher preparation programs for K-12 physical education in New York State are constantly changing to meet the required demands of state assessments, teacher Annual Professional Performance Review (APPR), licensure requirements for becoming a certified teacher in New York State, and the recently enacted new education law – Every Student Succeeds Act (ESSA, 2015) which replaced No Child Left Behind Act that was signed into law in 2002. Bongiovanni's (2013) study found that physical education was often marginalized and viewed as a lesser subject compared to core academic areas such as math, literacy, science, and social studies. As an example, after the educators informed administration that Smart Boards would enhance instruction and would be useful instructional technology, Smart Boards were provided to all teachers in the district except physical educators. Additionally, many administrators seemed unclear regarding what to observe in a quality physical education program and what would make an effective physical educator. Many administrators would focus on managerial and safety aspects of the physical education context as opposed to the strategies, styles, and developmentally and instructionally appropriate activity progressions evidenced by physical educators. The local administration has not recognized physical education as a discipline for the unique contributions the subject can provide to student learning and development. As a result, Bongiovanni (2013) stated the profession has continued to endure marginalization. Similarly, many physical educators across the country have struggled to gain respect as educators who can provide valuable learning experiences for children (Brockmeyer et al., 2011; Zeigler, 2011 as cited in Bongiovanni, 2013).

According to Eberline and Richards (2013), physical education is at a crossroads in the 21st century. With government mandates related to No Child Left Behind Act (U.S. Department of Education, 2001) emphasizing core subjects, such as math and literacy, non-core subjects have been deemphasized. Physical education teachers have traditionally relied on observations as a primary method of assessment in determining student activity levels. However, recent advances in physical activity instructional technology provide more valid and reliable measurements that can help document student performance. Armed with data gathered through instructional technology, physical education teachers become better equipped when trying to convince various stakeholders—including students, parents, colleagues, and administrators—of the merits of a quality physical education program.

Entering the last half of the second decade in the 21st Century, this study will examine the current beliefs and practices of K-12 physical educators with implementing instructional technology in their district's physical education curriculum. In addition, the study will examine if instructional technology will assist physical educators in creating a physically educated person as assessed by the Society of Health and Physical Educators (SHAPE) America Standards and New York State Physical Education Standards. SHAPE America's National Standards & Grade-Level Outcomes for K-12 Physical Education (2013) define what a student should know and be able to perform as a result of a highly effective physical education program. State Education Departments and local school districts across the country use the National SHAPE America's Standards to develop or revise existing standards, frameworks, and curricula. SHAPE America recommends that schools provide 150 minutes of instructional physical education for

elementary school children, and 225 minutes for middle and high school students per week for the entire school year. New York State Education Department requires all pupils in grades K-3 participate in a physical education program on a daily basis. All pupils in grades 4-6 shall participate in the physical education program not less than three times each week. The minimum time devoted to such programs (K-6) shall be at least 120 minutes in each calendar week. All secondary (grades 7-12) shall have the opportunity for regular physical education, but not less than three times per week in one semester and two times per week in the second semester (New York State Education Department Commissioner's Regulation 135.4). A quality physical education program provides learning opportunities, appropriate instruction, meaningful and challenging content and student assessment.

In the Fall of 2015, 234 K-12 health and physical education teachers throughout New York State responded to an electronic survey conducted by members of the New York State Association of Health, Physical Education, Recreation and Dance (NYS AHPERD) Technology Survey Section. Survey items were developed to measure the needs and interests of NYS AHPERD members. The survey responses were used to guide the development of various initiatives and resources, which was designed around questions received from the NYS AHPERD membership. *Technology Tidbits* is a resource guide from the NYS AHPERD technology section that provides instructional technology topics, helpful links and resources to the physical educator and answers to instructional technology-related questions of the membership. The survey results regarding which type of device(s) would they be interested in using (or having students use) in their classroom, 189 (80.8%) of the teachers responded with Tablet (iPad,

Surface, Android Tablet, etc.). When asked what instructional technology topic(s) would they like to learn more about, 179 (76.5%) responded with iPad apps in physical education and 162 (69.2%) in assessment of students. The results of this survey assist in designing programs on instructional technology that are held at the annual NYS AHPERD State Conference. The November 2017 conference instructional technology programs include: Y Tech? Infusing Technology Into A 21st Century PE Classroom; Technology-infused Lesson From Start To Finish; High-Tech Physical Education; Reimagining Student Engagement, Assessments, & Data Collection and Let's Talk Technology (NYS AHPERD 80th Annual Conference booklet, 2017).

Purpose of the Study

When teachers use instructional technology in physical education, they are creating an environment of productive learning for 21st Century learners. During the one-to-one interviews conducted for this study, participants stated that the popularity and availability of health and fitness apps were either learned through personal research, professional development, pre-service learning opportunities, and discussions with colleagues. It provides an opportunity for K-12 physical educators to incorporate these free or low-cost resources into curricular programming and lesson planning. The purpose of this exploratory study was to compare instructional technology usage and obstacles among novice, intermediate, and veteran K-12 physical education teachers to determine what instructional technology they utilize and what affect it has on student participation in their K-12 physical education curriculum. The study was conducted among ten K-12 physical educators employed within school districts in suburban Long Island, New York.

Novice, intermediate and veteran teachers interviewed in this study use instructional technology in their teaching. A veteran teacher stated that her own "fear" of not being able to know something and needing to know everything because kids have all the answers especially when it comes to instructional technology. In contrast, an intermediate teacher uses instructional technology to reinforce whatever lesson is for the day. "It especially motivates them because it's something that is on their level."

This phenomenological study will attempt to contribute to research literature and expand on the integration of instructional technology into physical education. Physical educators are in a position to integrate instructional technology in their classes by making their programs more effective and to make student learning more practical in today's educational environment.

Significance of the Study

For physical educators, the 21st Century has become an era or journey of exploration, learning, growth and promises to come. Physical educators need to have technological knowledge and the desire to bring it in their classroom to incorporate instructional technology into their pedagogy (Mohnsen, 2010). Revamping physical education curriculums and daily lesson plans using innovative instructional technology might inspire digital natives living through the 21st Century to participate in class at higher rates, maintain an active and healthy lifestyle as teacher's delivery of instruction to students might resonate in ways other mediums of expression do not. This study will investigate these problems by understanding why physical educators choose to use or not use different types of instructional technology within their K-12 curriculums. DelTufo's (2000) study demonstrated the scope of computer technology, and found that it could be

used in a variety of ways to accomplish educational goals. Implementing instructional technology appropriately into physical education can enhance teaching and learning and contribute to providing a quality physical education program and student fitness. Instructional technology can aid in content presentation and help students become physically educated individuals who have their knowledge, skills, and confidence to enjoy a lifetime of physical activity (National Association for Sport and Physical Education, 2009). Integrating instructional technology in physical education would get more students interested and would broaden the appeal of physical education to the increasing number of technology-minded students (Hubbard, Ennen & Gray, 2016).

Researching physical education teachers instructional technology use is important due to the increased level of childhood obesity and other lifestyle illnesses of K-12 children in the United States, which indicates that physical educators should be using all tools at their disposal to help fight these diseases. Childhood obesity has been and continues to be a big problem throughout the United States. According to the Physical Activity Guidelines for Americans (Centers for Disease Control, 2008), less than 3 in 10 high school students get at least 60 minutes of physical activity every day. The Centers for Disease Control (CDC) found physical activity can improve health. People who are physically active tend to live longer and have lower risk for heart disease, stroke, Type 2 diabetes, depression, and some cancers. Physical activity can also help with weight control, and may improve academic achievement in students (CDC, 2008). Children need new and innovative ways to learn and have fun in learning healthy choices while exercising in order to live healthy lives. Instructional technology is a resource teachers can use to update or integrate ways to help children love to be active (Armijo, 2016).

Physical education programs in the 21st Century can inspire, motivate, and prepare learners to live in an ever-changing world, increasingly marked by the epidemic of obesity and overweight individuals (Edginton, Chin, Geadelmann & Ahrab-Fard, 2011).

This study is designed to assist school district leaders, school building leaders, and physical education teachers to use the results to aid in current and future instructional technology usage for students. In addition, the results can be used as part of the strategic plan and or mission for their school district, revision of instructional curriculums, grants, annual school budgets, and community benefits. Results of this study can also assist in preparation of students in higher education teacher preparation programs by requiring coursework in the appropriate use of instructional technology in teacher training.

Research Questions

This study was guided by the following research questions:

1. How do K-12 physical education teachers describe their instructional technology usage in their instructional settings to meet the demands of today's 21st century learners?
2. How do physical education teachers incorporate technology in their instructional practices?
3. How do male and females compare in their instructional technology practices?
4. How do years of teaching experience influence their instructional technology usage?

5. What factors influence or limit the use of instructional technology by K-12 physical education teachers? How does school climate, technology support and district demographics affect their instructional technology?
6. How do physical education teachers describe teaching 21st century learners in terms of instructional technology?
7. What should teacher preparation programs include for students majoring in physical education in terms of instructional technology?

Definition of Terms

The following terms used throughout the proposal are defined as follows:

Digital Immigrants

For the purpose of this study, digital immigrants are those individuals born prior to 1980. Prensky (2001) stated,

> Digital immigrants learn—like all immigrants, some better than others—to adapt to their environment, they always retain, to some degree, their *accent,* that is, their foot in the past. The *digital immigrant accent* can be seen in such things as turning to the Internet for information second rather than first, or in reading the manual for a program rather than assuming that the program itself will teach us to use it. The single biggest problem facing education in the 21st century is that our *digital immigrant* instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language. *Digital natives* are used to receiving information really fast and multi-task. They prefer their graphics before their text rather than the opposite. They

> function best when networked. They thrive on instant gratification and frequent rewards. They prefer games to *serious* work. *Digital immigrants* typically have very little appreciation for these new skills that the *digital natives* have acquired and perfected through the years of interaction and practice. (pp.2-3)

Digital Natives

According to Sanburn (2015), digital natives are current K-12 students born between 2000-2010 who were born in the digital world and for whom all forms of information and communications technology are natural.

Digital Natives are individuals born after 1980 following the introduction of digital technology. In many parts of the world, digital natives are surrounded by technology, often beginning in early childhood, and their daily activities include learning and using digital technology. *Digital natives* are proficient with their use of smartphones, iPads, Xbox, Facebook and other technology. Whether or not they embrace it, they cannot remember a time when technology as it is currently known in the 21st Century did not exist (www.Bobology.com).

Instructional Technology

Januszewski & Molenda (2008) defined educational technology as the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (p.1). Ely (2008) stated that *educational technology* and *instructional technology* are sometimes used interchangeably and that the former term encompasses all uses of technology within the educational sector. An online survey conducted by Roslow Research Group (2009) of physical education teachers throughout the United States, defines instructional

technology of their physical education programs as a function of its ability to enhance teacher and parent communication, provides data for assessment and grading, enhances instruction and communication with school and district administrators regarding student performance and achievement and increases student motivation.

Teacher Experience

For the purpose of this study, a novice teacher is operationally defined as having less than three years of teaching experience, an intermediate teacher is operationally defined as having four to fourteen years of teaching experience, and a veteran teacher is operationally defined as having over 15 years of teaching experience.

SHAPE America's National PE Standards:

SHAPE America's National Standards & Grade-Level Outcomes for K-12 Physical Education define what a student should know and be able to do as result of a highly effective physical education program.

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

Standard 2 - The physically literate individual applies knowledge of concepts, principles, strategies, and tactics related to movement and performance.

Standard 3 - The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.

Standard 4 - The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Standard 5 - The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression, and/or social interaction (http://www.shapeamerica.org/standards/pe/).

New York State Physical Education Learning Standards:

It is the New York State Education Department's (NYSED) responsibility to set student learning expectations (standards) for what all students should know and be able to do as a result of skilled instruction. It is the responsibility of each local school district to develop curricula based on these NYSED Learning Standards, select textbooks and instructional materials, develop pacing charts for learning (scope and sequence), and provide professional development for staff to ensure that all students have access to instruction leading to attainment of these learning standards (http://www.p12.nysed.gov/ciai/).

Standard 1 – Personal Health and Fitness

Students will have the necessary knowledge and skills to establish and maintain physical fitness, participate in physical activity, and maintain personal health.

Standard 2 – A Safe and Healthy Environment

Students will acquire the knowledge and ability necessary to create and maintain a safe and healthy environment.

Standard 3 – Resource Management

Students will understand and be able to manage their personal and community resources (http://www.p12.nysed.gov/ciai/).

Conceptual Framework

In researching literature for this study, it appears that recent studies have not been conducted in a K-12 physical education setting regarding instructional technology in suburban Long Island, New York.

Through on-site practicums with prospective student teachers in various suburban schools on Long Island, there appears to be limited use of instructional technology in physical education instruction. It appears that veteran teachers look to novice and student teachers for up-to-date lessons using instructional technology.

Students in K-12 are known as *digital natives* (Sanburn, 2015) and are considered the first to grow up alongside communications technology including computers, videos, video games, cell phones, social media including Twitter, YouTube, Facebook, Google, etc. Where is the (dis)connection between the K-12 student population and current teachers as it applies to using instructional technology in the physical education instructional environment? Are teacher's instructional practices keeping pace with student's pre-loaded apps on their cell phones? Are lesson plans inclusive of what students know about physical activity using instructional technology? Numerous fitness education apps are developed free by companies that can benefit students and teachers. For example, Pinterest offers physical education apps encompassing elementary, middle and high school student's lessons, bulletin boards, fitness, curriculum and assessment.

Bennett-Walker (2006) examined the relationships of teacher demographics, such as gender, years of professional teaching experience, technology training, and the grade level taught with technology use. The subjects for this study included 181 public elementary, middle, and high school physical education teachers in Georgia. The study

revealed that 146 (82.1%) of the physical education teachers sometimes or frequently used computers for preparation (record keeping, documentation, and lesson preparation. However, only 30 teachers reported using computers during lessons due to availability and lack of access which was seen as a barrier to instructional technology use. Lack of time was the biggest barrier to instructional technology use with lack of access and money a close second and third respectively.

The only form of instructional technology that had statistical significance among male and female physical education teachers and instructional technology use was Hyperstudio. Hyperstudio was perceived as an easy-to-use tool for combining text, graphic, sounds, and video in a multimedia project that was relatively new at the time of the Bennett-Walker (2006) study. Researchers found that unfamiliarity of Hyperstudio caused some physical education teachers to not fully understand the application or benefits.

The findings from Bennett-Walker's study regarding a difference in the use of instructional technology, based on years of teaching experience, suggest that there were no statistical significance among years of teaching experience and instructional technology use. Two factors that may be contributing to this finding are, first, instructional technology is relatively new and constantly evolving not just for novice teachers but to veteran teachers as well. Secondly, the teachers have a self-assessment of their instructional technology skills. One hundred seventy-eight (98.3%) of the teachers believed their computer proficiency skills were fair to excellent.

The Roslow Research Group (RRG) online survey was conducted among physical education teachers in elementary, middle and high schools across the United States in

2009 on behalf of Polar Electro Inc. and the National Association for Sport and Physical Education (NASPE), (currently known as SHAPE). The survey was designed to explore a number of key aspects of physical education programs throughout the nation. Questions covered instructional content, the use of instructional technology in physical education programs, professional development for physical education teachers, principals' knowledge and support for physical education programs, physical education teachers' perceptions of student and parent interest and involvement and funding for physical education programs. A total of 1,375 physical education teachers participated in the survey between May 28 and June 15, 2009. Of this, 1,164 K-12 physical education teachers completed the survey. How does instructional technology enhance your school's physical education program? Figure 1 indicates the results of ways technology enhances the physical education program.

Figure 1

Ways Technology Enhances the Physical Education Program

Ways Technology Enhances PE Program	Total	School Level: Elementary	Middle	High School
	%	%	%	%
Provides data for assessment and grading	60	57	65	64
Enhances instruction	59	57	57	63
Enhances communication with school/district administrators about student performance/achievement	52	51	54	49
Increases student motivation	51	52	51	48
Increases student accountability for performance/achievement	47	41	49	55
Enhances physical education	45	42	48	45
Provides objective data about student performance	44	45	46	42
Expands physical activity offerings	30	29	34	26
Enables teachers to determine the amount of physical education class time that students spend in moderate to vigorous physical activity	27	23	30	29
Increases students' skills and confidence in using technology	25	22	26	28
Increases support from stakeholders (e.g., parents, administrators)	24	23	25	24
Frees time for teachers to provide students w/ individualized feedback	17	15	19	19
Technology is not used in my school's PE program	12	10	13	13
Base (#)	1147	500	294	280

Roslow Research Group. (2009). Physical Education Trends in Our Nation's Schools: A Survey of Practicing K-12 Physical Education Teachers (Survey) (p. 5). Port Washington, NY. Prepared for: Polar Electro Inc. and National Association for Sport and Physical Education (NASPE)

Results of the RRG survey found that instructional technology enhances a physical education program in many ways. As per Figure 1, 60% feel that it "provides data for assessment and grading," 59% feel it "enhances instruction," and 51% feel it "increases student motivation." How frequently is instructional technology used in your school's physical education program for student instruction/learning? Figure 2 indicates the results of the frequency of use of technology in physical education programs for student instruction.

Figure 2

Frequency of Use of Technology in Physical Education Program for Student Instruction

		School Level		
	Total	**Elementary**	**Middle**	**High School**
Frequency Used	%	%	%	%
Very frequently	11	11	11	10
Somewhat frequently	33	30	34	36
Somewhat infrequently	47	48	47	36
Not at all	10	11	8	8
Base #	1147	500	294	280

Roslow Research Group. (2009). Physical Education Trends in Our Nation's Schools: A Survey of Practicing K-12 Physical Education Teachers (Survey) (p. 5). Port Washington, NY. Prepared for: Polar Electro Inc. and National Association for Sport and Physical Education (NASPE)

Results of the RRG regarding use of instructional technology in physical education programs found that 44% of physical education teachers use instructional

technology as part of student instruction "very" or "somewhat frequently." Only 10% do not use instructional technology at all. These incidences vary little, regardless of school level. Nearly two-thirds of the respondents cite—"*technology*"—as enhancing their physical education program as a function of its ability to enhance teacher/parent communication. Over half of the teachers also cite other ways that instructional technology enhances their physical education programs, to include:

- Providing data for assessment and grading,
- Enhancing instruction,
- Enhancing communication with school and district administrators about student performance and achievement,
- And increasing student motivation.

One of the more notable findings in the RRG survey: those teachers who are more likely to incorporate instructional technology into their student instruction perceive increasing interest among students in physical activity and physical education. For example:

- 38% of physical education teachers perceive increased interest among students in physical education over the past three years. Among those teachers using instructional technology more frequently, 46% perceive increased interest; while among those using instructional technology less frequently or not at all, 32% perceive increased interest.

The RRG survey found that during 2006-2009 school years, 38% of the physical education teachers perceive that their students' attention/interest in physical education class "has increased." Among those teachers using instructional technology for student

instruction more frequently, 46% perceive increased interest among their students in physical education class.

Gibbone (2009) investigated physical educators' attitudes and practices regarding instructional technology integration. The study also examined the relationships between attitude and practice. Participants in the pilot study were 92 public school secondary physical educators within New York State. The actual study consisted of 616 participants from 42 states. Findings indicated physical educators' expressed positive attitudes even though their reported instructional technology use was not prominent. Use of instructional technology in physical education was at a basic level for the majority of participants, but there is potential for expansion in the type of learning activities established within the physical education instructional environment. Gibbone (2009) stated, "These educators are confident about their skills and have taken steps to initiate increased usage of instructional technology" (p.120). Factors influencing or limiting the use of instructional technology among physical education teachers was examined in Gibbone's (2009) study.

The participants in Gibbone's (2009) study had an overall positive attitude about instructional technology use yet they were generally not using the instructional technology that was listed in the survey. The Gibbone (2009) study stated,

> The results indicate that the most known piece of technology equipment for teachers is their school and district websites, educational CD Rom/DVD's, word processing software and electronic fitness equipment and heart rate monitors. The most accessed items in school were reported as school and district websites, email, Internet search engines, word processing, and digital videos/YouTube .

