

The Effectiveness of a Flipped Classroom Approach Unit on Student Knowledge, Skill Development, and Perception of Collegiate Physical Education

by

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Abstract

A key factor in emboldening collegiate students to become physically active and improve their health and wellbeing is to create effective pedagogy with an intellectually stimulating, engaging and, student centered focus. Recently, the science, mathematics, and engineering fields have acknowledged the Flipped Classroom Approach (FCA) as an effective pedagogical approach with its homogeneous attributes. The FCA is a students centered learning approach, which incorporates both online learning outside of the classroom as well as a variety of activity based learning styles for practical application in the classroom. Despite its pedagogical effectiveness there is no research to support its application at any level in physical education.

The current study explored the implementation of an FCA unit impact on the engagement of students and instructional delivery of collegiate physical education content. The five questions addressed the FCA instructional model, during a collegiate physical education unit, impact on 1) skill development, 2) content knowledge acquisition and retention, 3) collegiate students' perceptions of the FCA, 4) the teacher perceptions of the FCA as it relates to pedagogical effectiveness, and 5) student self-efficacy and self-regulation in collegiate physical education.

The students and the teacher of two sections of a muscular strength, flexibility, and cardiorespiratory fitness course were investigated. The data collection methods utilized were one-on-one interviews, classroom observation, skills rubrics, surveys, knowledge and fitness tests, and pedometer measures. The paired sample t-test and case study analysis revealed students' skills and knowledge improved over the course of the unit. The analysis also indicated that students' self-efficacy and self-regulation were not significantly influenced by the unit. The

students enjoyed the variety of exercise presented, the autonomy, the integration of content, and engagement that the unit offered. Equally as important, the students enjoyed the unit and felt engaged in the learning process. The teacher acknowledged the FCA as an effective pedagogical approach to implement in collegiate physical education courses.

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Chapter 1: Introduction

Overview

After years of classifying obesity as an epidemic, a major public health problem, and an urgent chronic condition, the American Medical Association (AMA) in 2013 has declared obesity as a disease in the United States. This decision has heightened public awareness of how overweight and obesity is plaguing our society. Several professional organizations and government sectors such as the American College of Sports Medicine (ACSM), Center for Disease Control and Prevention, National Association for Sport and Physical Education (NASPE), and other health sectors have implemented various mandates and intervention programs to curtail and alleviate this problem. Some of these mandates included banning oversized sugary beverages like soda, cutting trans-fat from food, posting caloric intake information on menu boards at fast food restaurants, the White House's *Let's Move Initiative*. Additionally, programs such as the Centers for Disease Control and Prevention's program *Communities Putting Prevention to Work*, that undertake obesity and tobacco use in communities, and *Children Healthy Living* that prevent childhood obesity in underserved populations are becoming more common.

One of the main approaches taken to address this problem is to educate people on how to live healthy and active lives. A way that this could be accomplished is by providing students with an engaging and active learning environment. While physical education classes can directly get students to be physically active, the science, engineering, and mathematics fields have taken initiatives to incorporate an engaging and active learning environment for their students by using

a student centered approach to teaching. Moreover, they are using technology to engage students and supplement learning by creating activities within the classroom to get students engaged. One of the recent pedagogical approaches that have been practiced by these areas in education is the Flipped Classroom Approach (FCA). The FCA is a pedagogical practice that consists of active, problem-based, peer-assisted, cooperative and collaborative learning, and skill acquisition and development inside the classroom and video recorded lectures are accessible to students outside of class time. This research seeks to examine how the implementation of the FCA can impact the engagement of students and instructional delivery of collegiate physical education content.

Statement of the Problem

Recently, study by Charity et al (2013) has indicated that physical education classes are making an “unremitting effort to address the public health issues of obesity, nutritional education, and promotion of lifelong physical activity” (p. 141). There has been a movement at the college and university level to bring about awareness and encourage the young adult population about the importance of lifelong physical activity and health. Some of the main initiatives on college campuses are “Exercise is Medicine” that was started by ACSM to encourage faculty, staff, and students to work together to improve the health and wellbeing of everyone on their campus and psychoeducation that offers a semester long course on eating disorder and obesity.

In these courses students were provided information about the physical activity recommendations for adults that included at least 150 minutes of moderate exercise per week that could be met through 30-60 minutes of moderate intensity exercise 5 days per week or 20-60 minutes of vigorous intensity exercise three days per week. Additional recommendations were

that physical activity routine should include cardiorespiratory, resistant, flexibility, and neuromuscular exercise (American College of Sport Medicine, 2011). Even though students possessed the knowledge of what is required to live healthy and active lives the literature has shown that recent studies conducted by Hackmann and Mintah (2010) and Fountaine et al (2011) on college student physical activity and exercise rate indicated that only 55.2% participated in moderate physical activity 1-4 days per week and only 19.5% participated in moderate physical activity 5-7 days per week.

In addition, 40.6% of college students do not participate in any vigorous activity while 30.1% and 29.3% participate in vigorous activity 1-4 day and 5-7 days per week respectively. More significantly, is that only 46.5% of college students meet the physical activity recommendation for moderate and vigorous intensity exercise for adults (American College Health Association, 2013). One of the more comprehensive studies conducted on college student physical activity was Keating, Guan, Piero, and Bridges (2005) research which reported that 40%-50% of college students are physically inactive. Furthermore, findings from the American College Health Association national survey conducted in 2005 indicate that 3 of 10 college students are either overweight or obese.