> Teachers indicated that they feel most confident using their email, search engines, digital videos/YouTube, school website, age-appropriate websites, and department website. Teachers also reported the most used equipment to teach with as word processing, computer generated handouts, homework, or tests, Internet search engines, educational CD ROM/DVD's, and electronic grading. The top items that teachers reported never using included wiki or blog, podcasting, IEP software, Polar Tri-Fit Technology, advanced website design, spreadsheet software, active video games, digital portfolio, Smart Board and educational management software (pp. 90-92).

Overwhelmingly, teachers were not using instructional technology to teach. It is more likely that most teachers are using these items for personal use or teaching preparation and not for instruction.

The results of the Gibbone (2009) study demonstrated that if teachers with positive attitudes have more access to instructional technology, it is likely they will use it for teaching. If teachers with poor attitudes have access to instructional technology, it is unlikely they will use instructional technology for teaching because an educators' decision typically reflects their own feelings over simply having the equipment availability.

Findings from the Gibbone (2009) study revealed that participants overwhelmingly acknowledged a willingness to use instructional technology for teaching if barriers were immaterial. This suggested that the middle and high school participants of this study value the use of instructional technology for physical education. In addition,

these teachers tended to have a greater inclination to use instructional technology. Their actual use, however, was not as apparent.

There was a positive relationship between the factors of instructional technology use and teachers' attitude about instructional technology as correlations were found between these factors. Among the factors for attitude and instructional technology use, the strongest correlations were found between instructional technology use and teachers' perception of importance/relevance of instructional technology and between instructional technology proficiency and teachers' perception of importance/relevance of instructional technology. The results from this study indicated that involvement in instructional technology training was associated with positive attitudes about instructional technology use. Furthermore, those who participated in this study seem to be willing to learn and apply instructional technology if given the opportunity to prepare themselves and if supplied with appropriate resources.

CHAPTER 2
Review of Related Literature

The purpose of this study was to compare instructional technology usage and obstacles among novice, intermediate, and veteran K-12 physical education teachers to determine what instructional technology they utilize in their K-12 physical education curriculum. This chapter is divided into the following areas (a) historical overview of physical education, (b) physical education learning in the early 21st Century, (c) instructional technology and physical education: past, present, and future possibilities, (d) school climate, (e) instructional technology barriers, (f) instructional technology integration for tomorrow's teachers, (g) trends towards the future of instructional technology in physical education, and (h) suggestions for policy changes.

Historical Overview of Physical Education

Shimon's (2011) evidence suggests that that the concept of physical education in the Western world began in ancient Greece (800-300 BC) (Leonard & McKenzie, 1927). During the Early American period, mid- to late 1700s to 1900, was the beginning of physical education in the United States. These early systems were developed by medical doctors to improve physical training and health for youths and adults. Leaders in physical education began to see the importance of testing their students to see whether they were improving, and then prescribing corrective exercises if the outcomes were not acceptable. During the early 20th Century (1900 to 1930), new systems of physical education were developed, and scientific studies of physical training conducted on men and women were informing the future development and improvement of physical education. Many movements and trends affected physical education during the mid-20th

century (1930-1960s), including sports, dance, and lifetime and recreational activities. There was a growing concern to help children in public schools who were mentally and physically challenged to participate in physical education, although no formal school mandate had yet been declared. Research on physical fitness and movement expanded, significantly affecting the growth of the profession in the decades to follow (Shimon, 2011).

Shimon (2011) stated that the 1970s to the end of the 20th century was a period of vast growth and change in physical education. During the early 1970s, education across the United States shifted from required course work and began to provide students more freedom to select courses of interest. By 1980, the pressure to hold teachers and schools accountable for content and student learning was taking hold. A reformation back to required courses, accountability, and standards was in process. In response to the growing concern over content standards and accountability, NASPE (National Association for Sport and Physical Education) (currently known as SHAPE), created a task force in 1986 to develop a definition of what physically educated students should know and be able to do (p. 20).

Several laws were passed that changed the course of physical education. The Education for All Handicapped Children Act (EAHCA) was passed in 1975. The law mandated that free and appropriate public education be available for all handicapped children. In 1990 the Individuals with Disabilities Education Act (IDEA) changed the terminology to include all children with disabilities and not just handicapped children. In 1972, Title IX was enacted and had a tremendous impact on physical education and sports. Title IX mandated equal physical education and sport opportunities for females in

all institutions receiving federal aid. In 1991, No Child Left Behind (NCLB) had an enormous impact on physical education. This law affected K-12 levels and held schools and teachers more accountable for helping students learn. Schools were required to show improvements in test scores in core academic subjects including English, reading, language arts, math, science, foreign languages, civics and government, economics, arts, history, and geography. Physical education was not included as a core academic subject and created challenges for physical education entering the 21st century. As school districts struggle to raise academic test scores in the core classes, many physical education programs have been reduced or eliminated to allow more time to teach within the core subject areas (Shimon, 2011).

Although the content of physical education has remained relatively consistent during the last half of the 20th century, new teaching approaches, and an emphasis on fitness became apparent. Shimon (2011) described the following current models used by physical educators in the second decade in the 21st century.

> Movement Education: helps elementary-aged children develop and refine fundamental movement patterns, such as running, hopping, skipping, throwing, catching, and kicking. (Developed under Rosalind Cassidy in the 1950s and under the leadership of Eleanor Metheny, Ph.D in the 1960s and 1970s.
>
> Humanistic Model: instruction is individualized, allowing each person to develop his or her own uniqueness. Students became more responsible for what they learned and not the traditional one-size-fits-all method of teaching. This model reflects the current student-directed teaching style of Mosston and Ashworth (2002) (p. 23).

Concepts-Based Model: it helps students learn about content and the concepts of moving (the why's) while participating in physical activities, e.g., exercise physiology, biomechanics, motor learning, and development (Mohnsen 2003).

Responsibility Model: was developed and introduced by Don Hellison, Ph.D in the 1980s. It enhances the personal and social skills of students, especially at-risk and troubled students, by learning to respect others by being in control of their own emotions and behavior.

Sport Education Model: became popular in the 1990s (Siedentop 1994; Siedentop, Hastie, and van der Mars 2004). Students develop skills and learn how to play the game while being members of a team. Each group determines roles such as coach, equipment manager, sport information director, conditioning coach, and other duties found among sport teams. Under the guidance of the teacher, teams develop their own practice plans, scrimmage, and compete in pre-season, in-season and post season play.

Cooperative Games: came into being during the 1990s. It includes cooperative games and group initiative activities involving problem-solving games and trust-building activities such as rope courses, climbing walls and outdoor adventure education programs.

Fitness Education Model: in this model, physical education teachers select activities that will help students develop and improve their personal fitness levels. Some fitness models also integrate performance- or skill-related fitness components (balance, speed, agility, coordination, and power) (pp. 23-25).

Physical Education Learning in the Early 21st Century

Technological advances in K-12 physical education curriculums have the potential to make groundbreaking history for decades to come. Physical education programs, as well as physical education teacher preparation programs, need to be rethought and reformed. Hosted by the University of Northern Iowa and the Grundy Center, Iowa Community Schools, the Global Forum for Physical Education Pedagogy (GoFPEP) 2010 conference, was organized to examine (1) a new pedagogy for preparing physical education teachers; (2) utilization of instructional technology to help teach physical education; and (3) the building of school, university, community, and corporate partnerships. Major recommendations included focusing on healthy, active lifestyles; promoting student-centered learning; and advancing knowledge, skills, and dispositions required by 21st century learners. The consensus statement called for integrating health and physical education, promoting best practice, building partnerships, developing sensitivity to diverse conditions, gaining strategies to promote accountability, and linking practice to theory. These recommendations serve to advance the interest of health and physical education at a time when obesity and overweight among individuals throughout the world has reached epidemic proportions. Such recommendations call for aggressive strategies aimed at advancing physical education pedagogy and rethinking the way in which physical education teachers are prepared (Edginton, Chin, Geadelmann & Ahrab-Fard, 2011).

The latest generation, Gen Z, also known as Post-Millennials and the iGeneration, born between early 2000s and 2010 (Sanburn 2015) are current K-12 students. They are considered *digital natives* having been raised with digital technology since birth. Mears

(2012) reported that since the birth of the iGeneration, the iPod, iPhone, Wii, Xbox, PlayStation, MySpace, Facebook, Twitter, Second Life, flash drive, and Satellite Radio, just to name a few, have all been developed. They have never known life without wireless high-speed Internet connections, cellular phones with data connections, texting, or video gaming consoles. Most are very familiar with technology interfaces, using apps and social media on a regular basis. They do not hesitate to configure computers to networks or printers and/or download and install applications once considered the responsibilities of instructional technology specialists. This new generation enters elementary school already spending an estimated 5 to 9 hours per day using some form of technological media with only 2 hours of this time being spent watching traditional television that is not streaming live, a decrease from the almost 3 hours reported by previous generations (Hersey & Jordan, 2007; Rosen, 2010, 2011). By the time they reach the end of middle school, their use of technology increases to over 15 hours per day, and multitasking becomes prominent. It is estimated that over one-half of children and preteens use additional forms of media while simultaneously playing video games or reading, and over three-fourths use other forms of technology while working on a computer, watching television, emailing, texting, talking on the phone, surfing the web, or listening to music. Many use four or five of these types simultaneously (Rosen, 2010). The current prevalence of multitasking technology use among the generation of students in K–12 schools far exceeds that of other generations. These distinct differences in use will have profound effects on future educational policy development, not only in physical education but in all subject areas. The source of this increase in multitasking has been attributed to the influx of mobile technology, which is inundating society. Texting,

Internet, and MP3 music currently account for over two hours of technology use per day for 13- to 15-year-olds (Rosen, 2010, 2011). These media have recently transitioned from desktop computers and/or home stereo systems to handheld iPods, MP3 players, and cellular phones. With the rapid development of tablet devices and mobile broadband access, multimedia libraries and Internet browsing are at the user's fingertips wherever a data signal exists. Based upon current trends, this area of technology advancement is just beginning and will continue to expand. The technology present in the homes of school-aged children will also be a factor in shaping educational policies. It is estimated that approximately 70% percent of children's homes contain three or more televisions, and over 80% contain video gaming systems. Internet access is common, with almost three-quarters of homes having connections, an increase of 27% during the past 5 years (Hersey & Jordan, 2007; Roberts, Foeher, & Rideout, 2005). Approximately 62% of elementary-aged children have televisions in their bedrooms, and 50% have their own video game consoles. Welcome to the *iGeneration* and portable video gaming devices. By the time students reach middle school, between 25 to 35% have their own computers, and 81% have their own cell phones. Among high school students, 92% have their own cell phones, 87% their own iPods or MP3 players, 73% a television in their bedrooms, and 43% their own computers (Rosen, 2010, 2011). This generation is connected more to the grid, or wireless, than past generations of students; they are accustomed to having technology and information available at their fingertips.

The physical education environment is one of the best educational settings for integrating instructional technology. The broad array of options can allow physical educators to increase activity time, improve feedback and instruction, and integrate

effective assessment. Meeting these goals will serve as a powerful advocacy tool for physical educators, and most importantly, it will improve their ability to develop students who are competent movers and who want to maintain an active and healthy lifestyle (Roth, 2014).

Instructional Technology and Physical Education: Past, Present, and Future Possibilities

Leight and Nichols (2012) stated that many physical educators could remember a time when instructional technology, as the *iGeneration* currently knows, was non-existent. A gymnasium, athletic equipment and a whistle were the only teaching tools that educators had to do their jobs. Instructional technology is definitely changing the ways physical education is taught for most. The first use of instructional technology in the field of physical education was in the 1970's and 1980's when college professors used computers to analyze fitness scores. The students would be tested, the data would be inputted into a computer, and then a report would be printed (Mohnsen, 1995). With the exception of these early fitness reports, the discipline of physical education has been slow to join the instructional technological revolution (Sharpe & Hawkins, 1998). Physical educators are still collecting fitness scores, but the equipment has become much more sophisticated, the criteria for the data are different, and the results can be sent electronically and viewed by both parents and students (Dillon, 2008).

Silverman (1997) stated that in the future, it is possible we will see instructional technology permeate all areas of school physical education. Instructional technology will assist with instruction by providing demonstrations and interactive learning activities, monitoring physical activity and fitness activities of children and providing feedback for

teachers to improve their lessons, and all instruction and assessment will be integrated with the automatic recording of data and a quick provision of feedback.

Silverman (1997) stated that in teacher education, we can expect many advances in instructional technological applications. Video assessment and monitoring of teacher education students and teachers can provide valuable methods of feedback to teachers and may help assure accountability. Interactive video learning can be used to help teachers and teacher education students to learn about virtually any discipline, activity, or pedagogy-related topic, and the interactive feature can help teachers customize this to their own needs. The availability of virtual instruction on the World Wide Web may provide access to many physical educators whether or not they are associated with a university. The use of telecommunications in teacher education clearly will grow and will be available from preservice to retirement.

Templin (1987) wrote that although most educational innovations or reform movements seem to leave teachers unaffected, today's instructional technology may have the greatest likelihood of affecting the physical educator of the future. Instructional technology has forced a communications explosion in our information society, which means teachers will have access to educational resources far beyond that available in the past. Computers, video recorders, and other forms of audiovisual technology have already had an impact on our profession. Sinclair (1983) and Tymeson and Hastad (1985) (as cited in Massengale, 1987) and will probably continue to do so for those who avail themselves of such instructional technology. Certainly if physical education teachers do not consider and provide technological aids for students' learning, they may

be depriving those students of learning technologies that could give them an educational advantage. Boyer (1983) (as cited in Massengale, 1987) stated,

> The challenge is not to view instructional technology as the enemy…Rather the challenge is to build a partnership between traditional and non-traditional education, letting each do what they can do best. The potential of instructional technology is to free teachers from the rigidity of the syllabus and tap the imaginations of both teacher and student…In the long run, electronic teachers may provide exchanges of information, ideas, and experiences more effectively than the traditional classroom or the teacher. (pp. 200-201)

The instructional technological movement may expand the role of the teacher to beyond the school whereby interactive instructional technology will enable teachers to physically educate people both young and old in various settings such as schools, homes, and offices at varying times. With an expanded role, the physical educator of the future could have to develop time management skills to keep pace with mandates of their new role.

In June 2013, President Barack Obama announced the ConnectED initiative, designed to enrich K-12 education for every student in America. ConnectED empowers teachers with the best instructional technology and the training to make the most of it, and empowers students through individualized learning and rich, digital content. Preparing American students with the skills required to secure employment and compete with other countries in the global economy relies increasingly on interactive, personalized learning experiences driven by instructional technology. Under ConnectED, 99% of American students will have access to next-generation broadband by 2018. That

connectivity will help transform the classroom experience for all students, regardless of parents' household income. Progress has been made, and as of June 2015, 20 million more students have been connected to high-speed broadband since ConnectED's launch—cutting the connectivity and digital divide in half (ConnectED The White House, 2015).

New York's Governor Andrew M. Cuomo's 2014 State of the State address called for a new $2 billion investment in broadband capacity and other instructional technology that would produce "the smartest classrooms in the nation" (http://www.smartschoolsny.com). Voters approved the so-called Smart Schools bond initiative in November 2014 by 62 percent of the vote. Veteran school administrators described the upgrades as a *sea change*, noting that the extra bandwidth supports far more than the desktop computers and laptops that have been a familiar sight in classrooms for decades. Increasingly, they said, students bring their smartphones into classrooms to access the web and work on assignments—far from the days when many districts banned cellphone use during instruction. One sign of the transformation is that a growing number of districts are adopting Bring Your Own Device (BYOD) policies, which allow students to use their smartphones and electronic tablets in class, as long as they use only websites screened by the district. The school districts must first pass an extensive state review. To qualify, districts have to meet the Federal Communication Commissions (FCC) broadband standards and must agree to lend a portion of newly purchased high-tech equipment to private and parochial schools within their borders.

School Climate

Lambert (2016) stated there is time for instructional technology in physical education class. In this day and age of limited time and budgets, physical educators are commonly under extreme pressure to administer their curriculum effectively. When confronted with the combination of childhood obesity and sedentary lifestyles, many educators try to increase activity levels within strictly defined class time. Instructional technology can be easily and seamlessly incorporated into a physical education curriculum in a variety ways that benefit both the student and the teacher. If educators want to engage students, getting familiar with instructional technology can help. Not only does instructional technology engage students, but it can also make learning more efficient, customizable, transparent and motivational. The possibilities are endless. Students of this generation are quick at learning instructional technology. It is second nature to them, and educators need to learn the language of instructional technology in order to better communicate with students (Lambert 2016).

Lambert (2016) further stated that physical education programs are seemingly on the chopping block, and many school districts are questioning the effectiveness of and even the need for physical education. One such way to advocate for the physical education program is to be on the forefront of instructional technology. Twitter, Facebook, school district and teacher websites are some of the ways that teachers can post assignments, messages, emails, and pictures which can provide immediate information, feedback and provide parents and the community with information on what is going on in the classroom.

Schrum, Galizio & Ledesma's (2011) research investigated the status of administrator preparation to understand how individuals may or may not learn to provide the leadership necessary for facilitating teachers' use of instructional technology in creating student curricular engagement and achievement and improving the school conditions necessary for teachers' integration. School leaders were asked to provide information regarding how they learn about using instructional technology for education activities. School-based administrators reported learning about instructional technology on their own, during their teacher preparation programs, by using instructional technology as a classroom teacher, and for managerial or clerical tasks. Many also noted that professional development activities offered by their school systems have increased their interest in instructional technology. One principal stated that he learned about instructional technology in his teaching through professional development opportunities and exploring on his own. This was reiterated by an elementary school principal who described his experiences through reading literature, attending conferences, as well as using the equipment that is housed in his school. In contrast, many of the survey participants in the Schrum et al. (2011) survey who were leaders in instructional technology within their school district, noted that they learned about using instructional technology from their university coursework, most typically in an education technology master's or doctoral program. Administrators described many professional uses of instructional technology in their everyday lives—communication, data analysis, professional uses (reports, spreadsheets, etc.), student management—and in their professional development for teachers. A building principal responded by using instructional technology for communication in the form of email, blogs, and

presentations. The principal uses instructional technology to help his staff understand the vision of using instructional technology as both a teaching and learning tool. Several administrators described ways that they model instructional technology use, such as leading faculty meetings with a Smart Board, use of a blog to send out a weekly newsletter and posting weekly announcements on the school website.

Schrum et al. (2011) survey asked how do leaders encourage the use of instructional technology by educators. Some of the respondents' districts take a systemic approach in which the purchase, use, and support for instructional technology are integrated into all aspects of activity. This included statements such as "competencies that all new teachers to the school must complete within their first 3 years," "All new staff go through a Tech Boot Camp," and "Each of our teachers is required to have 6 hours of instructional technology training every year." Some districts offer professional development for all educators in a "one size fits all" approach or in which teachers can pick and choose what they want to learn. Other districts provided traditional daylong professional development workshops, summer boot camps, and "March Tech Madness", in which special sessions are offered throughout the month of March to coincide with the basketball tournament. Another respondent stated that all educational community members at their school (teachers, administrators, counselors, nurses) are given a laptop upon arrival at their school. They are supported from day one with professional development and online resources for learning how to use the computer. In addition, another respondent stated that at the conclusion of each faculty meeting, one of the teachers (chosen at the previous meeting) presents a 5-minute tech tip and shares the tool with everyone else.

Administrators indicated a shared sense of the importance or value of instructional technology. One said, "I encourage teachers to use instructional technology only when it makes sense. Teachers who use instructional technology simply for technology's sake do all of us a disservice." Another commented, "We strongly encourage use of instructional technology as a means to differentiate instruction and to increase student motivation." Some respondents mentioned changes in their budgets and needed to scale back their spending. Others stated about using Enhancing Education Through Technology federal funds to continue their professional development and instructional technology purchases. Many respondents did mention going after grant funds to support their use of instructional technology.