As a result of the awareness of the inactivity among college and university students, health initiatives and policies were put into practice to increase student physical activity. Some of the initiatives and policies included improving facilities to provide a walking campus environment, “change current policies on use of student fitness centers and intramural sports program, changing physical education requirements to better educate students on the importance of physical activity, and offer other fitness services” (Keating, Guan, Piero, & Bridges, 2005, p. 117). Colleges and universities also began to offer a wider variety of Conceptual Physical

Education (CPE) courses to comply with their institutions requirement to include more academics into the program. The CPE courses were derived from the Basic Instruction Program (BIP) that included skill acquisition and development, physical fitness, and preparation for participation in team and individual sports.

The BIP were frequently offered on campuses, however the CPE had a physical activity as well as a laboratory component to it that covered conceptual topics such as physical activity, components of fitness, overweight and obesity, stress management, fundamental movement skills, and nutrition. Sometimes the content of the CPE courses were taught totally in the classroom or as reported in recent years online (Ransdell, Rice, Snelson, & DeCola, 2008,). These courses included but were not limited to weight lifting, yoga, aerobics, dancing, and team sports. The CPE courses fostered positive health habits by equipping students with the necessary knowledge and skills required to initiate and encourage physical activity incorporation into students' daily lives.

With the emphasis of collegiate physical education courses being more academic along with providing a variety of different physical activities classes, some may wonder why immense progress has not been seen in the number of collegiate student population enrolling in physical education and activity classes. More significantly, is why are so many student still inactive, overweigh, and obese with the considerable number and variety of physical activity classes offered on college and university campuses. There are a few studies that have attempted to answer these questions. Mohr, Sibley, and Townsend (2012) identified some detrimental aspects of physical activity classes that included "poor classroom management that resulted in loss of activity time, lack of a wide variety of activities, failure to address health related fitness content that are practical and applicable to everyday life, lack of physical and intellectual challenges

within lesson plans, and disconnection with classmates” (p. 295). Fox, Cooper and McKenna (2004) also pointed out that “physical education is not long enough in duration to meet the daily physical activity requirements recommended by ACSM, that 25% of physical education time is spent in passive activities, and instructional time, while certainly a necessity, takes away from overall activity time which may also lead to students not always participating in physical education at a health enhancing level of intensity” (p. 144).

This lack of time also was proven to have profound influence on the variation of lessons teacher delivered in class (Morgan & Hansen, 2008). The lack of variety in lesson plan content and activities has been reported to have cause dissatisfaction with student physical education experience. Research by Prochaska, Sallis, Slymen, and McKenzie (2003) reported that females, younger adults, and those who did not participated in sports were bored with the activities of the physical education classes. Most of the sport skills were taught in class and often met the needs of highly skilled highly fit students, who would be successful in almost any program. However these traditional classes failed to fully engage students who were less fit and not as highly skilled (Bryan, Johnson & Solmon, 2004). This problem with engaging low skills students and female exclusion in physical activity classroom has been well documented over the years.

In another study by Gibbone, Rukavina, & Silverman (2010), they identified the issue of deficiency in technology practices within physical education classes. When studying teachers attitude and practices with technology in physical education, they described that teachers had positive attitude toward technology integration yet they did not use it. But when students were survey about whether the use of technology enhanced or increased participation in physical activity their responses were very encouraging. While some students believed that there is too much reliant on technology, the majority of the students indicated that more time is available

with the use of technology, there is increase fun and enjoyment, and learning is stimulated as a result of technology utilization in physical education (Scott, Martin, & Browning-Johnson, 2012).

However, one of the major issues with physical education class languorous response to combat the obesity crisis is inadequacy in teaching people about how and why to be physically active and healthy throughout their lives. This requires teaching students about “fitness and skill development team sport participation as well as personal assessment and planning for lifetime physical activity, health, and fitness through self-awareness (e.g., fitness, health, and nutrition assessment) and behavioral skill acquisition, for example, behavioral monitoring, goal setting, and self-planning” (Cardinal, Sorensen, Cardinal, 2012, pp. 507-508). Colleges and universities need to adopt approaches that would enable them to implement physical education classes that are activity and skill-based along with having a conceptual base component. But difficulty has been reported regarding incorporating all of this content into the allotted 50 minutes, three days per week or 1 hour and 30 minute, two days per week time allocation for physical activity.