Finally, Schrum et al. (2011) survey gathered information from nationwide administrators who provided insight into the ways that school leaders are accomplishing their goals with respect to supporting the effective use and curricular applications of instructional technology and encouraging their staff to stay current. The Schrum et al. (2011) research project provided a glimpse into the country's administrators and where they see their future and points out some ways to improve the preparation, readiness, and actions of all administrators in our schools.

In this current study, participants shared their knowledge of district and school-wide physical education curriculum plan for the integration of instructional technology. Participants varied in their responses including use of district-provided Chromebooks, some were on their own to develop the integration of instructional technology, and one participant stated that he uses the district-provided SPARK curriculum. SPARK is dedicated to creating, implementing, and evaluating research-based programs that

promote lifelong wellness. SPARK strives to improve the health of children and adolescents by disseminating evidence-based physical activity and nutrition programs that provide curriculum, staff development, follow-up support, and equipment to teachers of Pre-K through 12th grade students (http://www.sparkpe.org/about-us/our-mission/). Results from this study do not show a strong indication that teachers know if the school or the district had a written plan (curriculum) for instructional technology in physical education.

Instructional Technology Barriers

According to Ertmer (1999) lack of adequate resources can constrain any integration effort. If teachers do not have sufficient funding, equipment, time, training, or support, meaningful integration will be difficult, if not impossible, to achieve.

Eberline and Richards (2013) stated that instructional technology has the potential to facilitate more effective instruction in physical education and to provide physical educators with key pieces of information that can be used in advocacy efforts. Educators can efficiently summarize student performance records through tables and graphs to help stakeholders understand the impact of a quality physical education program. Student performance videos can be shown during school board meetings, parent/teacher conferences, and assemblies to demonstrate the variety of activities offered through physical education. Teachers can also conduct video interviews to document students' impressions of physical education and learning. Despite the potential impact of instructional technology, school funding is often limited and—because of the expense—some physical education teachers may perceive that they are unable to integrate instructional technology.

Budget constraints were one of the major barriers stated by the participants in this study in implementing instructional technology. The participants concerns were not being able to purchase equipment, software and not having Wi-Fi access for their use and their student's use in the physical education instructional environment. Some participants stated they have antiquated desktop computers and damaged equipment (heart rate monitors, pedometers).

In this current study, results showed a strong indication that building and district administrators are very supportive in implementing instructional technology in physical education. It is just a matter of finances and if available, trying to secure funds through grants. Teachers must pursue creative ways to fund programming needs beyond their typical school allocations. Technology funds are often available within school district budgets. If physical education teachers can properly demonstrate a need for the request equipment, this type of funding may be used to assist in instructional technology purchases. Parent organizations such as the PTA, is a potential source for fundraising opportunities. Organizations often require the applicant to provide a rationale for use of the funds. Grants through local and state associations such as the state Associations for Health, Physical Education, Recreation and Dance and national grants such as the Carol M. White Physical Education Program Grant are available and can provide supplemental funding. Teachers who are near a college or university can create partnerships that support instructional technology integration and help bridge the gap between schools and institutions of higher education. Funding opportunities are available, but teachers need to seek them out and be willing to apply for them. When funding can be procured,

instructional technology can substantially impact instructional practice and provide teachers with key resources to aid in the advocacy process.

Some participants stated that they interact with other faculty members throughout their school building in sharing ideas and some reported knowing that other teachers outside of physical education use instructional technology to a much greater degree. Participants were generally satisfied with technical support personnel within their school and district as well as instructional technology training in-district, and at state and local conferences.

Instructional Technology Integration for Tomorrow's Teachers

Leight & Nichols (2012) stated that using instructional technology in physical education can increase both student learning and teacher productivity. Whether it is for preparation in lesson plans, instruction or assessment, promoting public relations during an open school night, professionalism, aid in teacher effectiveness and performance, assist with data collection, and help with motivation, instructional technology can play a vital role in the development of future physical education teachers, and so it is important to prepare potential physical educators to utilize the myriad of technological options available in the field. From digital video to podcasting to exergaming, tomorrow's teachers need to know how to infuse instructional technology into their teaching

Although there are many ways that instructional technology can be incorporated into a physical education setting, it is still not a widely used medium. A challenge of using instructional technology in a Physical Education Teacher Education (PETE) program is having PETE faculty use the instructional technology effectively as a teaching tool, while also teaching students how to incorporate instructional technology into their own future

classrooms (Schell, 2004). In higher education, many students are more advanced than their professors with regard to instructional technology, and so instructional technology is not used and modeled in teacher preparation classes (Silverman, 1997). If the instructor does not feel comfortable using instructional technology, and is unaware of the potential of this medium, then it does not matter what kinds of instructional technological advances have occurred in the world; it still will not be used. Faculty may also not utilize instructional technology because they are unaware of what is available to them and their students. In public schools there are time limitations to learn and implement instructional technology, and money to purchase the necessary software and electronic devices (Leight & Nichols, 2012).

Roth (2014) stated that integrating instructional technology into education used to be a choice for teachers. Some educators took comfort in more traditional forms of teaching, such as *paper and pencil grading* and lectures. However the option to remain no-tech or low-tech is quickly waning due to the significant investment schools are making to promote the development of the *net generation* of students. Some school districts acquire the latest instructional technology trends such as iPads, Chromebooks, and Google Apps for Education, yet they do not invest in the necessary training of current teachers for these investments to prove productive. Subsequently, many districts seek to employ new teachers who already have the comfort and competence to use current instructional technology (Dillon 2010).

Heidorn (2014) expressed his viewpoint on preparing the next generation of physical education teachers use of instructional technology. While some Physical Education Teacher Education (PETE) programs embed instructional technology

throughout the curriculum and other programs incorporate classes dedicated solely to instructional technology, all programs should integrate instructional technology in significant ways. Candidates need familiarity with instructional technology; should develop skills for health, fitness, and physical activity software; identify and use mobile apps, iPads, and other physical activity monitoring devices; and effectively use instructional technology in the classroom and physical activity settings. The instructional technological knowledge base and skill set developed by candidates in their undergraduate program can assist them with planning efficiency, can be used as a motivational tool for their K-12 students, and can become a means for additional professional growth and development throughout their career.

Baert's (2011) study stated that the use of instructional technology by pre-service or beginning teachers is often influenced by how they have been taught in their teacher preparation program. Even further, those new teachers will be impacting students for the next 30 years (Handler, 1993). Baert further concluded that it is crucial to investigate the teaching practices of current Physical Education Teacher Education (PETE) educators in relation to the use of instructional technology. The results indicated that PETE professors on average were not integrating instructional technology at such a level in which the students can learn how to effectively integrate instructional technology to enhance learning in physical education. In order for pre-service teachers to learn how to integrate instructional technology, integration levels should be much higher within their teacher education experience. When evaluating the proficiency levels, professors did not perceive themselves to be confident in the use of instructional technology.

The Baert (2011) study results showed that while some professors do feel confident and do integrate some instructional technologies, on average, both the level of proficiency and integration is too low. Consequently, the current level of instructional technology integration may have an impact on the ability of pre-service teachers to create effective physical education lessons infused with instructional technology. In addition, pre-service teachers need additional practice with instructional technology in other courses to obtain knowledge in their own future teaching practices. While PETE programs can provide the foundation for instructional technology, it should not be the teacher candidates' only exposure to instructional technology (Baert, 2011).

Trends Towards the Future of Instructional Technology in Physical Education

Witherspoon and Sanders (2012) reported that instructional technology can provide a dramatic positive change in the way school-aged children approach learning in physical education. The challenge is not simply that instructional technology can be a driving force in improving the health, physical activity, and obesity challenges facing today's youth. Instructional technology is changing the way children learn about and participate in physical activity through mobile devices recording daily step counts and what they consume daily during meals, active gaming technologies to provide daily physical workouts, and social media to gain information on health issues and physical activity websites. This information is used by teachers to assist kids in learning about the importance of daily activity and appropriate nutrition. The challenge we face is providing the technology tools, infrastructure, classroom instructional technology environment, appropriate mind-set, and prepared, knowledgeable teachers needed to implement daily use of the cutting-edge technology devices and systems necessary for

student learning in a contemporary society. Physical education teachers and individual school principals can push forward to prepare students to be physically active, and thus healthy, in a technology-driven world. But, this is also where school district administrators and state educational policymakers play an important role. The New York State Education Department (NYSED) Commissioner's Regulations Part 100.12 (http://www.nysed.gov/edtech/schools/district-technology-planning) requires public school districts to develop and maintain a plan, in a format prescribed by the commissioner, for the use of the instructional computer technology equipment. NYSED collects and reviews district Instructional Technology Plans (ITPs) from school districts through an online survey system accessed through the NYSED Business Portal. The survey is designed to allow districts the opportunity to compile all data related to their technology planning and needs. The data collected in the survey may be used as the basis for funding opportunities and will satisfy the NYSED requirement that all school districts submit technology plans per New York Codes, Rules & Regulations (NYCRR) 100.12.

To create universal, large-scale change, educational decision-makers at all levels must put in place the infrastructure, personnel, equipment, and environments required for implementing the use of instructional technology in physical activity settings. Across the country, many school-based physical education programs are challenging students to know about and understand the latest instructional technologies available for physical education and how to take advantage of these tools.

Even with this expanded use of instructional technology in physical activity, we have just scratched the surface. It is estimated that far less than 20% of schools and

children across the nation have regular access to the instructional technologies described above (Witherspoon & Sanders, 2012).

Witherspoon and Sanders (2012) provided a synopsis of the major policy considerations related to increasing the use of instructional technology in the nation's physical education programs:

The National Association of Sport and Physical Education (now known as SHAPE) has developed standards for use of instructional technology in the physical education curriculum. It is recommended that school systems and physical education programs incorporate these instructional technology standards into their curriculums.

- Providing funding for instructional technology can be a challenge; however, districts should look at technologies that can be purchased and used across the curriculum and be infused into multiple academic areas. Instructional technology, such as active games, smartphones, GPS units, heart-rate monitors, and pedometers, can be used to integrate physical education concepts with other areas of the curriculum, such as math and science.
- School systems must provide specific professional development to train physical educators in the use of various types of instructional technology. Workshops and in-service days can be devoted to learning about the instructional technology available and how to infuse it into the curriculum to meet state standards. In addition, time should be allocated for practicing with instructional technology so teachers feel comfortable using instructional technology in the classroom. It is not enough to simply learn what is

available; training implies time for practice to understand the scope of use of instructional technology.

- A line-item in the school system's budget for classroom technology expenditures which specifically includes physical education should be a priority.
- Policy and standards must be established for age-appropriate and safe use of instructional technology in all physical activity settings.
- Consideration should be made for the development of a timetable and budget process for purchasing and updating software and hardware used in the physical education classroom. Also, strategies for technology storage and repair must be part of the planning process.
- University physical education teacher preparation programs must update teacher preparation curricula to provide beginning teachers with the knowledge and practical experience needed, so that when employed, they can immediately incorporate new instructional technologies into their instruction.
- Preparation of beginning teachers should include experience with online instruction and provide for virtual internship experiences.
- Incorporating new technology along with traditional methods of student assessment and program evaluation will assist students in getting appropriate feedback and increase learning opportunities.
- Instructional technology in the form of websites, blogs, forums, and such should be used in all physical education programs in order to provide and share.

- Information with teachers, administrators, students, and parents. These instructional technology venues allow physical education teachers to discuss their curriculum, share stories, and progress, and expose students to an enormous variety of learning experiences (pp. 206-207).

It is time to turn children on to daily physical activity, and for many of today's youth, instructional technology is a significant motivating factor in this process (Witherspoon and Sanders, 2012).

Suggestions for Policy Changes

Nichols & Leight (2012) stated that in order make an effective change in the delivery of physical education along with the use of instructional technology at the K–12 level, Physical Education Teacher Education (PETE) students will need to not only be introduced to instructional technology, but ownership and use needs to become a requirement at the individual level. This would suggest that PETE students be required to purchase their own pedometers, heart-rate monitors, and possibly iPads. They would create and maintain their own professional blogs, wikis, and/or electronic portfolios. A personal investment would ensure that students not only know how to use them, but that they have a clear level of understanding of the benefits of use at the individual level, which they could then transmit to their students. Funding for instructional technologies in school districts can be a challenge; however, school districts should look at instructional technologies that could be purchased and used across the curriculum and be infused into multiple lessons. Instructional technology, such as GPS units, heart-rate monitors, and pedometers can be used in math and science along with physical education. Writing and reflecting about current fitness levels and using reports generated by fitness

analysis software can serve as writing prompts for writing assignments. It can certainly be a challenge to convince physical educators that instructional technology can be a positive addition to their classroom. The thought of having to learn anything new, especially instructional technology, can be daunting to many individuals. It is important that departments provide adequate professional development sessions to train physical educators in the use of various types of instructional technology specific to the discipline. A quick hour-long tutorial may not be enough. Workshops and in-service days need to be devoted to learning about the instructional technology available and how to infuse it into their program. Time has to be allocated to attend trainings to learn the instructional technology, and time also needs to be given to practice using the instructional technology, so educators can feel comfortable implementing it into the classroom. It is not enough to learn about instructional technology; training also needs to be directed towards how it can be used specifically in the physical education curriculum. Creating policies that not only provide professional development for staff and faculty involved, but make it required, would help the level of comfort that some teachers may lack when confronted with infusing instructional technology into lessons. Standards, which address the use of instructional technology within physical education, would also assist decision-makers in ensuring that instructional technologies are introduced and used within physical education. There are many places and opportunities where instructional technology can and should be introduced within a PETE program; however, like all other uses of instructional technology, there can be a few challenges. These challenges include keeping up to date with ever-changing software and hardware, and acquiring new knowledge and skills involved in using new instructional technologies. Many times,

instructional technology devices and software are purchased with grant money, but when the instructional technology becomes dated, new monies must be found to upgrade. As the discipline of physical education moves forward and looks for innovative methods to use in creating generations of physical activity enthusiasts, the use of instructional technology in appropriate manners can help reach students who, in past cases, have been turned off by traditional physical education methods and activities. Instructional technology can also provide the physical educator with tools to assist in planning, assessment, motivation, gathering of data, and public relations (pp. 170-171).

Summary

The purpose of this phenomenological study was to examine K-12 physical educators' beliefs, and practices regarding their experiences with the use of instructional technology in their classes. DelTufo (2000) stated that computer technology can enhance student learning, increase teacher effectiveness and that there is great potential to use computer technology in physical education. Computer technology is a viable resource, tool and enhances instruction in the field of physical education. This current study, 16 plus years after DelTufo's (2000) study, Smartphones, Tablets, iTunes, Wii, Xbox, Play Station, social media, health and fitness apps, pedometers, and heart rate monitors just to name a few, are commonplace with today's K-12 students.

Physical education classes play an integral role in student fitness, education and lifelong skills. Many *digital natives* are more interested in Smartphones and tablet games than playing outside. Martin, Ameluxen-Coleman & Heinrichs (2015) stated that a significant number of youth spend a large portion of their day being sedentary, accumulating, on average, seven hours of screen time each day. High levels of habitual

sedentary time, especially screen-based activities, are associated with various health risks, including poorer measures of body composition, decreased fitness, lower self-esteem, and reduced prosocial behavior. Modern technology can easily be incorporated into the physical education curriculum, thus increasing youth's long-term commitment to physically active lifestyles. Smartphone apps contain characteristics that increase fun and enjoyment, reinforce progress, and provide support through social media platforms. By utilizing screen-based instructional technology and smartphone apps, educators can better assist youth to meet the national physical activity guidelines and decrease the overall number of hours spent in sedentary activities (pp. 46-53).

Physical education teachers should focus on activities that spark their students' interests, as well as motivating them to participate in physical fitness in and outside of the classroom. Physical education needs to be fun, stress free and an enjoyable environment where students can develop positive attitudes about physical activity. Implementing various instructional technologies in physical education will energize and motivate students and help create a more physically educated individual. Infusing instructional technology is one way to reach students who in the past may have been turned off by traditional physical education activities.

Instructional technology does not come without its problems. Barriers exist in instructional technology implementation in K-12 physical education programs. On-going research into what enables or inhibits instructional technology usage is essential to keep pace with 21st Century learning. Future trends in instructional technology as well as

professional development for current and future educators, will add to the profession's role in instructional technology. The literature review provides the framework in which K-12 physical educators will share their lived experiences of instructional technology integration into their classrooms.

CHAPTER 3

Methods and Procedures

Education has been undergoing an enormous change in recent years. Access to the Internet is readily available via smartphones. Blackboards, desks, dry erase whiteboards now seem archaic. Learning in the 21st Century includes smartboards, tablets, apps, electronic fitness equipment, etc. that may assist in educating today's *digital natives.* However, *digital immigrants* try with difficulty to keep up with the digital natives (DeBruyckere, Kirschner & Hulshof, 2016).

Research Design

A phenomenological methodology was used to examine K-12 physical educator's perceptions of their use of instructional technology, obstacles among novice, intermediate, and veteran K-12 physical education teachers to determine what instructional technology they utilize, what affect it has on student participation in their K-12 physical education curriculum, and what motivating and deterrent factors contribute to their use of instructional technology. The use of phenomenological methodology allows participant perspectives to emerge without the bias of an established theory influencing the emerging themes. Interviews were transcribed, coded and analyzed for emergent themes, patterns, and discrepancies. Upon analysis, descriptive validity was employed to illustrate the themes (Gowin, Cheney, Gwin & Wann, 2015).

An open-ended interview protocol was used to explore what instructional technologies are used by K-12 physical educators in their instruction, how they integrate the instructional technology into their instructional practices, and building and district administration support. One-on-one semi-structured interviews were conducted with

participants with novice, intermediate and veteran physical education teaching experience. The interview questions assessed the physical educator's instructional technology usage, knowledge, and any barriers that prevent instructional technology usage.

Reliability

The trustworthiness of the study included findings that generate an understanding of the way K-12 physical educators use instructional technology to bolster their practices. Dependability was established once the data was collected and analyzed. An expert in qualitative research conducted an audit trail of the transcribed interviews, descriptive and reflective field note journal entries to ensure the themes, patterns, and discrepancies emerged over time.

Data Analysis

The interviews were transcribed and coded based on emergent themes. After the data was coded based on themes, units of text from the interviews supporting the themes were generated. The units of the text were further analyzed searching for emergent themes, patterns, and discrepancies. The emergent themes, patterns, and discrepancies from the analyzed data were used to answer the following research questions:

1. How do K-12 physical education teachers describe their instructional technology usage in their instructional settings to meet the demands of today's 21st century learners?
2. How do physical education teachers incorporate instructional technology in their instructional practices?
3. How do male and females compare in their instructional technology practices?

4. How do years of teaching experience influence their instructional technology usage?
5. What factors influence or limit the use of instructional technology by K-12 physical education teachers? How does school climate, technology support and district demographics affect their instructional technology?
6. How do physical education teachers describe teaching 21st century learners in terms of instructional technology?
7. What should teacher preparation programs include for students majoring in physical education in terms of instructional technology?

The Setting

The setting for this study encompassed six school districts that range in size from large, moderate, and small: District #1 (K-12 population under 5,000); District #2 (K-12 population over 5,000); District #3 (K-12 population over 5,000); District #4 (K-12 population over 5,000); District #5 (K-12 population under 5,000); and District #6 (K-12 population under 5,000). School districts within the county consist of diverse student populations, varied socio-economic populations, digital divide between well-funded and economically challenged school districts, and some of the highest paid teachers and administrators throughout the country. For these stated reasons, it seems apparent that a study of instructional technology use in a K-12 physical education setting could provide results as to how novice, intermediate, and veteran teachers as well as school districts are keeping pace with 21st Century learners.

Selection of Participants

Participants included twelve K-12 physical education teachers teaching in public school districts in suburban Long Island, New York. The participants were chosen by the district's director of athletics, who served as the informant. Requested criteria are that each teacher is chosen from different grade levels within different schools within the district, an equal sampling of gender, and various years of teaching experience encompassing novice, intermediate and veteran teachers.

Instruments

To conduct this study, a qualitative approach in the phenomenological tradition was used. The phenomenological methodology was selected because it describes the meaning for several individuals and their lived experiences of a concept or a phenomenon. The phenomenon was examined from physical educators' lived experiences as it relates to instructional technology in their classes. The semi-structured interview questions were developed following a review of existing surveys (Bennett-Walker, 2006; Gibbone, 2009; DelTufo, 2000) and based on the themes that emerged from the literature (Appendix A). Table 3.2 presents the dimensions, interview questions and sources used in this study.

Table 3.2

Dimensions, Interview Questions, and Sources

Dimension	**Interview Questions**	**Sources**
Demographic Questions	1, 2, 3	DelTufo, (2000); Bennett-Walker, (2006); Gibbone, (2009)
Types of Technology	4, 5, 6, 7	DelTufo, (2000); Bennett-Walker, (2006); Gibbone, (2009)
Instructional Technology	8, 9, 10, 11, 12, 13, 14, 15	DelTufo, (2000); Bennett-Walker, (2006); Gibbone, (2009)
School Climate	16, 17, 18, 19, 20, 21, 22, 23	DelTufo, (2000); Bennett-Walker, (2006); Gibbone, (2009)
Technology Support	24, 25	DelTufo, (2000); Bennett-Walker, (2006); Gibbone, (2009)

Data Collection Procedures

Prior to the data collection process, six district director of athletics were contacted by email and asked if they were willing to participate as an informant to select two to three current K-12 physical educators to participate in a study based on instructional technology usage in their classes. The data collection method was accomplished through one-on-one audio recorded interviews.

An application to the St. John's University Institutional Review Board (IRB) was submitted prior to the data collection. In addition, permission from school administrators

was sought. Once IRB approval was obtained, participants were contacted to schedule interviews at a mutually agreed time and place. At the start of each session, participants were presented with a consent form (Appendix B) that provides a descriptive statement explaining the purpose of the study and IRB approval.

CHAPTER 4

Results

Introduction

The purpose of this exploratory study was to compare instructional technology usage and obstacles among novice, intermediate, and veteran K-12 physical education teachers to determine what instructional technology they utilize and what affect it has on student participation in their K-12 physical education curriculum. Results of this study can also assist in preparation of students in higher education teacher preparation programs by requiring coursework in the appropriate use of instructional technology in teacher training.

Ten K-12 physical educators were interviewed and their responses were analyzed for emergent themes, patterns, and discrepancies. The one-on-one interviews served as the primary method of data collection and occurred in March and April 2017. Each interview lasted approximately 35 minutes and was conducted in the physical education office or in a conference room at the participant's school. A semi-structured interview protocol (Appendix A) consisted of 25 questions which were developed after a review of the research literature. All interviews were audio-recorded and later transcribed verbatim followed by data analysis, which consisted of emerging themes, patterns, and discrepancies that were used to answer the seven research questions.

Description of Participants

Ten K-12 practicing physical education teachers in six different school districts located in suburban Long Island, New York participated in this study. There were a total

of six men and four women. Three of the participants teach at the high school level, three teach at the middle school level, and four teach at the elementary level. Teaching experience ranged from novice (one teacher), intermediate (two teachers), and veteran (seven teachers). All teachers were tenured except the novice. The demographics of each participant were revealed from their responses when answering the initial question, "Tell me about yourself?" The demographics of each study participant are identified in Table 4.1.

Table 4.1

Participant Demographics **Instructional Level (K-12)**

Participant	**Gender**	**Teaching Experience**	**School Level**	**School District**	**District Enrollment (P-12) 2015-16 School Year**	**# of School Building Full Time PE Teachers (K-12)**
P1	Female	Intermediate	High School	SD 1	<5,000	3
P2	Male	Veteran	Elementary	SD 1	<5,000	2.5
P3	Female	Veteran	Middle School	SD 1	<5,000	2.5
P4	Male	Intermediate	Middle School	SD 2	>5,000	2
P5	Male	Veteran	Elementary	SD 2	>5,000	2
P6	Female	Veteran	High School	SD 3	>5,000	9
P7	Male	Veteran	High School	SD 4	>5,000	6
P8	Male	Novice	Elementary	SD 4	>5,000	3
P9	Female	Veteran	Elementary	SD 5	<5,000	2
P10	Male	Veteran	Middle School	SD 6	<5,000	2

Participant 1 (P1) was a female whose teaching experience is at the intermediate level and is tenured. She has also taught health education. P1 teaches in SD 1.

Participant 2 (P2) was a male whose teaching experience is at the veteran level and is tenured. He has also taught health education. P2 teaches in SD 1.

Participant 3 (P3) was a female whose teaching experience is at the veteran level and is tenured. She has also taught health education. P3 teaches in SD 1.

Participant 4 (P4) was a male whose teaching experience is at the intermediate level and is tenured. He has also taught health education. P4 teaches in SD 2.

Participant 5 (P5) was a male whose teaching experience is at the veteran level and is tenured. P5 teaches in SD 2.

Participant 6 (P6) was a female whose teaching experience is at the veteran level and is tenured. She teaches in SD 3.

Participant 7 (P7) was a male whose teaching experience is at the veteran level and is tenured. He teaches in SD 4.

Participant 8 (P8) was a male whose teaching experience is at the novice level and is not tenured. He teaches in SD 4.

Participant 9 (P9) was a female whose teaching experience is at the veteran level and is tenured. She teaches in SD 5.

Participant 10 (P10) was a male whose teaching experience is at the veteran level and is tenured. He teaches in SD 6.

Research Question One

How do K-12 physical education teachers describe their instructional technology usage in their instructional settings to meet the demands of today's 21st century learners?

Research question one allowed the participants to describe their instructional technology usage and training in their physical education instructional environment. They shared what devices and apps that they use as well as their experiences in teaching with instructional technology and their personal use of instructional technology. The theme that emerged from the teacher's responses was that the teachers had various experience levels of instructional technology usage. The patterns that emerged from this theme include self-efficacy, confidence, personal skill level, proficiency, and level of comfort. The participants also shared any previous or current interscholastic coaching and if so, what instructional technology they use when they coach. Table 4.2 shows the theme and patterns that emerged regarding faculty instructional technology usage and training.

Table 4.2

Themes and Patterns: Instructional Technology Usage in Instructional Settings

Theme	Pattern
Faculty Instructional Technology Usage	Self-Efficacy, Confidence, and Personal Skill Level Proficiency Interscholastic Coaching
Faculty Training	Instructional Technology Training

Faculty Instructional Technology Usage

The participants shared their personal instructional technology usage and their proficiency with instructional technology in their physical education environment.

Self-Efficacy, Confidence and Personal Skill Level

P1 stated,

I consider myself to be pretty tech savvy. I like knowing the newest stuff out there and learning how to do it so I can be a step ahead of the kids. I personally use social media including Snapchat, Facebook and Instagram. I bank online. I have the Nike training app and I have a FitBit which I use on a daily basis.

P2 stated,

I think I'm pretty tech savvy. I'm familiar with most technology and can figure most things out. I use all aspects of social media. I use Instagram, Facebook, Twitter, and I access You Tube. I don't use Snapchat. I bank online. I use the health app for my personal fitness stuff through Apple. I use Sport Rules, Three Rubric Maker, Musical Workout, PE Games, Spin It, Balance It, Jump It. There is a constant plethora of stuff constantly at your fingertips.

P3 stated,

I would say that I am not very tech savvy. I use Twitter professionally and try to tweet once a day so that parents that are using it can see what their kids are doing throughout the day. I use Facebook. I use Instagram but not Snapchat. I look at You Tube all the time. I use Twitter a lot for professional development because there are so many great young people out there with so much stuff. I bank online.

P4 stated,

I think I'm pretty tech savvy. I think I'm on the more advanced side of technology. I use Facebook and Instagram. Not a big fan of Snapchat. Not a big fan of You Tube. I bank online. I did have Fitness Pal and currently use the FitBit.

P5 stated,

I'm going to say the moderate level when it comes to being tech savvy. Right in the middle. I'm not an expert by no stretch of the imagination.

I don't use social media because of the coaching situation. I don't because I've seen too many weird things happen over the years. I bank online, text and do emails and stuff like that.

No, I do not have any health or fitness apps on my cell phone. I would think about using health and fitness apps on my phone.

P6 stated,

I'm going with the flow of it every year. I think every year I'm getting more comfortable with the new technology that's out there. I'm decent, but I'm not the best, but I'm not a novice – I'm in the middle somewhere. I compare myself to teachers in general. I actually think some of the kids are probably more in tune then we are with the newer technology. We actually learn from each other. I do use technology most every day.

I do use social media. I use Facebook and Twitter. I don't use Snapchat. I've actually been on Instagram. I actually use You Tube in the classroom sometimes. I do bank online.

P7 stated,

I would say I'm moderate when it comes to being tech savvy. Because there are different programs that can be used here, however, we might not have the resources to utilize them. The district is heading into a technology base with televisions and You Tube in our fitness center.

I use FitBit, 8fit, I have MyFitnessPal which I utilize in my classroom as well for students to track your food intake, keeps a food diary and an activity log. I have the Nike running app and MapMyRide for when I bicycle.

I use social media for coaching and teaching. I do not use Snapchat, Facebook or Instagram. I also do not use You Tube personally. I do bank online. I research everything I do online.

P8 stated,

I'm decent when it comes to being tech savvy. I can do any Smart Board activities and things like that. I can use Word, PowerPoint, all normal stuff.

I have all social media, but I'm not on Facebook. I have Instagram and Snapchat and all those things. I don't use You Tube. I don't use Facebook because the school district checks that. All my banking is online. I don't write any checks. I use iPads, Smart Boards, laptops, pedometers, stereos, that's really it.

I have the Under Armour fitness app, I have a weight training app. I have the regular iPhone heart app that checks how many steps you do. I use them on a regular basis for myself.

P9 stated,

I think I'm pretty decent at being tech savvy. I'm definitely not getting a job at any type of Apple store, I'm not that good, but for a teacher in physical education, I try to bring in a lot of technology and there's a lot of stuff that I learn as I go. I think it is very

important to stay up on it and it's constantly changing so I think I do a fairly good job trying to keep up with it or at least ask if I have no idea.

I'm on Twitter. I have Facebook but I do not use it for professional reasons. I use Snapchat and You Tube all the time. I love You Tube. You Tube is awesome. Twitter I love professionally because I get some great ideas. It's a great way to connect to other phys ed teachers and health teachers across the state. Pinterest I love too. I love everything Apple-related so I do a lot more on that. Yes, I bank online.

P10 stated,

I consider myself a neophyte with technology but I would have to say I'm using it.

Social media I have not used. I do not use Snapchat, Facebook, Instagram or Twitter. I use You Tube. I use the pedometer on my cell phone for my own purposes. My wife does all the banking.

Proficiency

P1 stated,

I like knowing the newest stuff out there and learning how to do it so I can be a step ahead of the kids. Yes, we use technology when we can to show videos and certain things on the projectors that we talked about and also using the heart rate monitors. We are currently waiting to go one-to-one with Chromebooks…I will be more excited to use that more once we have the availability.

P2 stated,

I'm familiar with most technology and can figure most things out. We have the Smart Board hooked up all the time; show YouTube videos for demonstration or highlighting someone's stuff; we use that for music as well. We have pulse monitors. We used to use the heart rate monitors but that was a little too much time for management with the straps because of the age of the students.

P3 stated,

On my iPhone I have Fitness Pound, a running app which will chart the mileage when you're running. I have that music one that changes based on your song when you're exercising. I have an integral timer. I have used technology in the past for a scavenger hunt, but other than that, not regularly. I use Smart Board at the beginning of the unit to show them what it's really supposed to look like. I mostly talk with colleagues and other people in the field who are tech savvy. I use music all the time like Pandora.

P4 stated,

We have Chromebooks that we can show different videos, skill work and things like that. We don't have a Smart Board but we have a screen that gets pulled down that we can use with a computer.

P5 stated,

I think a lot has to do with this age bracket (K-2). We don't use a lot of things we were thinking about using because from age 5-7, the apps don't always connect. Like we wanted to use an app for just learning how to hike or how many steps you take. We've used pedometers before, but the second graders it's kinda worked okay, but kindergarten and first graders not okay.

We use video technology for a dancing section and a traffic safety unit.

P6 stated,

Yes, I use technology. A little bit everywhere. I think personal experience using some things outside of school that you bring into your own classroom.

P7 stated,

We give our athletic director pictures of our classes and we do tweet pictures of our classes out there under the district athletics. Yes, we use heart rate monitors, videos such as when we do our aerobic unit, technology radio when we are doing our aerobics unit in the pool. I preach MYFitnessPal with my kids when I'm in the fitness center because we go over about eating with our calories and about using that with different specific goals.

P8 stated,

Yes we use technology. We did a healthy heart month. We showed a video about the heart and what it would be like. I've used the Smart Board in the gym and talked about how the heart pumps…We have an iPad and it gets passed around and it shows the circulatory system…

P9 stated,

My phone and my iPad are loaded with apps. Actually, I purchased a lot of this stuff on my own because it was the only way to get technology here and to promote it. Kids love it. I personally use a nutrition app that I use all the time. There's Tabata, a Ninja one, Tiny Scanner and I'm doing Jump Rope for Hearts next week. Heads Up! Is a great one to use as a type of assessment. I have more than 40 apps.

P10 stated,

I take tons of pictures and video segments of my classes. I upload it to my laptop and then I create Google photo albums or video folders and I use it to email to administration documenting work that I'm doing in the class, goals that I'm achieving and I also put it out to parents. I've been sending these emails out on a weekly basis.

Interscholastic Coaching

P1 stated,

I coach at the junior varsity and varsity levels. I don't use technology as much as I would like to. I think I could probably use more video feedback because we do tape games, but

I don't use it so much as in to show them their skill technique, which I could probably do more. I do not use an iPad during games. I have just a regular dry erase board which tends to be a lot easier.

P2 stated,

I have coached for about fourteen years on the varsity and middle school levels. I showed videos a lot for demonstrations and we filmed the kids and breakdown their sequential movements and stuff like that for biofeedback.

P3 stated,

When I coach I use the Remind app, other than that, not really.

P4 stated,

In coaching I use the Remind app for communication, but not for instructional purposes. As far as instructional when I'm coaching – not really. I would love to see a little bit more.

P5 stated,

Yes, I do use technology in coaching. We film our practices. We also use Huddle where we put on our game film and sit down every week and go over all our film. We use Coaches Corner and Crossover apps.

P6 stated,

I do use technology in my coaching duties. We use the team Snapchat and a Smart Board. I do not use Remind or an iPad.

P7 stated,

I use technology in my coaching duties. I coach on the middle school, junior varsity and varsity levels. I actually videotape my athletes. We do corrections through videotape…I use the Remind app all the time. That's how I communicate.

P8 stated,

When I coached I used an iPad on the field where I keep all of the kid's stats. It's called Game something. The kids log in and they have the parents email and they can find out how their kid is doing the whole time. It's pretty cool.

P9 stated,

I used Coach's Eye to film, analyze, and give feedback to my athletes. I also use interval training apps to help with conditioning, Remind Me apps for communication and video delay apps.

P10 stated,

Yes, I use technology when I'm coaching. I have coached on the middle school, junior varsity and varsity levels. I take close-up shots of them moving…and I'll send a weekly update recapping what took place during the week, game results, practice focus.

An emerging theme became apparent from the participants in that they have varying levels of knowledge with instructional technology. Some consider themselves to be very tech savvy, while some consider themselves with having very little knowledge to being neophytes. All participants, except P5, use some form of social media. P5 stated that he does not use social media because he coaches and has seen a lot of weird things happen over the years. Coaching is an extension of the classroom and it is apparent that the participants use of instructional technology in coaching ranges from very little usage to extensive usage especially with communication apps.

Faculty Training

The participants shared where they obtained their resources for instructional technology in the classroom. A variety of resources, particularly the local zone conference, not only provides a numerous workshops, but also provides for collaboration among fellow physical education educators in the tri-state area.

Instructional Technology Training

P1 stated,

I obtained my resources for technology during my experiences in college. Also through professional development. I do not use chat rooms. I use online discussion boards only through advancing credit classes. I currently coach but I don't use technology as much as I would like to. We do video games and we do video replays. I do not use an iPad during games. I have just a regular dry erase board which tends to be a lot easier.

P2 stated,

I've been to the national and state conferences a couple of times, the Suffolk Zone, most of my stuff is just searching it out on my own. As needed, I just Google it as I need it. I'm not a blogger, but I search out information and get it.

P3 stated,

I use the QR thing with the bar code and I was able to get information from the presenters at the Suffolk Zone conference.

P4 stated,

I have obtained my knowledge through professional development with Google classroom, Google docs, Google spreadsheets the district has provided through professional development and in addition to that, at the Suffolk Zone Conference and other conferences.

P5 stated,

I only attend one conference which is the Suffolk Zone conference. The athletic director does some things with us as well. We sit down as a phys ed group and we knock things off each other and try to figure things out…we try to have a meeting with other K-2 buildings to see whatever they are doing might help us or what we're doing.

P6 stated,

The New York State Conference this past fall I picked up some new things to look at. ….a lot of great apps there…you can go to and look at some of things they're doing in PE, so I'm starting to tap into that a little bit more when I have time when I'm not coaching.

P7 stated,

I attend conferences and just my own personal research and discussions with my colleagues.

P8 stated,

I obtained my technology through some schooling…not really and professional development. I do attend conferences but it's mostly for sports.

P9 stated,

I use technology all the time. I learned through professional development, conferences…I like to research so find the newest things out, constantly on the computer looking for the latest trends.

P10 stated,

I obtained technology resources through one particular colleague I used to work with at the elementary school. The colleague was very big in getting me over the hurdle to showing me and from there I have been learning on my own. I do attend the Suffolk Zone conference.

The participants obtained their instructional technology training by attending national, state and local conferences as well as collaborating with colleagues, personal research, and previous schooling which are essential components that enhance instructional technology and learning.

Research Question Two

How do physical education teachers incorporate instructional technology in their instructional practices?

Research question two allowed the participants to share their thoughts regarding use of apps in their instructional practice and were asked to describe one or two of the newest and/or most innovative activities that they do with their students in physical education. The themes that emerged from the participant's responses ranged from very little to extensive usage of instructional technology, grade level taught, fear, and self-research and creativity.

Table 4.3 shows the theme and patterns that emerged regarding use of apps in the physical education instructional environment.

Table 4.3

Themes and Patterns: Implementing Instructional Technology in the Physical Education Instructional Environment

Theme	Pattern
Faculty Usage of Apps With Students	Limited Use of Instructional Technology
	Extensive Use of Instructional Technology
	Grade Level
	Fear
	Self-research and Creativity

Faculty Usage of Apps With Students

Participants shared their usage of apps in their instructional practices. Patterns that emerged were non-use to limited use to extensive use of instructional technology; grade level; inexperience, fear and self-research.

Limited Use of Instructional Technology

P1 stated,

I haven't been able to use too many apps because my iPad currently wasn't thinking with the WiFi so it was a little difficult.

P5 stated,

I really don't use them. I really haven't seen an app that's applicable to this where I thought it would help me. My colleague and I have looked at things – the AD does send us stuff. I look at it but it hasn't grabbed me that we need to do this. Everything we do technology-wise, we put it on our computer, everything is written out so all of our lesson plans are on the computer.

P7 stated,

Just utilizing MYFitnessPal depending on what your goal is using that app. I created a lifeguard course now where the kids come out certified lifeguards which I just started this year. We use the SPARK PE curriculum (K-12) so that's basically with music and heart rate monitors.

P8 stated,

I don't use any for instruction except the Hoops for Heart app and that was to track money. I don't use any apps in the classroom. I use it for myself so I think it would be good to start teaching the children.