A pedagogical approach that could be used to potentially resolve aforementioned issues associated with the traditional collegiate physical education classroom and instruction is the FCA approach. NASPE (2007) guidelines regarding collegiate physical education settings speak to the need to provide students with a “quality university physical activity instruction course should aim to promote appropriate behavioral changes method to improve health, enhance student intrinsic motivation to engage in physical activity, and facilitate the acquisition and development of skills and knowledge students need to practice a healthy lifestyle” (Pg.2) There is immense support for the implementation of FCA approach to meet the aforementioned academic requirements and guidelines in physical education in the college and university setting. This

approach had been credited for freeing class time for interactive activities such as active learning, cooperative learning, and problem-based learning, skill acquisition and development, for reinforcing course materials without sacrificing content, allowing educators to present course materials in a variety of format so as to engage student in a variety of learning styles and preferences, and help students to become active-learners and lifelong learners (Gannod, Burge, & Helmick, 2007; Haden, Flikkema, Weller, Frolik, Verrei-Berenback, & Shiroma, 2009; Lage, Platt, & Treglia, 2000; Zappe, Leicht, Messner, Litzinger, & Lee, 2009)

The FCA has been known for having a student-centered learning focus and could provide a stimulating and enjoyable learning environment for students in college and university physical education courses. The FCA has a natural inclination to identify and pinpoint student self-efficacy and self-regulation ability because as Bergmann and Sams (2012) and Bathker (2013) pinpointed that with the conceptual and skill base aspect of the class being available outside of class time, students will have autonomy over their learning. This study found that students were able to watch videos of skill movements before coming to class so that class time would be freed up for physical activity. Self-efficacy is an individual belief in their ability to accomplish a task while self-regulation is the ability to take control to accomplish a task, even when faced with challenges and obstacles. The literature has shown that enhancing students self-efficacy and self-regulation could result in increases in student motivation to enroll and participate in frequent physical activity and also change their exercise behavior (Anderson, Wojcik, Winett, & Williams, 2006; Doerksen, Umstatted, & McAuley, 2009; Joseph, Pekmezi, Lewis, Dutton, Turner, & Durant, 2011; Lockwood & Wohl, 2012).

Moreover, with the conceptual material and videos of skill execution and performance readily available outside of class, students that are low skilled, novice to physical activity and

sport, or excluded from certain aspects of activity time because on inability to perform a particular skill will now have the opportunity to learn the skill before coming to class. Instead of using excess amount of class time to demonstrate, explain, and correct student skills, the instructional content would be available online to be viewed by students at their convenience before, during, and after class, whenever necessary and as frequently as possible. This would provide a better opportunity for students to master skills and become effective lifelong participants in physical activity because of the availability and accessibility of skill videos for reference and model or practice.

Similarly, teachers will not have to condense the conceptual based sections in collegiate physical education and activity classes because they would have the opportunity to provide more materials in an interactive way online through videos and voice over power points. Students in turn will become more informed about how and why they need to be physically active and healthy throughout their lives. Studies (Dale, Corbin, & Cuddihy, 1998; Slava, Laurie, & Corbin, 1984) have shown that there is a greater influence on student participation in physical activity when there is a 'multidimensional' concept-base and skill/activity-base physical education program. As student become aware and knowledgeable about the importance of physical activity in practical ways that they could use to apply to everyday life scenarios, their participation in physical activity and exercise increases. Likewise, the problem with lack of activity variation in lesson plans and boredom in collegiate physical education classrooms could also be resolved by using the FCA. The mastery of skills as a result of longer activity and practice time and videos available for modeling and practicing would provide opportunities for a diversity of both new and familiar activities.

To date there is no research carried out on CPE within the university or college setting that utilized the FCA to improve pedagogical effectiveness in physical education. There is a huge gap in physical education CPE literature as it relates to quasiexperimental designs that investigate instructional and curriculum approaches in physical education such as FCA. More research is needed to fill the gap and provide a better understanding into the use of pedagogical approaches such as the FCA, the FCA utilization of technology, the guidelines and recommendation for its implementation and application, its usefulness in improving knowledge and skill development in students, and to provide insight into both student and teacher perspectives about the effectiveness of the FCA in physical education.

Statement of Purpose

The purpose of this exploratory study is four-fold: 1) examine the impact and function of a FCA instructional model in collegiate CPE course; 2) examine how students' knowledge and skills regarding physical activity movements can be influenced by using a the FCA model; 3) gain insight into the teacher and students' perceptions of the FCA instructional model; and 4) examine the role that self-efficacy and self-regulation play in student perception and attitude towards the FCA instructional model.

The theoretical framework that was used is the Social Cognitive Theory (SCT) by Albert Bandura (1986) in conjunction with social constructivism. The SCT describes how a person, environment, and their behavior interact in a social context to shape their behavior acquisition and maintenance. Social constructivism indicates that learning occurs in a social and active environment. This study will use the self-efficacy and self-regulation constructs of the SCT to better understand student perception of the FCA unit. Additionally, social constructivism will

inform this research by explaining how the FCA approach facilitated student engagement and critical thinking.

This study used both quantitative and qualitative measures to examine the effectiveness of a FCA unit in physical education. Two sections of a muscular strength, flexibility, and cardiorespiratory fitness CPE course were examined and the FCA unit was implemented in both sections. The effectiveness of the FCA unit was assessed by measuring student Health Related Fitness Knowledge (HRFK), skill development, and by understanding both teacher and students perceptions of the FCA unit.

Research Questions

1. Does the FCA instructional model, implemented during a collegiate physical education unit, impact physical activity skill development?
2. Does the FCA instructional model, implemented during a collegiate physical education unit, impact content knowledge acquisition and retention?
3. What are collegiate students' perceptions of the FCA instructional model during a collegiate physical education unit?
4. What are the teacher perceptions of the FCA instructional model during a collegiate physical education unit as it relates to pedagogical effectiveness?
5. Does student self-efficacy and self-regulation impact the FCA instructional model during a collegiate physical education unit?