P10 stated,

Right now I'm limited with, I have plastic pedometers, I don't have heart rate monitors yet.

Extensive Use of Instructional Technology

P1 stated,

I use a lot of technology in the weight room unit in which we use a whole slide unit that we discuss every day.

P2 stated,

Sometimes I'll show pictures like the pectoral muscles, the leg. I use my phone for everything. My phone is in my hand all day long. My phone controls the music in the gym. Technology is only good if it's going to be effective in the sense of time management. So my only issue with new tech stuff, if it's taking a long time to get it done, then it's not good technology because the ultimate goal is time on task for me.

P4 stated,

We do Hoops for Heart and the kids have the Chromebooks. We incorporate that in our Hoops for Hearts unit which is basketball and we raise money for a good cause. Using technology as a fundraiser. All of our units use technology. We use Google classroom.

P6 stated,

A couple of apps that I used in the beginning of the year with my hiking class, so I have the kids that were able to download a free geocaching app on their phones. It's just in the hiking and backpacking classes that I was using the geocaching. My hiking, orienteering and geocaching classes I think that the kids really enjoy it because it is something different and they never had before. We use pedometers. We use our iPhones for the playlist and those activities. Lots of times we will use a YouTube or a video.

P9 stated,

I use the apps all the time. I love them. My students love it.

Grade Level

P1 stated,

The heart rate monitors that we're incorporating this year. We used to have old monitors that went around the chest and now just go around the wrist so it's a lot of ease in instruction and organization, we're on the brink of implementing that in the classroom everyday so I would say that was the most innovative we have been able to do here in the high school.

P5 stated,

I'm learning how to utilize as we go forward, just the fact of doing stuff like this, simple things like this, make K-2 phys ed a little better. It also has to be age appropriate. I do a lot of things in a K-2 building that a lot of people are shocked that I do. It's not mission impossible. It's a thinking game. If you saw my second graders. You can see them thinking. They learn about the honesty part.

P8 stated,

I think they may be a little too young maybe, but the 5th grade I could show them how to track the calories and entering things like that might help them. I think the circulatory game we have is pretty cool. It's questions we have on the iPad. We show a video about it on our Smart Board and then they run around and do the different activities. There are questions at each station and there's technology there with the iPad with questions on it. They like doing that station the best because it's technology.

P9 stated,

It especially motivates them because it's something that is on their level. I would say I use more technology with the older grades. I would say grades 2-5, not as much in K-1.

Fear

P3 stated,

I don't use them right now probably because of my own fear because of not being able to know something and needing to know everything for our students and once I get past that like my friends tell me, the kids have all the answers. It took me so long to get on Twitter because someone is going to put something up there – so the fear. We are in the dark ages.

P5 stated,

I think one of the problems we're going to have with technology is me. Not me as a person, but me as an age. If you're teaching in your own ways, for twenty-plus years, some people get in a rut and they get into that situation where they say to you they're not open-minded. The thing is I'm open-minded, so it does help.

Self-research and Creativity

P9 stated,

I like to create games. I really enjoy creating so whatever topics I'm hitting with the different grades, I like to try and create a game where they're learning but moving at the same time. I try to use the technology to reinforce whatever topic is in there for the day. Any unit that I do there's a technology piece to it because I feel it goes hand-in-hand.

P10 stated,

I have seen a bunch of apps that I'm in the process of, so I've done some exploring on Google looking at phys-ed apps, but a few that I've come across are phenomenal. I just finished a 10-week long international sports unit and the culminating activity for the last week and a half of the unit was I had them in small groups and they created their own international game and the premise behind it was it started with a clipboard and a pen and they sat in their groups and they brainstormed ideas.

Responses ranged from P3 stating that she doesn't use apps because of her own fear of not being able to know something and P9 who uses apps all the time. There was a range of answers regarding the understanding of instructional technology. During the interviews, participants shared some of the same applications or types of instructional technologies ranging from Hoops for Heart, Chromebooks, YouTube and Smart Boards that are currently useful in physical education. There appears to be a limited use of instructional technology by participants by their own admission.

Research Question Three

How do male and females compare in their instructional technology practices?

Table 4.4 shows the theme and patterns that emerged regarding faculty instructional technology usage and training.

Table 4.4

Themes and Patterns: How Do Male and Females Compare in Their Instructional Technology Practices

Theme	Pattern
Male v Female Physical Educators	Differences in Instructional Technology Usage

There were four female and six male participants interviewed for this study. There were no discernable differences between male and female physical education teachers during the one-on-one interviews. All participants possessed the required New

York State K-12 physical education teacher's certification obtained either at the bachelor's or master's level. All participants are dedicated professionals willing to do what is best for their students. All participants conveyed that if they had an unlimited budget, the instructional technological capabilities would be endless.

Research Question Four

How do years of teaching experience influence their instructional technology usage?

Table 4.5 shows the theme and patterns that emerged regarding years of teaching experience influencing their instructional technology usage.

Table 4.5

Themes and Patterns: Years of Teaching Experience

Theme	Pattern
Influence on Instructional Technology Usage	Instructional Technological Realization of 21st Century Learners

The ten participants interviewed consisted of one novice, two intermediate and seven veterans physical educators. At the onset of the interview, each participant was asked how many years they have been teaching physical education. P3 was teaching the longest (over 25 years) and P8 the shortest (less than 3 years).

P3 stated,

Because of my own fear of not being able to know something and needing to know everything for our students.

We are in the dark ages.

The technology guy has 9 years' experience teaching. So he's just that much younger and little bit more savvy. I can go anywhere and ask any of the younger teachers.

Thirty-plus years of teaching so I'm looking for somebody to come and blow me away with their ideas.

P5 stated,

I think one of the problems we're going to have with technology is me. Not me as a person, but me as an age. If you're teaching in your own ways, for twenty-plus years, some people get in a rut and they get into that situation where they say to you they're not open-minded. The thing is I'm open-minded, so it does help.

P6 stated,

Like I said earlier, I think even someone like me who is in the middle-of-the-road with my career, it's just constantly changing every year the amount of information that is out there.

P8 stated,

I think pushback from some of the older teachers not knowing how to use it. I know the two guys I work with never use the Smart Board unless I'm there. They don't know how to use it.

P9 stated,

My co-worker who has been teaching in the district longer than I have, she doesn't even know how to use iTunes.

P10 stated,

I consider myself a neophyte with technology, but I would have to say I'm using it.

P3 and P5 distinctly referenced years of teaching experience and age regarding instructional technology; P6 distinctly referenced her career as middle-of-the-road; P8 distinctly referenced pushback from older teachers; P9 distinctly referenced her colleague's inability to know how to use iTunes; and P10 stating he is a neophyte. P3, P5, P6, and P10 are using some form of instructional technology in their classes. Despite pushback from older teachers, P8 does use instructional technology on a daily basis as well as P9 and P10.

Research Question Five

What factors influence or limit the use of instructional technology by K-12 physical education teachers? How does school climate, technology support and district demographics affect their instructional technology?

Research question five allowed the participants to share their thoughts regarding limitations or obstacles in implementing instructional technology including school climate, technology support and district demographics. Table 4.6 shows the themes and patterns that emerged from the participant's responses.

Table 4.6

Themes and Patterns: Limitations or Obstacles to Implementing Instructional Technology, School Climate and Technology Support

Theme	Pattern
Limitations or Obstacles to Implementing Instructional Technology	Financial Constraints Faculty Pushback Collaboration
School Climate	District and School-wide PE Curriculum Plan for Integration of Instructional Technology Instructional Technology in Unit and Lesson Plans
Technology Support	Accessibility and Availability District and School Administration Technology Personnel
District Demographics	Multi-cultural Student Population Language Barriers

Limitations or Obstacles to Implementing Instructional Technology

The participants were asked to describe their limitations or obstacles to implementing instructional technology in their current schools. The participants described various constraints including financial, language barrier, faculty pushback and computer literacy of faculty members. All of the participants, except P7, overwhelming

response to integrating instructional technology was money. Physical Education is not typically a priority when it comes to budgeting compared with core academic subjects.

The participants expressed satisfaction with collaborating with colleagues throughout their building in using instructional technology.

Financial Constraints

P1 stated,

I would say financial reasons, location and gym space.

P2 stated,

I think it comes down to money.

P3 stated,

Resources, financially it's hard to get a Smart Board.

P4 stated,

Funding.

P5 stated,

Money is always going to be the number one thing no matter how we look at it.

P6 stated,

I think the big inhibitor is money. If we had all the money in the world, we could do anything we wanted.

P7 stated,

Language. The majority of the Hispanic population speaks only Hispanic.

P8 stated,

Money for one thing. I don't think there's enough money to go around for Smart Boards.

P9 stated,

Funding. Yes, I think that they (administration) don't think we use technology here. Right now, currently, the only way I do it is I have to use my own personal budget. In my building alone, I had to fight to have a computer that sits on my desk, it's like directly saying your subject doesn't need it. Why would you think my subject doesn't need it if I'm teaching.

P10 stated,

Money.

Faculty Pushback

P5 and P8 were the only participants to state faculty pushback was a challenge or barrier to integrating instructional technology.

P5 stated,

I know a lot of other teachers that will close their eyes, put the folders up and say "we can't do that" or "I'm not going to try and do it."

P8 stated,

I think pushback from some of the older teachers not knowing how to use it. I know the two guys I work with never use the Smart Board unless I'm there, things like that.

The researcher probed with "Why is that?"

Because they don't know how to use it. They had training but they don't care. I think some teachers are set in their ways and are not going to try something new because what they have they think works and they're not going to change. It's harder to do something new. Even when I pull out some new games or re-teach it and pulling out a game you taught a billion times, so that in itself it's more set-up for them, more work for them, so they're not going to do it.

P8 shared his idea of using GoNoodle before school and there's a lot of pushback on that. GoNoodle is a website where they have dance things and maybe three songs that run maybe 15 minutes and we usually have 15 minutes before the bell rings before first period and they come to class so I thought maybe doing a little physical education in the morning would be good for them and some teachers bought in and some said okay we'll try it and some were we're never going to try that, it's not happening.

P8's frustration with being unable to integrate technology because of faculty pushback was quite evident especially because P8 is in his first year of teaching and is non-tenured.

Collaboration

Participants were asked to describe the support they receive from other teachers in their building on the use of instructional technology in the physical education program.

P1 stated,

We are definitely are all on the same page. We're all on a united front like this is what we need or this is what we're willing to do and where we want to go with the programs. So that's nice that we are all on the same page.

P2 stated,

Anything that I can drum up, everyone is on board. This building is a form of Camelot for people who love to collaborate.

P3 stated,

I can go anywhere and ask any of the younger teachers. Not just younger teachers, but teachers that utilize it.

P4 stated,

There are two tech mentors in the building that are available to all teachers. It's more of a support like logging in – general tech.

P5 stated,

All the special areas do a lot of support to each other. We talk to each other all the time as far as what we can utilize.

P6 stated,

Everybody's been great. Anybody that I have dealt with. Most of our PE staff here is around my age and we all kind of started together, so everybody, for the most part, is pretty good with technology.

P7 stated,

The other PE teacher is the most tech savvy guy we have. He's probably the most tech savvy than the guys who work in the district that we outsource too.

P8 stated,

I deal with science, music and art teachers. If we are doing something with dance, the music teacher will come in and talk about it but nothing like coming into the classroom and teaching it.

P9 stated,

I haven't had a teacher who hasn't shared with me. The great thing about the teachers here is that they are very supportive of the program and I love that. We feed off of each other.

P10 stated,

When you want to keep up with what's current and you want to email parents, e-blast, and do newsletters and you want to lower the walls in your gymnasium and display it to everyone, I think that colleagues can be uncomfortable with that in general. So I try to be as delicate as I can with getting other people on board because you're ruffling feathers.

School Climate

Participants were asked if their school district's physical education curriculum incorporates instructional technology usage and if their school has a written plan for the integration of instructional technology in physical education.

District and School-wide Physical Education Curriculum Plan for Integration of Instructional Technology

P1 stated,

Not where we are saying strictly a technology unit. We incorporated it as teachers and then depending upon the unit what it is. We have a separate curriculum from what they're doing at the middle and elementary levels. I believe it's a scaffolding that builds to what culminates to what we do. No, I do not know, I don't believe so that my school has a written plan for the integration of computer technology in physical education.

P2 stated,

It's a digital gradebook. This is done district-wide. No, the school does not have a written plan for the integration of computer technology in physical education.

P3 stated,

I have no idea. In PE, not that I know of.

P4 stated,

Not unless the PE teachers are doing it. I don't know what the other buildings are doing. Some might be, some might not be. As far as other usage of technology, that's in a building-to-building usage.

No our school does not have a written plan. Maybe have more grants. I think we have a grant writer in the district. I know the technology guy has written grants for technology, but I'm not really in touch with him.

P5 stated,

They do. I know the high school does a little more than us. They utilize it in weightlifting and show the kids stuff. We don't as far as technology, hard technology, I don't see a lot of it. We have had guys in here who are technology savvy, but we haven't done as much or as much as we should.

No, our school does not have a written plan.

P6 stated,

On our own to develop. There's nothing in writing that I know. I'm not sure about the middle or the elementary. I know up here we have a lot of free reign. We have a set program here, but it's up to the individual teacher how you want to teach your class and your course. We're not told specifics what to do. We have a curriculum, a broad curriculum, but we have a lot of freedom which I'll be honest I really like because I can do different things, try different things, somethings work, somethings don't.

Not to my knowledge that the school has a written plan for the integration of technology in physical education.

P7 stated,

We use the SPARK curriculum (K-12). Not to my knowledge, no, that the school has a written plan for the integration of technology.

P8 stated,

I know at the high school I know they do with the physical fitness test, we don't at the elementary level.

Not that I know of that the school has a written plan for the integration of technology in physical education.

P9 stated,

No, not in PE at all. There's nothing, like we have plans but no mapping on how to use technology in there, how to incorporate it, nothing like that.

P10 stated,

No, not yet.

Instructional Technology in Unit and Lesson Plans

P1 stated,

I use a lot of technology in the weight room unit in which we use a whole slide unit that we discuss every day. Certain other units I do part of a slide show with rules or demonstrating a video on how to play and showing them Olympic games compared to standard phys ed games.

P2 stated,

Nothing specific I can think of.

P3 stated,

Nothing that I can think of. We are in the dark ages.

P4 stated,

All of our units use technology. We use Google classroom. The information is sent out to them through Google chrome. We can send out the assignment to them and they can get a head start on what's going to happen and some people will view the assignment or read the assignment.

P5 stated,

Well everything we do technology-wise, we put it on our computer, everything is written out so all of our lesson plans are on the computer. Every week we put them in. So it tells you what we're doing for the week, it's pretty intense, it's a pretty good one, you'll like it. But that's pretty much what we do with our lesson plans.

P6 stated,

We use pedometers. We use our iPhones for the playlist and those activities. Lots of times we will use a You Tube or a video to show them what an actual Olympic match looks like. It really depends upon the activity.

P7 stated,

Aerobics, water aerobics, fitness testing.

P8 stated,

We follow SPARK and they have a whole thing online. Do I do every lesson from here, obviously not. But I do follow most of the protocol and I do print out things to send home.

P9 stated,

All of them. Any unit that I do there's a technology piece to it because I feel it goes hand-in-hand. I think there's so much you can do with technology to enhance your subject. Like if you have the tools in your hands, I use it to enhance learning.

P10 stated,

I try to use it in everything I can certainly documenting, right now I'm limited with, plastic pedometers. I don't have heart rate monitors yet. There's not a lot of technology in my classes other than having them think outside the box and use old fashioned techniques.

Technology Support

Accessibility and Availability

Participants described the accessibility of computer technology to physical education faculty members in terms of quality, quantity and convenience of devices, e.g., tablets, heart rate monitors, pedometers, etc.

P1 stated,

The only think I have in my accessibility is heart rate monitors. I do not have access to laptops or projectors at this point. I have to hustle and get everything I need or ask and beg and plead for anything that happens.

P2 stated,

I could use the computer lab anytime I want and have the support in there. I have access to everything. Kids use the pedometers a lot. We get the cheap ones. ‘

P3 stated,

The quality seems good. We have pedometers which is ease of access. I have 32 pedometers. The Smart Board is a hand-me-down.

P4 stated,

All of the teachers are provided with Chromebooks. We have computers, unless the parents bought their kids Fitbits or heart rate monitors. The school district does not provide Fitbits. We have pedometers that we use but they're old, they're not up-to-date.

P5 stated,

Quality-wise we're pretty good. We have our own technology expert in the school so whatever problems I ever have I actually go over to him and he'll sit down with me and show me things.

P6 stated,

Pedometers we usually have enough sets for two classes in the beginning of the year. We try to re-order every 2 years depending upon how many we have lost or broken. The batteries are easy to purchase because they are very inexpensive. The only issue we have that it takes forever to change the batteries.

P7 stated,

I would say limited. We have an iPad we can utilize. We're limited to where if I twanted to take time out of PE and take my class to the library, but very limited with 45 in a class, there's not a lot of time on task.

P8 stated,

There's not enough, that's for sure. We have computers to just take attendance. We have enough iPads maybe for 2 teachers in each school. So I would say it's very limited.

P9 stated,

To PE specifically, not great at all. We have heart rate monitors, we have pedometers. Pedometers are not the best.

P10 stated,

I've been trying to explain to school administration here that we need to have it because we're going to be the last few people to get WiFi in our gymnasium.

District and School Administration

Participants were asked to describe the types of instructional technology support they receive from their building and district administrators.

P1 stated,

The principal and assistant principal are definitely open to any ideas that we have. Again, it's just a matter of financially and location-wise and figuring out the kinks and what we need to make it work. The district administration (superintendent) is very supportive of any ideas we come up with and willing to do anything we dream of, but it's just a matter of finances and location. Chromebooks should be implemented by 2017-18 school year. Chromebooks can definitely help alleviate challenges and barriers and we can integrate a lot more into our everyday activities. I think two years ago students and staff have full WiFi access within the district schools.

P2 stated,

I receive a lot of support from my colleague, our principal, our director. We have much support as possible. Both principals are a 10 out of 10. Even district administrators. Everyone is fully supportive. No one has ever said no to me. Just find the money.

There's money out there. We just made a video for Let's Move for a Suffolk Zone physical education grant. Right now we are voting on it and the principal is on the loudspeaker every morning promoting it for votes.

P3 stated,

I can go and ask them (administration), but as far as them giving us anything there's really nothing. They had some kind of ED (education) camp that you can go to in the summertime, but I didn't go. That was a onetime thing (camp). I would just say the superintendent offering new technology to all staff. The principal set up the ED camp which was hosted at our school. ED camp is where people just bring ideas and things that they do.

P4 stated,

They're very supportive. They take the ball and run with it. The AD supports us and who points us in the right direction. I basically have the support basically from everyone.

P5 stated,

The principal is the one who got us the grant. She's (principal) the one that pushed for the grant. The principal approached me and said there's this money here and we need to figure out something that they would really like to give to us and between me (P5) and the recess teacher, we came up with this idea. My assistant principal, me and my tech guy has this little TV (an Apple TV), and it hooks into the television with an HMI cable, you put it in and get any program you want. So there would be a cable into this little box into our computer and show it on the big screen in the gym and we can do almost anything we want with it. The AD wants to put more technology in and his hands are tied by the money, but he sends out a lot of emails on what kinds of apps are out there. If you're talking about 10% of technology really in phys ed now, but I'm assuming in 10-15 years, 50% of technology should be there (in the gym).

P6 stated,

We really haven't had to ask for support. Like I said, we kind of do our own thing. I've never had to ask my boss (AD) or principal for anything. I have never run into an issue with anybody.

P7 stated,

Honestly I would say with our AD. Anything that we have in our mind that would be beneficial for our students, he would go out of his way to get, he'll do anything. That goes for my building principal as well.