Definition of Terms

Basic Instruction Program (BIP) – are activity or skill-based courses in physical education that aimed to develop students fitness and skills for participation in individual and team sports in a college or university setting suitable for recreation.

Conceptual Physical Education (CPE): are courses derived from BIP that focuses on teaching cognitive or conceptual materials in physical activity along with providing fitness and skills development for participation in physical education.

Flipped Classroom Approach (FCA) –a pedagogical approach that consists of active, problem-based, peer-assisted, cooperative and collaborative learning, and skill acquisition and development inside the classroom and video recorded lectures are accessible to students outside of class time.

Physical Activity- any bodily movement produced by skeletal muscles that require energy expenditure. Exercises such as walking, running, swimming, dancing, yoga, and resistance training, just to name a few, that increase the heart rate and requires more energy than resting are considered as physical activity. General recommendations call for young adults should engage in activities that include cardiorespiratory, resistant, flexibility, and neuromuscular exercise routine.

Collegiate Student- individuals that are ages 19-30 attending college or university.

Health Related Fitness knowledge- content specific knowledge about concepts of fitness, scientific exercise principles, components of physical fitness, and effects of exercise on chronic disease risk factors, and exercise prescription in physical education.

Self-regulation - the ability to take control to accomplish a task, even when faced with challenges and obstacles.

Self-efficacy - a person belief in his or her ability to successfully perform a behavior.

Active Learning - instructional methods that engage students in the learning process.

Peer-assisted learning – pedagogy that focuses on students that are at equal level or status, acquiring knowledge and skills to actively help and support their peers towards an established learning outcome.

Collaborative learning - a method where students work in groups towards a common goal.

Technology- internet network and electronic devices like the iPad, personal computer, and phones.

Chapter 2: Literature Review

The systematic collection of the literature was based on the topics that are pertinent to the research. Some of the areas are relatively new while others have accumulated decades of research. As such, only academic studies within the last ten years were reviewed along with literature that provided significant underpinning on the areas covered in this research. The literature review presented was derived from peer-reviewed journal articles, universities academic premier search engine, textbooks, dissertations, and educational and professional organizations that caters to the education field.

In order to identify and present the most pertinent literature needed for this research, terms such as Flipped Classroom Approach (FCA), Basic Instruction Program (BIP), Conceptual Physical Education (CPE), college, university, and higher education physical education program, Social Cognitive Theory (SCT), constructivism, self-regulation, self-efficacy, and technology in physical education, just to name a few, are used. The first segment of the literature review elaborates on the theoretical framework of the SCT. A brief history of the SCT is provided along with its relationship to social constructivism; some of the main constructs in the theory such as self-efficacy, self-regulation, observational learning (modeling), and behavioral capability are described along with empirical research to support the utilization of the theory in collegiate physical education.

The second segment discusses the FCA, provides some background information about the FCA origin and history of the approach, and scrutinizes academic studies that were conducted at the collegiate level that applied to the FCA. The third segment describes the effective use of various types of technology in the collegiate setting, the purpose that technology serves in these settings, the guideline for technology use in physical education or related settings, and studies

conducted that demonstrated technology application and effectiveness in such settings. The fourth segment provides a basic foundation regarding collegiate physical education programs and the conceptual physical education course (CPE), and pinpoint studies that surveyed CPE and described the benefits of having these courses at the collegiate level.

Subsequent to these segments, the literature review provides an epigrammatic account of how the flipped classroom approach, technology, social cognitive theory, and conceptual physical education are associated to each other in the discipline of physical education in conjunction with their experimental and mediated research. As a final point, the research questions that guide this study are proposed.

Social Cognitive Theory

On a daily basis, collegiate student cognition, ability, society, and environment have an enormous influence on their learning outcome. Since the FCA has been classified as a student centered approach to learning (Bergmann & Sams, 2012; Enfield, 2013; Johnson, 2013), students learning outcome is profoundly contingent on the student participation in the learning process. A student centered approach requires a significant amount of self-efficacy and self-regulation in order for students to obtain the best learning outcomes (Cheang, 2009; Froyd & Simpson, 2008; Montalvo & Torres, 2004). The social cognitive theory (SCT) constructs of self-efficacy, self-regulation, observational learning by modeling, and behavioral capability constructs was described throughout this review of literature. These constructs was illustrated in an effort to answer the research question about the impact of the constructs on a unit of FCA in collegiate physical education.

Hence, the theoretical framework used for this study is the SCT in conjunction to social constructivism. The assumptions of the SCT are that people learn by observation and modeling, internal process that may result in a behavior being practice or not, and goal directed behaviors that eventually becomes self-regulated. Similarly, social constructivist assumes that knowledge is constructed through human behavior and interaction and that learning is social and active. The two constructs that amalgamated these two theories are self-efficacy and self-regulation. In the 1960s, Albert Bandura originated the social learning theory which was later developed into the SCT. The SCT is often used to describe the acquisition and maintenance of behavioral patterns by individuals that lead to the initial staging for intervention strategies (Bandura, 1997). This theory has been used “extensively and successfully to explain, predict, and elicit physical activity behavior change among college students” (Doerksen, Unstated, & McCauley, 2009, p. 1202). In the SCT, Bandura (1986) emphasized that both environmental stimuli and behavior were associated with individual selection which solidified his believe that learning and development occur through an active construction processing. Bandura (1991) also indicated that "self-efficacy beliefs are altered thought processes, the level and persistency of motivation, and affective states, all of which contribute importantly to the types of performances that get realized” (p. 160).

Likewise, social constructivist believes that individual learning and development is dependent on their ability to self-regulate (Vygotsky, 1978). Bandura (1997) emphasized that individual ability to self-regulate leads to improve capability to act: "skilled performances are usually achieved by repeated corrective adjustments of enactments to the guiding conception as the skills are being behaviorally constructed and improved" (p. 26). Both theorists consented to the importance of cognitive processes and one’s ability to determine whether a behavior requires

improving or not, to the development process. Young adults in collegiate settings make the decisions every day, to be physically active or inactive which impact their health and wellbeing and their decisions to enroll and participate in physical education classes. Therefore, in the section below the self-efficacy and self-regulation SCT constructs was defined and the physical education literature that emerged over the last decade that emphasized the use of these constructs to explain collegiate physical education, physical activity and wellness behavior is described.

Self-Efficacy Application in Collegiate Physical Education

Self-efficacy describes the level of confidence that one has in his/her own ability to successfully perform a behavior. This construct has been known as one of the core constructs used to predict college students exercise adherence (Buckworth & Nigg, 2002; DeLong, 2006; Sidman, D'Abundo, & Hritz, 2009). In Sylvia-Bobiak and Caldwell (2006) study one of the construct that was examined was self-efficacy. Their study provided information about the impact of the self-efficacy construct on active leisure among university students. The participants in the study were 85% white, 4% African American, and 11% other from a large eastern U.S. university. Their results from their study indicated that active leisure was directly impacted by student self-efficacy. Likewise, Liang, Motl, McCauley, and Konopack (2007) study also examined the effect of the self-efficacy construct on physical activity enjoyment among college students. The participants were placed in a randomized high and low efficacy condition. The findings indicated that the self-efficacy manipulation significantly influenced participant enjoyment of the exercise test. The participants in the high self-efficacy condition reported higher enjoyment of the exercise than participants in the low self-efficacy condition. An additional study that supported the importance of self-efficacy in improving physical activity

among college students was conducted by Lockwood and Wohl (2012). Their study described the effectiveness of a lifetime wellness course on changing student self-efficacy. The participants in the study were students enrolled in nine sections of wellness courses. The results from the study suggested that perceived physical ability, physical self-perception, and physical self-efficacy all led to significant changes in physical activity.

It is well documented that the self-efficacy construct are relevant predictors of daily intention and motivation to participate in physical activity among college students (Buckworth & Nigg, 2002; Conroy, Elavsky, Doerksen, & Maher, 2013; Daley & Duda, 2006; DeLong, 2006; Kwan et al, 2011; Puente & Anshel, 2010; Wilson et al, 2004). If physical educators and practitioner are then able to understand and be proactive in implementing strategies to improve these groups of students' self-efficacy, then the student physical activity level will improve. Being able to understand the noteworthiness of self-efficacy to improving student physical activity level will prove to be essential for the FCA physical education unit. Since the FCA is a student centered approach and will have a natural tendency to identify student with both high and low self-efficacy for physical activity with regards to their approach to the FCA unit. This will provide opportunities to develop or enhance student self-efficacy in physical activity.

Further awareness of how self-efficacy impacts students across various groups may be necessary to improve physical activity among all students. Being able to meet students at their level is very critical in encouraging and sustaining their participation in physical activity. In the research literature, concerns were brought up about the number of minority students that were inactive. It has been suggested within the literature that minority student have lower self-efficacy towards physical activity due to cultural, personal, and socioeconomic barriers (Blanchard et al., 2003; Blanchard et al., 2008; Egli, Bland, Melton, & Czech, 2011). Studies conducted by

D'Alonzo, Stevenson, and Davis (2004) and Keating (2005) indicate that minority students are the least physically active ethnic group among college students. As a result of these alarming findings several studies were conducted to improve self-efficacy among these groups of college students.

Research by D'Alonzo, Stevenson, and Davis (2004) confirmed that the self-efficacy construct was important to the overall willingness to engage in physical activity. Their study investigated the outcome of an exercise program directed towards improving exercise self-efficacy and fitness in African American and Hispanic/Latino college-age women. The participants attended step, dance aerobic, or kick boxing exercise classes three times per week for 16 weeks. Pre and post assessments were conducted along with a follow-up 24 weeks later. The results from this study indicated that the participants who attended the exercise sessions most frequently saw significant gains in their exercise self-efficacy and perceived benefits and barriers to exercise. The 24 weeks follow-up also indicated that both African American and Hispanic females will maintain an exercise regimen with a self-efficacy enhancing exercise program. Therefore if physical educators dedicate an aspect of their course on improving student self-efficacy there is a possibility that student self-efficacy and engagement in physical activity might improve.

Similarly, Haider, Sharma, and Bernard (2012) addressed minority college student self-efficacy to participate in physical activity. In this study, a web based survey was used to assess South Asian college student physical activity level using constructs such as self-efficacy. The findings indicated that self-efficacy was the only predictor of exercise behavior within this group. The investigators also suggested that self-efficacy could be enhanced through exercise

mastery by using role models, persuasion and reinforcement, and reduce barriers (for example, anxiety, lack of time, and being busy) associated with performing exercise.