P8 stated,

Actually, all the principals or anybody that I ever talked to have always been if I need it, they'll get it for me if it's available. My AD has been awesome with that stuff and he gives me a budget every year and if there is something big I want if it's something extra, he'll get it for me that's no problem.

P9 stated,

My principal who's fantastic. Fantastic! Anything I need or I want to incorporate, she supports it in any way she can. She's very supportive.

District administration is not where I should be getting it directly to my own subject. I think that sometimes elementary tends to be the red-headed step child. Leadership directly affects everyone below and I think if you don't have someone strong on top really watching programs and making sure that things are being used, it's not going to happen because technology is not easy. It takes work to stay up with it. It takes work at home to set up what you want to do the next day using the technology, so there are things that you have to do, but you have to want to do and you have to be trained in it and I don't think that occurs not like it should.

I just think that there should be more fanfare, ya know realization, like "Hey, look at what we can do" and what we do do. Don't forget us. I think that's important. Here in this district I get more support and definitely my AD knows, but they come on in and see what we're doing and you know what would be great if you can get me this. So it's kind of like promoting it and you have to show that you're using it to get it, but I think our district is better than half the ones out there. Because everywhere else I think they do a great job with technology. I think in PE absolutely can be better.

P10 stated,

I think there is very good support. It's just a matter of knowing what you want, what you need, and if it's physically possible.

Excellent support from district administration. District-wide we're a little bit behind the eight ball compared to other schools, but there is a push here for technology and I'm trying to be patient.

Technology Personnel

The participants were asked to describe the technical support they receive in terms of computer maintenance, troubleshooting, and upgrades.

P1 stated,

We do have a tech support team here at the high school. There's one in every building. They're definitely in need a lot of time throughout the building so it's kind of hard to get a grasp sometimes but they do their work when we do need them.

P2 stated,

We're getting a full new audio/visual speakers, microphones, music system in the gym. We're actually going to have a microphone that we don't have to hold – a wireless microphone. We have a tech budget and they're going to be using it to upgrade our system this current school year.

P3 stated,

Maintenance is good. We have a line that we call and the guy is pretty accessible and helpful and keeps things moving. I can't really make an assessment because I don't really know what's out there.

P4 stated,

We use School Dude – you basically click on the icon, fill in who you are, where you are, what the problems are, click send and it goes to the IT department and they send somebody over.

P5 stated,

Quality-wise we're pretty good. We have our own technology expert in the school so whatever problems I ever have I actually go over to him and he'll sit down with me and show me things.

My assistant principal is outstanding and we have our own technology guy. He's here like three days a week and whatever questions you have, he'll come right in and boom, boom, boom.

P6 stated,

We have our computer service department here throughout our school district. We have a guy we call and he's pretty good he comes right down.

P7 stated,

I would say our computers are dinosaurs. We always fix what can be fixed. They're not updated so there's only so much they can put on a computer.

P8 stated,

If I need something from the tech department, they'll come right down before the end of the day, but if there is stuff that I want, easily accessible, no. If my program is not working correctly, they will come and fix by the end of the day.

P9 stated,

We're the last ones on the totem pole. If I have trouble with my computer, I would have to act like a two-year-old and stomp. When I have issues, I certainly better not hold my breath because it's not going to happen. I am last on the totem pole of fixing, maintenance, any of it, even in the beginning of school, the other teachers have the same issue, we don't get a lot of – the computers should be up and running prior to the beginning of school. They should all be out, they should all be in, Chromebooks should be set up for the classes, the carts, everything should be ready to go. It never is. The teachers are always up-in-arms about that. It's a joke. Hey, don't forget us! A lot of things I have to figure out because if I waited that long, it would never happen.

P10 stated,

They have Google Chromebooks but I don't have one. They don't have one for me. I'm just using a desktop here at the school. When I go home, I use my personal laptop.

District Demographics

The participants were asked to describe their district demographics.

Multi-cultural Student Population and Language Barriers

P1 stated,

High population of Hispanic students.

P2 stated,

We have a 70% percent Latin culture. English as a first language students especially in kindergarten.

P3 stated,

Rural and we have over 50% free and reduced lunch and basically a blue-collar community.

P4 stated,

It's a great, diverse district. There's a lot of Middle Eastern decent; a lot of South American and Dominican Republic.P5 stated,

When I first came here we had an approximate 5% Spanish population now we're up to about 60%. We have a huge influx of Spanish kids. The population is growing in leaps and bounds. Very few kids speak English.

P6 stated,

It encompasses a lot of different social and economic backgrounds in this district. We have real high to blue collar to real low. A little bit of everything. I don't know the exact percentages, but we are a high Caucasian enrolled district.

P7 stated,

It's a diverse district. Majority Hispanic. African American comes second, minority is Caucasian. High taxed community, low wealth community. Everyone receives free lunch and free breakfast. The majority of the Hispanic population speaks only Hispanic. Teen pregnancy is a big issue. Most of the people who are pregnant are of Hispanic culture.

P8 stated,

Most Hispanic. Most of the younger grades, there's a lot more Spanish-speaking classes, bilingual classes but most of them don't speak English. Most of this district has money problems, the parents are not very wealthy.

P9 stated,

I would definitely say it's middle to upper class. Definitely white, we have a couple of ESL students, not many, we have some who have free or reduced lunch.

P10 stated,

This is a small school. It is roughly one of the smallest in Suffolk County.

Research Question Six

How do physical education teachers describe teaching 21st century learners in terms of instructional technology?

Participants shared their vision of an effective physical educator teaching 21st century students; how students learn in the 21st century and similarities or differences from how students learned prior to the 21st century. Table 4.7 shows the themes and patterns that emerged from the participant's responses.

Table 4.7

Themes and Patterns: 21st Century Learning

Theme	Pattern
Student Instructional Technology Use	Vision of an Effective Physical Educator Teaching 21st Century Students
	21st Century Learners
	Similarities or Differences on How Students Learned Prior to the 21st Century
	Physical Education Teachers Making an Impact on Students in the 21st Century

Vision of an Effective Physical Educator Teaching 21st Century Students

P1 stated,

I think it is finding a balance between incorporating our technology skills and incorporating their reading and writing that we kind of need to in class and having these kids still play and experience sports. So I find that having them to have the technology each individually or available and accessible to us because it would be amazing because it would make things a lot easier if we had Smart Boards in the gym where we could throw something up quickly and show them things or show them how to access certain things on the Internet, different resources. It would definitely be an easier way to incorporate 21st century skills and balancing it with them actually strategizing and playing I think would be important.

P2 stated,

I see technology certainly as a motivating factor.

Just from a realistic, practical application for technology, if it takes away from the time of the kids being active, it's not worth it. If it takes away 10 minutes from a 40 minute class where the kids can be active, it's no good because those 10 minutes add up over the year. So technology is supposed to be to increase time on task. If you have to manage it, it's not good.

P3 stated,

I think that technology, which is their world, has got to come into the classroom. Like right now they are not allowed to bring phones into the classroom but I think at some point the phone is going to be their pencil. They learn in short bursts in PE. I recognize that in two weeks I need to change it up.

P4 stated,

That would be someone who is not afraid of change. An educator who embraces it and not afraid of it. Being able to step outside the box and try to learn something new and disseminate information used in technology.

P5 stated,

I think the biggest thing I see, how do we get (I think this is going to sound strange), "How do you get the video game to become part of an educational system where they're actually moving and using videos? " I mean I actually use it with the dancing and the video, but I think eventually it's going to be, like I've seen them have competitions watching and playing these video games and it has to be more active and I don't know how that will eventually happen, but I think that's something in the future that technology is going to be a big part of it.

P6 stated,

The phones are a great research for teachers to use but they're also an issue. So I think right now the teachers are trying to find a way in all areas, especially PE, how we can tap into that, but also not let it interfere with our classes.

P7 stated,

I'll give you a perfect example. If we had it, if we had a room full of the new craze, Spin, so no you had a Spin in our fitness room, we had a bunch of spin bikes, you might be able to take your class and go through a whole spin class utilizing a program that was on our TV and go right through it. Go right through it and demonstrate what they're doing as well and doing it inside your lesson. More active participation than sitting around in front of a computer.

P8 stated,

Each kid should have their own access to being able to see their BMI, height and weight and everything should be logged in on a computer so they can log in with iPad for themselves in the classroom. So they should be able to log in and see where they're at and track their progress throughout their classes. We should be teaching them all how to be healthy. We can track that using pedometers, Bluetooth things, wristbands and whatever it is that would be able to track their abilities throughout the day, how hard they're working and they can track that and compete against themselves instead of competing against everybody else.

P9 stated,

So typically with technology like if they come in there is some kind of ap that we'll use for warm-up. There's Spin It which I like to use. I do a lot of games specifically with the learning and moving. You can do Plickers for assessment. You can do a peer assessment, so that's another great thing you can do with technology. I'm big on assessment.

I think without technology. I don't think us as phys-ed teachers can be as effective. I think it's easier for us to become more effective.

P10 stated,

I think you need to be able to show the community that you're working the value of your program.

21st Century Learners

P1 stated,

Students learn through a lot of technology. They like to have hands-on. They like to be shown. They are very visual learners right now because I feel everything is at their hands. They like everything instantaneously so I try to balance that with what they are not used to and how to be persistent and work towards a goal.

P2 stated,

Students learn more kinesthetically in the 21st century. Tactile. Because they need more simulation because they were brought up with it.

P3 stated,

I feel like now the emphasis is more on differentiation as opposed to way back that this is the way it is, this is what we're doing, pass/fail, make it or you don't.

P4 stated,

I think they still learn through movement. I think technology is good if it's embraced the right way. Kids nowadays are on the phone all the time whether it's an iPad or a phone, devices are all over the place, so I think if we can use the technology in a good way, whether it's a FitBit or MYFitnessPal tracking nutrition, I think that would be great. It's turning the kids on to those type of apps and that type of technology that would be beneficial.

P5 stated,

I have a feeling, more by the computer aspect more beyond on computers – more like we do in education-wise, academic-wise it might be eventually involved in a physical education-wise.

P6 stated,

I think as a PE teacher now we need to do a better way of finding a happy medium with them because they are always on the phone. Especially in class they always bring it with them so we try to incorporate it in the lesson or we ask them to put it off to the side. I think most of the learning needs to come from the teacher or the environment or each other. I think the cell phone or the technology can be used as an enhancer in the class. I'm a big people-to-people person. You learn from others and you learn from watching.

I think we're kind of losing the communication piece especially with this generation. They don't talk to each other they text. Everything is on the phone. So in PE which is the one place where we can get them to communicate with each other. But there are ways that we can get them to use the phone in class. We're working on that.

I think even someone like me who is in the middle of the road with my career, it's just constantly changing every year the amount of information that is out there. It's insane for lack of a better word. The kids are really tech savvy and we can learn a lot from them and they can learn a lot from us. That's a kind of a good way to tap into each other.

P7 stated,

They're more visual learners. I'm going to tell you right now what I've seen due to this tech and phones and everything else they do, their communication is not what it used to be. So for them to even read instructions is nothing like them visually seeing, it's hands-

on constantly in order for them to learn. If I'm using it as a visual aid, it's perfect as a teaching resource.

P8 stated,

I think there's going to be a lot more demonstration on video. I think there's going to be less demonstration by the teacher. There will be more interact more with the technology themselves, so I think that will be a big part too. Teachers won't always have to be on top of you because they will be able to do it themselves and you can just monitor more.

P9 stated,

I have to keep up with the kids.

P10 stated,

I really think in this day and age where everything is at your fingertips and the media and the social media and what's out there, the physical educator in today's world needs to be able to hit the ground running with a lot of tools, resources, a lot of know-how and needs to be able to connect with the kids.

Similarities or Differences on How Students Learned Prior to the 21st Century

P1 stated,

Definitely in the way we teach physical education. It's more geared towards students having this lifelong learning and promotion. Not to say "just roll out the ball", but it was more get out there and play and exert energy and that kind of thing, whereas it's now more finding the underlining meaning of strategy and how we can work harder in this sport or something like that. Maybe that would be the only difference and not so focused on testing as well. Back in the day it was more focused on experiencing the sport and playing as more opposed to like the testing of the sport or knowledge of the sport or making sure they knew what they were doing or wanting to know all the rules by playing correctly I think is a huge one.

P2 stated,

If I can draw upon my personal experience of being a student in the 90s, yeah I think it was or less like telling, describing, now it's more like showing and experiencing a little more. The more different avenues of getting to the final product.

P3 stated,

In the middle there has been an evolution as to certainly getting away from traditional activities and moving more towards health and wellness and teaching and treating the whole person and through lifetime activities.

P4 stated,

When I first started there were no Smart Boards, just chalkboards and they had overhead projectors and now everything is technology. The kids now have, not necessarily in the

gym but in the classroom they have Smart Boards, tablets, Chromebooks, so it's becoming more digital, less paper. As far as phys-ed, it's still for the most part we learn by movement, we get the kids moving and it's slowly moving in with the Chromebooks, the apps and things like that.

P5 stated,

I think it's more oral vs. what the kids can visually see on computers. We can teach them both ways. I think the video aspect, even though we used to have reel-to-reel and 8 mm. Now it's jump on a CD, go on a phone. Kids can see themselves, see their mistakes a lot faster and a lot easier. Now they just jump on their cell phones and I can send it to them and say, "Look at these" and I actually write down the mistake and they can actually read it, see it, and go back and just do it on a phone. Whereas I used to say to them they would say yes or no or that's it and that would only be the visual part.

P6 stated,

In 2001 I didn't have a cell phone. I had a beeper at that point and even the past 4 or 5 years every student has an iPad or a cell phone and they're very very good with it. You can actually learn from the kids. If you walk in the hallways, even though phones are not supposed to be used here, at the bell they are all on their phones looking down with their headphones in without talking to each other anymore. I think that's part of the problem that kids are having a hard time, especially relationship-wise, whether it's family or friends or with each other because they are not communicating.

P7 stated,

I would say they are more apathetic now. They're apathetic and I'll use the term lazy. They're not as eager even in physical education. When you were a PE teacher back in the day, I mean you were God. They loved coming to class. Although there are still some kids that feel that way, not the majority is that any longer.

Now it's just, they want instant gratification. They want answers right now. There's no problem-solving to get to that answer. They're impatient getting to that answer. Just want everything now, now, now, now rather than to build up, let me problem-solve, let me figure it out and do it.

I went back to the old way of segregating my classes and I did it purposely for the pool. I just felt uncomfortable because I had girls who weren't getting changed because of the guys in there as well. I would rather my girls be in the water and the guys not be there. So I went back to the old way. I went 9-12 girls, not just 9-10 like it used to be many years ago.

P8 stated,

No, I don't think it's that much different now. I wouldn't say it's much different than when I went. I mean maybe the communication with the parent is a little more different. I feel that we contact the parents more than when I went. I have emails set up where I

can talk to some of the parents. I feel I can text them whenever I want to and they answer back so I think that's a little more than it used to be.

P9 stated,

It used to be, like the kids now I feel no more than me. If we don't study up on it, they're going to go right over us. They're going to know more than us, so I have to keep up with the young ones.

P10 stated,

Attention span. You need to be able to captivate them. I use a lot of humor. They're very distracted. They have a lot on their minds. They're technology savvy. Everything is instant for them. They're much more technological smart than I am. I need to be able to wow them right away. If the lesson is struggling, I need to pick up my energy level, I have to be way above theirs.

Physical Education Teachers Making an Impact on Students in the 21st Century

P1 stated,

I think the way we make an impact is kind of giving them a wide variety of different units and sports that they can really get interested into. Juniors and seniors are allowed to pick their unit so hopefully they are picking something towards what they would enjoy and that they can see themselves doing hopefully outside of school or something that gets them moving within the school year.

P2 stated,

There are many ways. I think in general as a PE teacher, it's all about giving students and teaching students, exposing the students to the tools that are necessary to live a happy and healthy life. It's more of a stimulation and more of a motivating factor. I think teachers need to show students and expose them to ways of living a healthy lifestyle.

P3 stated,

How? Like we always did with one-on-one contact with people. I think that has become lost in the last several years, 10 years, 15 years, conversations and I think that in some things haven't changed and I think that if you genuinely care for the student, irregardless of socio-economic anything that's what it all comes down to if you're going to make a difference.

P4 stated,

Showing them by example, doing things with them. Basically embracing the technology and showing them ways they can use technology to have a healthy lifestyle.

I think technology is here, people have to get used to technology. It's like when we switched over from snail mail to email and we were not used to that and it was an uncomfortable change, but we got used to it and now they are comfortable using it.

Technology is here and it's not going anywhere so we have to embrace it and use it in a positive way to impact the kids and have them lead healthy lifestyles.

P5 stated,

I really believe that even though technology does help, it still goes down to the basics of learning how to do something and you manually teach kids and how you teach it. It's all about schemes, it's all about how you do it, your method of teaching. Start from ground zero and build them up that way. It might be technology helping you, but it's still going to be starting from scratch, showing them manually, one by one.

To me those are things that I've done to try and motivate the kids. But technology down the road where it might not need that part. It might be something that I don't know.

P6 stated,

We have a subject area where is unlike any other. We're not sitting at desks, we're not staring at screens or confined to one area. We have the opportunity to kind of hit every aspect of a child every other day for 40 minutes whether it be physically, socially, mentally, emotionally. We have a big task at hand especially right now because of the lack of exercise and students getting out there and being active. We have a real important job in the next decade as to try and tap into all the aspects of a person. We have an important job to do.

P7 stated,

I would say trust is a big issue. Trust and respect. Once a student sees and you do care for them, they tend to, again, open up and that's where coaching comes in also. They see you in another light then what they do as when they see you in a classroom. It's two different faces. Two different hats you have to wear.

I keep my students away from everyone else from the minute I get here, my first 5 weeks always in the pool. I'm out of the general population I like to call it. Students will know me for being whom I am without being infiltrated by I was in this teacher's class last year and I was allowed to do this…no, no, no. They know how I am. So that's the rapport I built early. I like structure. I'm more of a command-style person.

P8 stated,

Kind of going back to a little technology, by showing the students how to save their data, looking at their data and be able to monitor themselves in that way a PE teacher can use the technology and they can teach the students how to use it to help them get better in life. Be a healthier person and find new outlets to go to in sports themes or anything like that. They can use it with the internet, iPads, iPhones, all that not just working in the classroom but outside of the classroom. That's a big deal.

P9 stated,

There's a lot you can do with monitoring. Just setting goals and portfolios. It doesn't no longer just have to be in a classroom alone any more. You can take it outside, you can do

homework assignments, you can do tracking. Kids can make videos on their skills. At least we can try to encourage physical activity, health and nutrition outside when we don't have the kids.

P10 stated,

I think they need to come away from our class with a toolkit with the skill set. I think now they need to be able to come into a elementary, middle or high school physical education program and they need to be able to "pop the hood" and see what's inside and even start to be the facilitator, the leader in the class.

Research Question Seven

What should teacher preparation programs include for students majoring in physical education in terms of instructional technology?

Participants were asked if they have been a cooperating teacher. A cooperating teacher oversees student-teachers in their K-12 placement. Participants shared their recommendations on what higher education teacher preparation programs should include for students who aspire to become physical educators.

Table 4.8

Themes and Patterns: Higher Education Teacher Preparation Programs

Theme	Pattern
Teacher Preparation Programs	Cooperating Teacher
	Effective Instructional Technology Practices

Teacher Preparation Programs

Teacher preparation programs in higher education, is an essential component in preparing future educators. In most higher education institutions during the third year of the program, the student is required to observe a cooperating teacher on the elementary and secondary levels. During the first semester of their senior year, the student is required to observe a cooperating teacher in an adaptive classroom setting. The final

semester is devoted to full-time student teaching where the student-teacher assumes the role of the cooperating teacher on a full time basis.

Cooperating Teacher

P1 stated,

Yes, I have been a cooperating teacher on the high school level.

P2 stated,

Yes, I have been a cooperating teacher. Middle and elementary school levels.

P3 stated,

Yes, at the middle school level.

P4 stated,

Yes, at the middle school level.