Self-Regulation Application in Collegiate Physical Education

Within the research literature, another construct that has been affiliated with college student physical activity behavior is self-regulation. Self-regulation has been identified as a mediator of self-efficacy. Self-regulation describes the process of “taking control of and evaluating one's own learning and behavior” (Ormrod 2009, p. 105). The main focus of self-regulation is based on the autonomy and control of individuals who monitors, directs, and regulates their actions towards goals of acquiring information, expanding expertise, and self-improvement (Paris & Paris, 2001). Bandura (1997) described self-regulatory efficacy as an individual belief in their ability to maintain physical activity participation despite barriers as being predominant to an individual successful participation in regularly exercise.

Self-regulation as it is related to physical activity in college students describes how students use their skills to carry out physical activity intentions and their ability to overcome situational and personal barriers. A recent study conducted by Joseph et al (2013) describes the positive association between self-regulation and increases in African American college student physical activity level with an internet-based approach. The internet-based intervention was conducted to examine the association between various constructs of which included self-regulation in physical activity. The participants in the study were thirty four (34) African American college female ranging from 19-30 years old. Throughout the study the investigators conducted baseline, 3 months, and 6 months assessments that included the Seven Day Physical

Activity Recall; the 9-item, Outcome Expectation Scale for Exercise; the Physical activity enjoyment scale; the Social Support for Exercise Survey; and the Self-Regulation Scale.

The findings indicated that there were significant increases in self-regulation for physical activity by the participants over the span of the study. These increases may have been due to the self-monitoring tools, like the exercise tracker, available on the website that was used to effectively promote physical activity self-regulation. Using internet-based approaches to promoting physical activity and health related discrepancy may be an effective process to connect with young people at their level, in view of the fact that on a daily basis, 95% of young adults ages 19-29 uses the internet (Pew Internet & American Life Project, 2013). These results seem to have provided some evidence into the rationale behind providing students with some autonomy in physical education classroom. The study demonstrated that the more students are able to self-regulate their physical activity behavior the likelier they are to be continuous participants in physical activity. These findings support a previous study by Anderson, Wojcik, Winett, and Williams (2006) who indicated that “self-regulation efficacy through practice and reinforcement are vital in getting individuals to plan and schedule physical activity” (p. 519). Self-regulation skills and strategies are necessary for students to be actively engaged in complex exercise behavior. Exercises that are more physiologically and behaviorally challenging will rely heavily on self-efficacy and self-regulation predictors of behaviors. Environments that foster self-efficacy and self-regulation opportunities might be able to offer some insight into understanding and satisfy collegiate student physical activity experiences and needs (Doerksen, Unstated, & McCauley, 2009).

In addition to enhancing student self-efficacy and ability to self-regulate, student behavioral capability also play a pivotal role in enhancing exercise participation. Behavioral

capability is often used as a mediator of self-efficacy. According to the behavioral capability construct, knowledge alone may not change behavior; the individual also has to be equipped with the skills necessary to change the behavior. Students skills and knowledge of physical activity could be improved by promote mastery learning through skill training and increase knowledge. Mastery of skills could be attained through observation and modeling of the correct skill by the instructor or expert through videos and game simulating technology for the students. Then through practice, repetition of the skills, evaluation or assessment, and feedback students was able to acquire mastery of those skills.

One of the studies that examined the effective of using technology to model motor skill acquisition was done by Smith (2004). In the study, students learned how to perform a golf swing by modeling the skill on a video. Participants were randomly assigned to a control group, a single view of the video group, and multiple view of the video group. The findings indicated that the single and multiple group participants' performance improved from pretest to posttest more significantly than the control group. By viewing the video modeling of the golf swing participants were able to significantly improve their skill acquisition and performance level. A similar study was conducted by Huang (2000) with college students and focused on acquiring and improving their golf swing. The participants also were assigned to groups and were asked to do three corporative learning training phases during video instructions. The finding indicated that participants that were actively engaged in corporative learning and video learning performed better than the students with no video model.

Consequently, the research suggested modeling is important to student skill acquisition and improvement in performance. If students are equipped with practical knowledge that they can apply to their daily lives about why it is important to participate in physical activity, then

there is a possibility that their beliefs about what they are capable of doing will be impacted. Hence, once behavioral capabilities changes are accomplished self-efficacy also improves.

The Flipped Classroom Approach Application in Education

In view of the fact that the research literature has associated the FCA with student centered learning (Brame, 2013; Hughes, 2012; Ropchan & Stutt, 2013). It is believed that the students that possess high self-efficacy and self-regulation are the one who are more likely to enjoy this type of learning environment and benefit tremendously from the new pedagogical method in education (Cheang, 2009; Froyd & Simpson, 2008; Montalvo & Torres, 2004), the FCA. In the literature, the FCA may be referred to as the inverted classroom or reverse instruction. One of the simpler definitions for the FCA is that “the standard lecture in-class format is replaced with opportunities for students to review, discuss, and explore the course with the instructor in class” (Hughes, 2012, p. 2434). Berrett (2012) also describe the FCA as information provided outside the classroom through watching recorded lectures or listening to podcasts and inside student complete homework, solve problems with professors and peers, and apply new knowledge to various contexts. However, the operational definition for the FCA in this study was a pedagogical approach that consists of active, problem-based, peer-assisted, cooperative and collaborative learning, and skill acquisition and development inside the classroom and video recorded lectures are accessible to students outside of class time.

The FCA is steadily being practiced in the academic fields of science, engineering, and mathematics. Research on this approach in physical education, at any academic level, is scarce. The FCA encompass a unique combination of learning theories with a focus on student centered learning. These theories primarily came from the works of Piaget (1967) and Vygotsky (1978).

Theories that fall under the umbrella of student centered learning included active learning, problem-based learning, peer-assisted learning, cooperative learning, collaborative learning, and peer tutoring. The pedagogy of the FCA began with educators and practitioners who wanted to get students more involved in their learning process. Some background information about the people that started this initiative and research literature about the positive learning outcomes that were obtained as a result of the implementation of the FCA is provided below.

Even though no one individual could claim that there were the founder of the FCA, a few people were credited with pioneering and popularizing it. They include educators Eric Mazur, J. Wesley Baker, Maureen Lage, Glenn Platt, and Michael Treglia, and Salman Khan. Baker (2000), a distinguished professor in communications at Cedarville University was the first to describe the FCA. He first presented the idea in (2000) at the 11th International conference on College Teaching and Learning. His practical application was when he tried to find more class time to engage student with the material without taking away what the curriculum specified. Baker then began to provide his collegiate students with online lecture notes and allocated class time for group work and practice problem. At the end of the course, when students were surveyed, they reported that they received more personalized attention, had autonomy over their learning, and think more critically about the material (Bathker, 2013).

Lage, Platt, and Treglia (2000) coined the classroom model 'inverted.' Their model was identical to that of Baker (2000). Collegiate students in an economic class were given the option to review videotape lectures or narrated PowerPoint outside of class and work practical problem and experiments in groups. The result from their experiment showed that the female student preferred the inverted classroom over the traditional, they enjoyed working in groups, work harder, and learn the content better.

Another pioneer was Eric Mazur, a professor at Harvard with his colleague Catherine Crouch. In their research, they described a form of FCA in which they referred to as “peer instruction.” In this approach “students are required to first gain exposure to the content prior to class, and used assignments (in this case, quizzes) to help ensure that students come to class prepared” (Brame, 2013, p. 3). Students in the class answered conceptual questions voluntarily via clickers. The questions that were answered incorrectly more than 30% of the time were discussed by allowing students to form small groups to re-examine the question outside of class. After students group discussions, the instructor would provide feedback along with the correct answer to the question.

Furthermore, Salman Khan who was credited with popularizing the FCA, created a large library of YouTube tutoring video in varying academic areas to provide educational instruction. His idea came about when he decided to tutor his cousin that was overseas. Khan began to create online videos to teach his cousin, and by putting them online he soon realized that there were being viewed by people nationally and internationally. Therefore this is how the idea for The Khan Academy emerged. Currently, his work is revolutionizing traditional models of teaching in all areas of education.

Since the FCA is relatively new to the field of education, research conducted in the area is incomplete. However, the few studies that have examined FCA as a pedagogical approach has described the benefits to implement the FCA in education:

The FCA increased teacher student interaction, fosters a student centered classroom, personalized experience, help struggling students, presented course content in short segments, reduce classroom management problem, use technology to integrate the digital

language of students, and create and use videos that can be used to enhance exam preparation (Ropchan & Stutt, 2013, p. 6).

Brame (2013) also saw benefits of FCA in addition to free time in class that was available to spend on analyzing, evaluating, and creating; when students get involve and participate in “problem solving in groups, exploring, and constructing their own knowledge with help from peers and instructor” (p. 7). Additional research conducted using FCA included Bergmann and Sam (2012) who were the first high school teachers to implement the approach. In their chemistry class, they recorded narrative PowerPoint to cater to student that would be absent from school. They soon discovered that students were watching the videos to study and review course materials. This new phenomenon freed up class time which allowed them to do interactive activities and student centered reviewed of content. Bergmann and Sams (2012) in their analysis of the FCA made generalization to physical education by suggested that physical education teachers can use the FCA to explain the rules of games and as a means to increasing class time for physical activity.

Similar research done within the science field with the FCA was conducted by Lents and Cifuentes (2009). They experimented with major level biology courses offered at a college level. The results from the study yield no statistical different between video lectures and in class lecture. One group received lecture in the traditional form while the experimental group received and reviewed voice over PowerPoint lecture from home. The two groups’ exams results were similar for the first exam despite the differences in approach. After administering a survey to obtain students feedback they discovered that the reason why no difference was not seen among groups was a as result of poor delivery method of the online videos because students had trouble staying focus. However, after an appropriate delivery method was implemented students that

received the video lectures grades improved greatly. Day and Foley (2006) study also provided some evidence of successful learning outcomes that resulted from the FCA in their research. The findings derived from their study indicated that students in an FCA group scored higher on all homework assignments, projects, and tests in a computer interaction course.