P5 stated,

Yes, at the elementary school.

P6 stated,

Oh yes I have. Almost every semester since I was able to.

P7 stated,

Yes, every year I'm a cooperating teacher.

P8 stated,

No, I have not been a cooperating teacher.

P9 stated,

Yes, I have been a cooperating teacher.

P10 stated,

Yes, many times on the elementary level.

Effective Instructional Technology Practices for Future Physical Educators

P1 stated,

I think making them up-to-date with how to use things like in Google classroom with sharing things and documents so that we can or if we want to do projects within the phys ed classroom so that it's easy and quick time periods so that you're not taking a chunk of

time out of the students playing and experiencing sports. I think just making sure they have a wide variety of resources where you're not just using one think like you're stuck on computers or the iPads or stuck on the Chromebooks but also using the heart rate monitors to incorporate all those things.

I wouldn't want technology to be taken over because I know it's been taking over in other classrooms as well. But I do think that a part of it should be taught so that you're not throwing out teachers into the world so that they're not behind in the times.

P2 stated,

It should include obviously the latest in technology which is virtual reality. They need to be exposed to more stimulating environments. I would use technology as a motivating factor.

P3 stated,

You need some courses in mentoring, how to talk to parents, how to talk to administrators, how to conduct a meeting. I feel like all those things are lost because of technology.

I just really need a young person like a friend of mine who is in the science room. She has a new young teacher and helped revamped her curriculum, labs and all that stuff and it's finding that person. I keep saying younger, but it doesn't have to be younger. Someone with new, fresh ideas. Thirty-plus years so I'm looking for somebody to come in and blow me away with their ideas.

P4 stated,

Maybe two courses on how to create and work on websites. What's up-to-date as far as using social media in phys ed, Facebook and Instagram, you could do a lot with Google. There definitely needs to be coursework in technology so that when they get out of a teacher prep program, they're on the cutting edge.

P5 stated,

One of the things I have to talk about, "How do you overcome the sitting down of technology? How do you motivate kids to want to be more physical?" We're going to have to find a way to motivate kids to get away from the video aspect of it and be more active.

You can take the books and throw it out the window, because I mean you learn by actual learning experiences.

P6 stated,

I think now, every unit that you are going to be teaching, you have to be able to use either an iPad or an iPhone, have certain apps on your phone that you can use. How to use a Smart Board. I also think that students need to understand the kids that they are going to

be teaching. This is big because the kids don't want to put down their phones in PE and how to be creative to use it or not use it in class.

P7 stated,

What's happening with the student teachers I said we all know what you're taught philosophy-wise, book-wise, what to expect. Until you are actually in that classroom seeing what's going on. I have kids that don't know how to do a high school lesson as opposed to them doing an elementary school their whole time in and doing kiddie games in college in their classes, so they have to get more advanced with the older kids of being tech savvy. Teachers coming out of school, have to ready of knowing what to expect even signing in. They don't even know the procedure of the actual when you first come into a building. The student-teachers today aren't ready, they're more book smart I would say as opposed to having experience.

P8 stated,

I think definitely teach them on how to use a Smart Board because I wasn't taught in college. The use of making videos and things like that because the kids love seeing each other.

P9 stated,

If I was coming out now, I would want to know about blogging, webcasts, webpods, all that stuff I'm not familiar with and these are terms that are becoming very big right now. I know tons of phys ed teachers who don't use Twitter or don't know about it and the amount of information you can get off of that is huge. Come out knowing that stuff and a way to find it or at least how to go about finding it and then researching what's the best app, which is not, which one you use the most, would be very beneficial to them.

P10 stated,

Everything is electronic so I would say if I'm mentoring a student-teacher now, everything should be seeing their lessons plans by email, by Excel document, Word document. So nothing is really handwritten anymore and all of these technology devices realistically you need to be taught in the classroom. So all this social media, lessons being taught through use of technology, program building, lesson plan building, curriculum mapping should all be done through technology and how to use an iPad in phys ed, how do students use apps in stations, fitness components, things like that.

It's an exciting time. It's unfortunate that there's been some downsizing and squeezing in our field. We're in a delicate field, but the physical education program that can keep up with the times and for advocate for the future of the profession, will endure bedause with all of the health factors, all the risks and all the things that kids have to deal with today, there's nothing like a quality health and phys-ed program that's using technology and up with the times it can be the best part of the day for students.

CHAPTER 5

Discussion

The purpose of this exploratory study compared instructional technology usage and obstacles among novice, intermediate, and veteran K-12 physical education teachers to determine what instructional technology they utilize and what affect it has on student participation in their K-12 physical education curriculum. The study was conducted among ten K-12 physical educators employed within school districts in suburban areas of New York. Chapter Five presents a discussion of the findings of this study addressing the seven research questions that guided the study.

Implications of Findings

In the present study, research was conducted pertinent to the issues regarding instructional technology in K-12 physical education classes in six public school districts. Ten educators participated in a one-on-one interview consisting of five topics including demographics, types of instructional technology used, school climate, and technology support.

Demographics

The ten participants were professionals who provided insight into their lived experiences. Their experience ranged from first year to over 30 years of teaching. The school districts varied from three blue collar districts, one district ranging from blue collar to mid- and upper middle class and two upper middle class districts. The student population ranged from a high concentration of Caucasians to a highly diverse population to include English as a second language.

Types of Instructional Technology Used

All participants use some sort of self-taught activities in their personal lives consisting of health and fitness apps. Some use instructional technology apps more extensively than others. Use of instructional technology varies by participant.

P1 stated,

> Students learn through a lot of technology. They like to have hands-on; they like to be shown; they are very visual learners; they like everything instantaneously so I try to balance that with what they are not used to and how to be persistent and work towards a goal.

P9 stated,

> I use the apps all the time. I love them. My students love it. It especially motivates them because it's something that is on their level. I try to use the technology to reinforce whatever topic is in there for the day.

All participants are either currently or have coached interscholastic athletics and stated some use of instructional technology in their coaching duties.

Regarding instructional technology usage in their teaching, their responses ranged from being archaic, slow, and hesitant to very willing and highly capable. Those that used some sort of instructional technology were at a basic to intermediate level and two that were highly effective in using instructional technology in their environment. The participants obtain their resources of instructional technology usage through professional development, attending conferences, participating in chat rooms, online discussion boards, self-research, and sharing ideas with colleagues. However, it appeared to be an individual's decision whether to pursue resources unless mandated by their district.

Some participants are skeptical of innovation, because they often believe that what they are already doing still works. They also sometimes believe that when it comes to their institution, they just don't have the culture, computer systems and infrastructure to make good on the benefits of the innovation.

Instructional Technology

The participants shared their insight in teaching 21st century learners. The participants who teach elementary level, particularly K-2, found it difficult to use instructional technology because of their students' inability to use cell phones. However, using Smart Boards supplants the use of hand-held devices. Integrating cell phone apps into the instructional environment comes with unique opportunities enhancing the learning environment. Teachers in all fields need to find a happy medium with students because they are always on their phones. Participants stated that teaching with instructional technology motivates students to be more active as well as increasing communication among students, which is becoming a lost art for this generation due to them constantly being on their phones. The consensus of the participants stated that 21st century learners need more stimulation in instruction and exposing students the tools to live a happy and healthy life. The students want instant gratification. They want answers now and there is a lack of problem-solving skills and trying to figure out the problem on their own.

It appeared that using some sort of instructional technology in physical education classes depends upon the teacher. During the interviews with the participants, their responses were generally favorable in implementing some level of instructional

technology, but to what extent varied by their own ability to implement it into their lesson plans.

Training seasoned educators in new instructional technology can be challenging according to P8. He stated,

> Some teachers are set in their ways and are not going to try something new because what they have they think works and they're not going to change. It's harder to do something new…more work for them, so they're not going to do it. A few school districts have or will be implementing Chromebooks mostly beginning in 6th grade.

P4 stated,

> The first year of using Chromebooks I was gung ho, the second year kind of gung ho and the third year not as much. I don't want to say not being held accountable and we basically have the freedom to do what we want and it's basically if you want to do Google classroom you can do it, so I guess it's too much freedom. I think if everybody was on the same page, we could be more cohesive as a group and talk about lessons that we are doing and how we're using the Chromebooks. I know what I'm doing, but I don't know what everybody else is doing.

Future Teacher Preparation Programs

The participants in this study are current or former cooperating teachers. Most have had great experiences with part time and full time student teachers. Most participants commented that student teachers do bring new and up-to-date strategies on integrating instructional technology in their lesson plans. P3 stated, "That most student teachers, because of technology, need some courses in mentoring such as talking to

parents and administrators and how to conduct a meeting. All of those things are lost because of technology." P5 stated, "You can take the books and throw it out the window, because you learn from actual learning experiences." P7 stated, "Until you are actually in the classroom seeing what's going on." The participants that were currently cooperating teachers or have been in the past shared which higher education institutions properly prepare their student teachers to go out in the field. This category is especially relevant for teacher preparation programs. Based on findings, participants suggest student teachers, at the time of this study, are not ready and perhaps instructional technology has contributed to their sense of lack of preparedness.

Reflecting upon participant's experiences with student teachers and cooperating teachers, there is a divide in how instructional technology is integrated into daily lesson plans. Cooperating teachers look to student teachers to bring new and innovative instructional technology applications when teaching their classes. Some of the cooperating teachers shared their experiences with student teachers from certain higher education institutions and were selective as to who they would take as student teachers. Perhaps the lack of instructional technology in Physical Education Teacher Education (PETE) programs stems from professors who do not feel confident in integrating instructional technology into their coursework or possible lack of instructional technology course options. Perhaps a future study of PETE programs needs to be conducted to prepare student teachers for integrating instructional technology teaching in the future.

Heidorn (2014) stated that while some PETE programs embed technology throughout the curriculum and other programs incorporate classes dedicated solely to

technology, all programs should integrate technology in significant ways. Candidates need familiarity with technology; should develop skills for health, fitness, and physical activity software; identify and use mobile apps, iPads, and other physical activity monitoring devices; and effectively use technology in the classroom and physical activity settings. Many PETE programs have continued or have begun to monitor the professional dispositions of candidates to measure characteristics such as professional growth and development, ethics and diversity, communication, collaboration, and other qualities essential for effective teaching. PETE program faculty craft their curricula in accordance with National and State Standards for the program as well as university accreditation standards as they strive to prepare teacher candidates.

New York State candidates for a first Initial teaching certificate must achieve passing scores on the Educating All Students (EAS) test, edTPA (Teacher Performance Assessment), and the Content Specialty Test (CST) in physical education for certification.

Preparing future educators in instructional technology is significant not only from a cooperating teacher's perspective, but also that higher education programs are keeping pace with preparing future educators to have the necessary skills and tools to teach 21st century learners.

School Climate & Culture

The school districts varied from blue collar to mid- and upper middle class. The dynamics of each building within a district can be unique unto itself. The makeup of students, staff, faculty, and building administrators makes each building a unique

educational learning center. Although every school district is governed by its state education department, it was quite evident that each site that was visited for this study had its own identity. The participants in this study were interviewed throughout various times during the school day. It was observed by the researcher when going to interview the high school physical education teacher, that most high school students, the *iGeneration,* were engaged on their cell phones during passing time.

Participants in this study stated that they receive moderate to excellent support from colleagues as well as building and district administrators regarding instructional technology. It is just a matter of finances and figuring out a way to accomplish obtaining the funding. P9 stated,

> The elementary level tends to be a red-headed child because it's almost as if the athletic director does not know what they teach and what the students are capable of doing. The elementary level standard is so low (the athletic director's opinion according to the participant) and that is why they don't get the funding.

Some administrators have established district Twitter accounts and encourage the use of apps to communicate any highlights of what is happening in the schools and district-wide. P2 stated, "The superintendent is always tweeting. People (teachers) are really starting to post to Twitter as our form of communication and the superintendent calls it our living scrapbook, a yearly type thing." Some districts encourage using emails to communicate with parents because sometimes it is difficult to reach out to parents via the telephone.

The overwhelming response to barriers in implementing instructional technology was funding. P6 stated,

> If we had all the money in the world, we could do anything we wanted. We do rely on the kids having their own cell phones. The quickest and least expensive way to have the kids tapped in is to use their own phones.

Some participants shared that they have antiquated computers in their offices. P9 stated, "I had to fight to have a computer on my desk." Most stated that the physical education budget is limited and they use their personal funds to buy equipment for their classes. WiFi and Internet access is sporadic in the gymnasium. P9 stated "Elementary phys ed is the red-headed step child. I feel like elementary standard is so low and it doesn't have to be, it shouldn't be, and that's why we don't get the funding."

Most districts were in need of revamping their current physical education curriculums. Some participants were not even sure if their district had a physical education curriculum. A curriculum provides the guidelines for unit and lesson plans necessary for implementing a solid fundamental program for learning standards and assessments under the state education department policies and procedures. In a higher education Curriculum Analysis class, one of the assignments required students to investigate a school district's physical education curriculum. Some students were unable to find such information on school websites and some found the posted curriculum was over 20 years old. There were a few districts that had up-to-date curriculums, but those were rare.

Language barriers with students and parents, limited education of transfer students, teen pregnancy and faculty pushback were challenges participants from several school districts indicated. Some teachers have limited use of Spanish and rely on a student in the class to translate verbally and demonstrate the skill being taught.

Sometimes students transferring from other countries have limited educational experience and are placed in a grade level according to their age in the district. Teen pregnancies inhibit the activities the student can actively participate. Faculty pushback regarding instructional technology was a concern shared by P8 and P9. P8 stated, "Most of the guys [colleagues] are really great, but they don't want to try new things. I think pushback from some of the older teachers not knowing how to use it. They had training but they don't care. Some of the teachers are set in their ways and are not going to try something new." P9 stated, "My co-worker who has been teaching in the district longer than I have, she doesn't even know how to use I-Tunes."

Physical education teachers are frequently faced with various issues that affect their teaching environment, such as limited equipment or gym space, large class sizes, or unfavorable perceptions of physical education by their colleagues and community (Shimon, 2011). Some gymnasiums are located at the far end of the school building isolated from classrooms, but this is in part due to the amount of noise that is emitted throughout a typical physical education class. Physical education teachers dress in attire which is suitable for various physical activities throughout the day whereas classroom teachers must dress in business attire. These two reasons may create a bit of resentment amongst faculty members. P6 stated,

> We have a subject area where is unlike any other. We're not sitting at desks, we're not staring at screens or confined to one area. We have the opportunity to kind of hit every aspect of a child every other day for 40 minutes whether it is physically, socially, mentally, emotionally. We have a big task at hand especially right now because of the lack of exercise and students getting out there and being

active. We have a real important job in the next decade as to try and tap into all the aspects of a person.

P9 stated,

> District administration is not where I should be getting it directly to my own subject. I think that sometimes elementary tends to be the red-headed step child. Leadership directly affects everyone below and I think if you don't have someone strong on top really watching programs and making sure that things are being used, it's not going to happen because technology is not easy. It takes work to stay up with it. It takes work at home to set up what you want to do the next day using the technology, so there are things that you have to do, but you have to want to do and you have to be trained in it and I don't think that occurs not like it should. I just think that there should be more fanfare, you know realization, like hey, look at what we can do and what we do. Don't forget us!

P8 wanted to run a fifteen minute physical education segment before the bell rings for first period. P8 informed school faculty that it's proven that activity in the morning gets the brain started. Some faculty said "okay we'll try it" and some were "we're never going to try that, it's not happening. I have to have my students settled in in the morning."

Beale (2013) observed the ways our public and private educational systems focus on the science, technology, engineering, and mathematics subject areas, while physical education from kindergarten through college, is being systematically marginalized. This is becoming increasingly apparent in higher education, where departments of physical

education, recreation and dance disband or dissolve altogether due to low enrollment. We must not allow this perceived irrelevance of physical education to persist. Physical educators and Physical Education Teacher Education (PETE) professionals, seek to create, deliver, facilitate, and implement relevant curricula that address the learning of students in the 21st century. Lambert (2016) stated that physical education programs are seemingly on the chopping block, and many school districts are questioning the effectiveness of an even the need for physical education.

Technology Support

The majority of participants have accessibility to pedometers, heart rate monitors, and Smart Boards for use in class. There is limited availability with I-Pads and computer accessibility unless pre-arranged with the computer lab or library. Chromebooks are used in a few districts with anticipation of implementation in the future in several other districts.

On-site technology support by designated personnel varied by school district. Some participants were very favorable in receiving assistance with computer-related problems when they contact support personnel. P5 stated, "We have our own technology expert in the school so whatever problems I ever have, I actually go over to him and he'll sit down with me and show me things." Other participants expressed their displeasure. P9 stated, "We're the last ones on the totem pole. If I have trouble with my computer, I would have to act like a 2-year-old and stomp."

Relationship to Prior Research

The research literature provided information on the pervasiveness of instructional technology, particularly for digital natives. Rosen (2010) reported that by the time

children reach middle school, their technology increases to over 15 hours per day, and multitasking becomes prominent. Educators, who are considered digital immigrants, have a difficult time keeping pace with current trends and advancement. All of the participants use apps on their mobile devices when it comes to health, physical activities, and social media, but it appears that they are not as diligent when it comes to fully integrating instructional technology into their teaching. Of course one must take into account obstacles such as a no cell phone use policy during school hours, lack of or sporadic Wi-Fi availability, and fear that the students know more than the teachers.

The literature shows the potential for instructional technology in physical education. It begins with teacher preparation programs and instituting instructional technology classes as a requirement for granting teaching degrees. Templin (1987) stated, "today's technology may have the greatest likelihood of affecting the physical educator of the future." This statement occurred 30 years ago. Templin had the foresight decades in advance of how instructional technology would change the educational system.

From a historical perspective, instructional technology in physical education has come a long way from several decades ago when it was used primarily by college professors using bulky mainframe computers to analyze fitness scores. Today, there are programs that are simple and user-friendly to produce assessment reports instantaneously and provide on-the-spot reports. It was apparent that some participants in this study were willing to go over and above to bring their classes in tune with 21st century learning. Others were hesitant by their own admission due to this is how it has worked for me in the past and why change it now. It may not come full circle until digital natives are

teaching where there will be a substantial change in integrating instructional technology in the classroom. Leight and Nichols (2012) stated that if the instructor does not feel comfortable using technology, and is unaware of the potential of this medium, then it does not matter what kinds of technological advances have occurred in the world; it still will not be used. Faculty may also not utilize instructional technology because they are unaware of what is available to them and their students. In public schools, there are time limitations to learn and implement instructional technology, and money to purchase the necessary software and electronic devices.

Instructional technology needs innovative administrators leading the way and clearing the barriers that confront teachers from implementing instructional technology. New York's Governor Cuomo's 2014 State of the State address calling for a $2 billion investment to produce the smartest classrooms in the nation. School districts must seek and implement instructional technology plans to make implementing instructional technology realistic. These plans should include infrastructure, equipment, staff training and partnerships in an effort to provide the greatest possible access to educational resources. These resources are critical to the teaching-learning process, enabling students to become lifelong learners and compete successfully in the 21st Century.

Schrum, Galizio and Ledesma's (2011) research was a first step in understanding the complex issues surrounding school leaders' knowledge, skills, and interest in promoting the instructional use of educational technology by themselves and by their staff. The research further stated that it would be useful to investigate students' use of the tools, as well as ways that school leaders evaluate or assess teacher and student implementation of technology-enhanced teaching and learning. It would also be helpful

to understand what teachers see as being needed from their school leaders to encourage, support, or require them to use the instructional technology in curricular ways. Given that many administrators in the Schrum et al. research had a high comfort level with instructional technology having learned their skills on their own or outside of their formal training, it would be interesting to investigate how administrators with lower levels of comfort with instructional technology learn these skills for their own professional use and how it may affect their ability to make decisions regarding instructional technology integration and staff development.

According to State University of New York (SUNY) Cortland website (http://www2.cortland.edu/home/), the Physical Education Department is one of the best and most highly regarded in the nation in preparing students to become physical education teachers in grades K-12. It is also one of the nation's largest and oldest undergraduate programs in physical education. In reviewing the course listings there was no stand-alone instructional technology course for students in the Bachelor of Science degree in physical education. However, that is not to say that instructional technology is not embedded in physical education activities and methods courses.

There are several benefits in having students use instructional technology in physical education:

(1) it can enhance the quality of learning experiences by providing access to information and functions not otherwise available;

(2) it can be a way of catching students' interest, making what might otherwise be an unappealing activity more interesting;

(3) increase participation for the non-participant and adaptive students in physical education classes; and

(4) students can learn about new forms of instructional technology or how to use familiar instructional technologies in ways that support increased physical activity.

Compared to the active environment in today's classrooms, physical educators have lagged behind in their instructional technology utilization. The instructional technologies that they do frequently use, pedometers and heart rate monitors, cannot compete with the cool, cutting edge technology that students are carrying around in their pockets or purses. It is time to get up to speed and put smart phones to use in physical education programs (Sibley & McKethan, 2012).

Recommendations for Future Practice

Physical education programs in the 21st century can inspire, motivate, and prepare learners to live in an ever-changing world, increasingly marked by the epidemic of obesity and overweight individuals. Increasingly, globalization, explosion of knowledge, and changing demographics has a significant impact on the knowledge, skills, and dispositions required to live, work, and play in the 21st century. Children and youth will be required to gain critical thinking and problem solving skills; operate with agility and adaptability; effectively analyze information; communicate in various oral and written forms; reflect greater curiosity, imagination, and innovation in their thinking; and develop healthy active lifestyles (Edginton, Chin, Geadelmann & Ahrab-Fard, 2011).

Physical Education has and remains marginalized in comparison to other subjects in K-12 public school curriculums. What other subject is used extensively in one's daily life? Not a day goes by that you do not hear or read about the high rate of obesity, inactivity among all age groups, heart disease, and cancer as well as other ailments and

diseases among the United States population. Physical educators lose their classroom environment multiple times because there are more important uses for the gymnasium such as a book fair, blood drive, and class pictures. On open school night, do many parents visit the gymnasium to hear and discuss the physical education curriculum? Proactive physical educators could see this as an opportunity to educate building administrators, parents of students, and other faculty about the importance and uniqueness of physical education by creating avenues of communication (e-mails, Twitter, school district website, and invitations to colleagues to observe a class). As a result they can get a better understanding of what is happening in the gymnasium.

Instructional technology is ever-changing for educators; building and district administrators must keep abreast of their student's abilities and capabilities of using instructional technology on a daily basis. Whether it is increasing school budgets to keep pace with instructional technology, securing grants, additional professional development classes for faculty and incentives for faculty using instructional technology in their teaching, school districts, state and federal governments must consistently infuse funding so that 21st century learners are technology savvy for a lifetime.

School district administrators should implement a strong teacher-development program that provides individual and group instruction in instructional technology usage. Require at least one or two new lessons each marking period that require the use of instructional technology in their instruction. Promote membership into physical education associations on local, state and federal levels including conferences.

Recommendations for Educators, School and District Administrators, and Technical Support in School Districts

- K-12 physical education teachers, district physical education chairpersons, district physical education and athletic directors, and school district curriculum administrators should redesign the physical education curriculum. Include the integration of instructional technology designed to promote active student-centered learning, lifelong engagement in physical activity, and integration for the non-participant and adaptive students by using apps on their smart devices.
- Increase collaboration among all teachers in the school district to share ideas on instructional technology
- Recommend that more instructional technology be integrated into professional development and on-site training
- Institute periodic workshops to include students and their recommendations on the use of instructional technology
- Expand use of electronic portfolios to all intermediate and primary students
- Implement community-involved instructional technology programs to promote, educate, and inspire individuals on using physical activity apps in their daily lives
- Replace outdated computer equipment periodically
- Evaluate and expand available software
- Integrate use of instructional technology into all written curricula
- Evaluate, revise, and extend District Technology Plans
- Expand and enhance school district website
- Continue to make additional training available to support staff

Recommendations for School of Education Administrators and Faculty of Physical Education Teacher Preparation Programs

- Increase the amount of instructional technology-infused classes in higher education
- Provide periodic updates on the latest updates on instructional technology in the classroom
- Provide teacher candidates the opportunity to institute lesson plans in instructional technology in the classroom during their fieldwork
- Require teacher candidates to join physical education federal, state and local associations as well as attending conferences
- Require student teachers to use social media outlets to stay informed of physical education events

Common Core in Physical Education

The Common Core standards were introduced to schools throughout the nation in 2010 and have quickly been adopted by 45 states (SPARK PE, 2013). On July 19th, 2010, the New York State Board of Regents adopted the Common Core State Standards (CCSS) for Mathematics and CCSS for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects, with the understanding that New York State could add additional expectations to the Common Core. (http://www.p12.nysed.gov/ciai/common_core_standards/ccsbackground.html).

The official SPARK PE (2013) blog, "*How Common Core Can Be Implemented in P.E.*" stated, that Common Core is designed as a robust, nationwide set of school standards, the Common Core program and builds off the state standards already in place. The standards prepare students for college and the workforce by providing them with various skills that enforce writing, thinking critically, and solving real-world problems. The program focuses primarily on math and English language arts, which extend to all school subjects, including physical education. The following subjects are how physical educators currently integrate Common Core standards in their physical education classes.

Reading

A prominent focus in the Common Core standards is developing verbal and reading skills. Simply providing verbal cues and instructions each day is a good starting point, but it can be push further with these simple ideas:

- Station cards: During an activity that involves moving between several different stations, create station cards that offer in-depth written instructions for what to do next for critical thinking/comprehension practice.

- Read-alouds: Also known as shared reading, read-alouds give students a chance to hear fluent reading. Provide hand-outs and read out loud while your students follow along. They can then keep the hand-outs to peruse later or to reinforce your verbal instructions.
- Bulletin boards: Provide a bulletin board that gives your students instructions, tasks that must be accomplished, or provides a lesson that they must apply during class. Create a PE word wall that displays important vocabulary—movement words, health terms, names of muscle groups—that will be used throughout the day's lesson.
- Supplemental texts: Post or hand out supplemental materials about the sport or skill you're currently covering. For instance, if you are on your baseball unit, post a short history of baseball, the basic rules, fun facts, and profiles of athletes.

Writing

Proficient writing has become one of the most important skills in the modern day. Some ways you can integrate writing into your P.E. curriculum:

- Setting goals: Have students write down their goals before an activity or at the start of the week. At the end of the activity or the week, have kids provide a post-assessment of what they accomplished and what they could have done better.
- Health and fitness journals: An extension of the above, you can have each student compile an in-depth journal that records their fitness goals for the entire year and includes a daily breakdown of the foods they ate and the physical activities they performed.

- Create a new game: Split kids into groups and have them write out the rules and directions for a new game. They can then provide a quick demonstration of the new game, and you can choose from the best to play during the next class period.
- Educational brochures: Kids can create informational brochures on various subjects, like the importance of physical activity, nutrition, or how to maintain a healthy heart. You can then make copies and distribute them or post them on your bulletin board.
- Home fitness projects: These projects extend the lessons kids learn in class to their lives at home. Have them write out ideas for living healthy outside of school.
- Create a class website or blog: Put kids in charge of certain elements of the blog or website and encourage students to contribute to the blog by writing short posts and comments. This is also a great way to build students' technological proficiency.

Math

Math comprises a whole range of skills that go far beyond solving equations on a chalkboard.

- Graphs: Students should create graphs and charts that show their results for a given activity. For example, when students run timed laps, you can have them chart out their times and see their progress over the course of a month.
- Skip counting: Normally, when your students warm up or do stretches, they count by ones. Switch things up by having kids skip count progressively. For example, they can do ten jumping jacks counting by ones (1, 2, 3, 4…), then do toe touches

for ten seconds but counting by twos (2, 4, 6, 8…). This is a great way to combine physical activity with multiples.

- Pedometers: Pedometers can be used for all kinds of fun math-related activities. Kids can wear pedometers during class to see how many steps they've taken and then challenge themselves to take more steps during the next class. They can add the numbers together to see how many total steps they took.

In this study, P5 stated, "All the special areas do a lot of support to each other. We talk to each other all the time as far as what we can utilize." P8 stated, "I deal with science, music and art teachers. If we are doing something with dance, the music teacher will come in and talk about it."

New York State Education Department Learning Standards for Physical Education

Perhaps the current New York State Education Department (NYSED) Learning Standards for Physical Education: Standard 1 – Personal Health and Fitness; Standard 2 – A Safe and Healthy Environment; and Standard 3 – Resource Management, needs to be updated to include instructional technology. NYSED Learning Standards for Mathematics, Science, and Technology Education include:

Standard 5**:** Technology

Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

Standard 6: Interconnectedness: Common Themes

Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

Standard 7: Interdisciplinary Problem Solving

Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

Recommendations for Future Research

- Using the dimensions of this study, replicate this study by interviewing all faculty of the physical education department, building principal, athletic director, physical education chairperson and school district administrators.
- Using the dimensions of this study, conduct a study to explore differences and similarities between male and female teachers and their use of instructional technology.
- Conduct a study with students and obtain their feedback on using instructional technology in physical education classes.
- Using the dimensions of this study, expand the study to include K-12 private schools and compare and contrast to public schools in the same geographical area.
- Using the dimensions of this study, conduct a longitudinal study of the same participants over the next 2-3 years to see if there are any changes in instructional technology usage.
- Conduct a study that looks at demographic variables to assist in developing instructional technology programs by examining similar district demographics regarding their district-wide technology plans to modify or enhance their district instructional technology program.
- Conduct a study researching Physical Education Teacher Education (PETE) programs and what instructional technology is being offered to pre-service teachers.

Conclusion

Ten public school educators in 6 school districts located in suburban areas of New York were interviewed. The school districts comprise small and large student populations. The suburban area is considered to have one of the highest paid salaries among administrators and faculty in New York State.

On June 24, 2011 the New York State property tax cap was signed into law. Chapter 97 of the Laws of 2011 established a tax levy limit (generally referred to as the tax cap) that affects school districts in New York State except the *Big Five* dependent city school districts (New York City, Yonkers, Buffalo, Rochester, and Syracuse). Under this law, the property taxes levied by school districts generally cannot increase by more than 2 percent, or the rate of inflation, whichever is lower. However, the law does allow school districts to levy an additional amount for certain excludable expenditures. An override of the levy limit is also permitted. School districts may override the tax levy limit by presenting to the voters a budget that requires a tax levy that exceeds the statutory limit. However, that budget must be approved by a 60 percent of the votes cast. If that budget does not pass, the school board may adopt a final budget with no growth in the tax levy from the prior year or resubmit the original or a revised budget. If a resubmitted budget is defeated, the district must adopt a final budget with a tax levy that is no greater than the levy of the prior year. Districts may also pass separate referenda on individual programs which, if they cause the levy to go over the cap, would each need to receive a 60 percent vote to pass (Office of the New York State Comptroller, n.d.)

School district administrators are constantly cutting services and programs while dealing with increasing salaries, health benefits, and retirement costs to balance school budgets. The New York State 2% Real Property Tax Cap has crippled school budgets coupled with uneven funding sources and the need for school leaders to run efficient schools and get the most value for resident taxpayers' dollars. The majority of participants in this study stated that funding was one of the major obstacles in implementing instructional technology. P1 stated,

> The principal and assistant principal are definitely open to any ideas that the teachers have. It's just a matter of finances. The district administration (superintendent) is very supportive of any ideas we come up with and willing to do anything we dream of, but it's just a matter of finances.

P2 stated, "the principal, athletic director and district administrators are fully supportive. Just find the money."

Reed (2009) stated that budgetary constraints and increasing pressure to improve standardized test scores have caused school officials to question the value of PE and other physical activity programs. This has led to a substantial reduction in the time available for PE, and in some cases, school-based physical activity programs have been completely eliminated. Americans must recognize that our nation is a nation of fat people. Youth and adults alike are consuming unhealthily oversized portions of foods at a blistering pace. At the same time they are failing to participate in recommended levels of activity. Children, in the full view of their parents, continue to behave irresponsibly when it comes to their health and wellness. Childhood obesity and physical inactivity are primarily adult-driven problems manifesting themselves in children. Most children cannot control the types of foods their parents purchase and the meals they prepare. More than 65% of American adults are themselves obese or overweight, according to the Center for Disease Control (CDC) recent calculations. A similar percentage of American adults do participate in regular physical activity. Therefore, it should not come as a surprise that so many children are overweight and inactive (p.2).

Twenty-first century instructional technology can easily be incorporated into physical education curriculums through in-class use of mobile devices, Smart Boards, Chromebooks, take-home assignments that will also promote leisure-time physical activities. Popular mobile apps such as MyFitnessPal and Fitbit tracks personal fitness, nutrition, tracks the food you consume, increases fun and enjoyment, and provides support and maintenance through social media platforms. By implementing instructional technology in physical education, educators provide students with the necessary tools to focus on leading a healthy, active lifestyle and advancing the necessary skills and knowledge for 21st century learners.

The information gathered from this study can provide insight into ways that school district leaders to remain on the cutting edge of instructional technology with information to reinvent classrooms, make informed decisions of continued progression in instructional technology for physical education teachers, and to ensure students are able to meet the needs and demands of a 21st century education.

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APPENDIX A
Semi-Structured Interview Protocol

Date:

Time:

Place:

Interviewer:

Interviewee:

Demographic Questions:

1. Tell me about yourself?

   Probe: What is your educational background?

   Probe: How many years have you taught physical education?

   Probe: Have you taught any other subjects besides physical education

2. Tell me about your school district and building?

3. How many physical education teachers are in your building?

Types of Technology Used:

4. How tech savvy are you?

   Probe: Do you use social media (Snapchat, Facebook, Instagram, YouTube)? Banking online? What other technology do you use?

5. Do you have any health and fitness apps on your cell phone? If so, could you describe how you use them in your regular activities throughout the day? If not, what is your thinking about using health and fitness apps?

6. Is instructional technology used in your classroom/gymnasium? If so, where did you obtain your resources for instructional technology in the classroom?

(professional development, conferences, chat rooms, online discussion boards, etc.) If not, could you explain whether or not it should be used?

7. Have you ever coached before? If yes, do you use instructional technology in your coaching duties? If no, please explain if you think it should be used.

Instructional Technology:

8. Describe your vision of an effective physical educator teaching 21st Century students?

   Probe: How would you describe how students learn in the 21st Century?

   Probe: Is it similar to or different from how students learned prior to the 21st Century?

   Probe: What do you make of the similarity or difference?

9. In what ways can a physical education teacher make an impact on students in the 21st century? Why those?

10. In your thinking, what should teacher preparation programs include for students majoring in physical education in terms of instructional technology?

    Probe: In what way(s) could colleges and universities include a more comprehensive instructional technology education for students majoring in physical education?

    Probe: What about instructional technology—do you think more emphasis should be placed on this area in preparation programs?

11. Can you share your thoughts regarding use of apps in your instruction?

Probe: If you are using apps, which ones? How are they working?

12. Describe one or two of the newest and/or most innovative activities that you do with your students in physical education?
13. What types of training or programs would be most effective for helping current physical education teachers develop a more comprehensive instructional technology program in physical education?
14. What unit plans and lesson plans do you use instructional technology?

Probe: Explain what device(s) and programs/apps do you use?

15. Does your school district's physical education curriculum incorporate instructional technology usage?

Probe: Explain how the district incorporates instructional technology in physical education in your school?

Probe: To your knowledge, is this done district-wide?

School Climate:

16. Does your school have a written plan for the integration of computer instructional technology in physical education?
17. What challenges or barriers exist in integrating instructional technology as a physical education teacher in your building?

Probe: How could such challenges and barriers be alleviated?

18. Could you describe the types of support you receive from your building administrator on implementing instructional technology in your program? Types of support from district administration?

    Probe: What type of support would you like to receive?

19. Could you describe the support you receive from other teachers in your building on your use of instructional technology in your program?

    Probe: What about your colleagues?

20. Could you explain factors that contribute to the use of instructional technology in your program? Factors that inhibit?
21. Are there any changes that could be made to assist you with implementing instructional technology in your program?
22. How did you acquire the skills necessary to use computer instructional technology in your lesson plans?

    Probe: What about your colleagues?

23. Have you ever been a cooperating teacher? If so, when? What level: Elementary, Middle School or High School level?

Technology Support:

24. How would you describe the accessibility of computer technology to physical education faculty members in terms of quantity and convenience (number of devices, e.g., tablets, heart rate monitors, pedometers, etc.)?
25. How would you describe the technical support the physical education program receives in terms of computer maintenance, troubleshooting, and upgrades?

Are there any comments or thoughts you have about instructional technology in physical education that were not covered in this interview that you would like to mention? If so, please share.

APPENDIX B
Informed Consent Form

Voluntary Participation in a Research Investigation

You are invited to participate in a research study about K-12 physical educators' use of instructional technology in the classroom. You have been selected to participate in the study due to your professional involvement in the field of physical education. This research is being conducted by Lois J. Kahl as part of the dissertation process at St. John's University.

Purpose and Procedures:

The purpose of this study is to examine instructional technology usage among K-12 physical education teachers to determine what instructional technology they utilize in their K-12 physical education curriculum with 21st century learners.

Possible benefits associated with this study are to gain knowledge of instructional technology being used in education, to reflect on your own instructional technology use for physical education, and to become aware of how other educators feel about instructional technology and use instructional technology for teaching. Building and district level administrators can benefit from the study results in that program design and professional development opportunities might be informed based on the results of the study. University faculty in teacher preparation programs can also benefit from the results of this study in that it might inform their instructional practices when preparing students to work in a 21st Century learning environment.

Participation in this study entails a one-on-one interview conducted by the researcher for approximately 45 to 60 minutes consisting of approximately 24 questions. The interview will occur in February 2017. The researcher will schedule the interview with you in advance and will occur at the participant's discretion. The interview will occur at the work setting of the participant in a room free from noise and distractions. The interview will be audio-recorded and later transcribed word-for-word by the researcher.

Voluntary Nature of the Study:

Your participation is voluntary and is considered service to your profession. There are no incentives or remuneration provided to you for participating in this study. Only the researcher has access to the information you provide in the interview. If you decide to participate in the study, you are free to withdraw at any time without penalty.

Privacy and Safety:

Although your name is provided for the interview, a participant number will be assigned to you and your affiliated school to maintain confidentiality at all times. All interview responses will remain confidential. No known risks are associated with participation in the current study. Any significant new findings will be provided to you during the course of the study. At any time during the interview, you have the right to not answer questions that you may not want to answer. You may request to receive a copy of the audio transcription. The researcher and faculty mentor will be the only individuals with access to the data. The data will be stored in a locked file cabinet at the researcher's home office; all computers, flash drives, and other equipment will be password protected. For participation, you will obtain a summary of the results of the study. You will receive a copy of the Informed Consent Form for your files.

Contacts and Questions:

For further information regarding the study, please feel free to ask the researcher any questions you may now have or if you have questions later, you may contact the researcher via email at Lois.Kahl16@my.stjohns.edu or 516-381-6316. You may also contact Dr. Stephanie Tatum, faculty mentor, at tatums@stjohns.edu or 631-218-7703. If you want to talk privately about your rights as a participant, you may contact Dr. Raymond DiGiuseppe, Chairperson of the IRB Committee at St. John's University, at digiuser@stjohns.edu or 718-990-1955.

I CERTIFY THAT I HAVE READ AND FULLY UNDERSTAND THE ABOVE STUDY. ALL OF MY QUESTIONS HAVE BEEN ANSWERED TO MY SATISFACTION BY THE RESEARCHER. I WILLINGLY CONSENT TO PARTICIPATE.

X _____ X _____

Participant's Signature Researcher's Signature

X _____

Date of Consent

Researcher's Email: Lois.Kahl16@my.stjohns.edu

Researcher's Cell #: (516) 381-6316