In addition, assessment from students in an introductory Biology class indicated significant gain in learning outcome when using multimedia vodcasts compared to those viewing class lectured captured videos (Walker, Cotner, & Beermann, 2011). The experiment performed by Marcey and Brint (2012) yield almost similar results as well. They determined that during the first half of the semester significant differences in learning were observed with the flipped classroom students performing better on all exams and quizzes. However, in the latter half of the semester students in the tradition class had learn about the online lecture and had added them to their viewing so the differences in the assessments disappeared.

Mason, Shuman, and Cook's (2013) study compared the effectiveness of an inverted classroom to a traditional classroom in an upper-division engineering course. The findings indicated that:

The inverted classroom allowed the instructor to cover more content and resulted in students performing as well or better on comparable quiz and exam questions and on open-ended design problems; and while students initially struggled with the new format, they adapted quickly and found the inverted classroom format to be satisfactory and effective (p. 1).

When applying this approach to collegiate introductory Physics classes, Sadaghiani (2012) study divulged that students understanding increase when online prelectures were followed by analytical problem solving. Implementing the FCA to the field of mathematics, Strayer (2009)

compared an inverted statistic class to that of a tradition class. He used a mixed method approach to describe “personalization, innovation, student cohesion, task orientation, cooperation, individualization, and equity” (Ropchan & Stutt, 2013, p. 9). The findings indicated that students in the FCA had a greater preference for innovation and cooperation than those in the traditional class. While studies have reported the enormous learning outcome benefits from implementing the FCA, this pedagogical approach could also prove to be challenging if proper planning and execution of the approach is not done correctly. Some of the challenges that educators and practitioners could encounter while implementing this approach is described below.

Possible Issues of the Flipped Classroom Approach

These are several “cons” to implementing the FCA. Herreid and Schiller (2013) identified some issues that programs might face when implement the Flipped Classroom Approach (FCA). One of the major problems is that students who have never been exposed to the approach or style of teaching will be resistant because it requires them to work at home. The success of the approach depends heavily on student preparation outside of the classroom. Teacher will have to spend significant amount of time to prepare lecture videos and adequate assessment will need to be given to assess student interaction and use of out of class information. Additionally, homework and assignment will also need to be specifically tailed to prepare student for in class activities. In order for this approach to work and produce an gratifying learning experience for both the educator and the students, the implementation of strategies described below are necessary.

Strategies used in implementation of the Flipped Classroom Approach

Research (Moore, 2013; Nielsen, 2013) has suggested several strategies suggested for educational effectiveness when implementation the FCA includes, planning and organizing your course prior to the beginning of the semester. Making adequate use of online video resources that were created by other educators and professional in education that may pertain to you class content. It is not required that you should “flip” the entire class, start by flipping a segment of the class that has a substantial content base. The students were introduced and familiarized to the FCA and the FCA was explained to them as it related to why you as an instructor believe that it will be beneficial to them and produce a more positive learning outcome. Use the videos as a guide to the lessons so that students could actively watch the videos. That may require posing a question at the beginning of the videos to get the students to start thinking critically; structuring the videos similar to that of an outline by putting information into context, setting expectations, and encouraging students to view and review the videos; and embedding short graded quizzes or self-assessments within or at the end of the videos. Use videos as a platform for focusing discussions and stimulating critical thinking among students. Use free class time to do collaborative projects, encourage social interactions, and provide peer support and peer-assisted skill teaching

Technology use in Collegiate Physical Education courses

Successful implementation of the FCA is austere dependent on the effective use of technology to supplement learning in the classroom. Research has demonstrated that, the use of iPads and personal computers for collaborative group projects, viewing of skills demonstration, recording student skills execution and providing immediate feedback, record keeping, providing class announcement, and to complete quizzes and discussion postings are effective.

Furthermore, by creating videos and voice over Power-Points of the conceptual and skill development information online that are initially taught in class, technology can assist in the process of freeing up more class time for practice in the FCA unit. In the physical education field technology research has been growing in K-12 education but minimum investigation has been conducted into its use and application in collegiate physical education. More research is needed to fill the gap and provide a better understand into the use of technology, the guidelines for its implementation and application, and also to provide insight into both student and teacher perspective about its effectiveness in physical education. Key research that has examined the effectiveness of technology and how it was used in physical education is discussed next.

The types of technology used in collegiate physical education included but is not limited to computers, video recording equipment, projectors, interactive presentation boards, audio system, software programs, sport equipment such as treadmill, elliptical and cycle trainers, bioelectrical impediment devices, skin folds, accelerometers, heart rate monitors, interactive dance machines, wiki, dartfish, iPad, Nintendo Wii, and Xbox Kinect (Goktas 2012; Hastie & Casey, 2012; Woods, Goc, Miao, & Perlman, 2008). These technological devices and tools have been used in physical education for assessments, providing feedback, individual development, and aiding visual learners (Woods, Goc, Miao, & Perlman, 2008).

Finding effective ways to use technology in collegiate physical education is still in its initial stage of development. It has been suggested that “educators could best use technology within a framework of technology-based teaching and learning that focuses on engagement” (Gubacs, 2004, p. 33). One of the most recent investigations of technology usage in collegiate physical education was by Hastie and Casey (2012). The study examined three case studies that investigate using Wiki to create communities of practice in physical education. Findings indicate

that students were not constrained by time and that using wikis support formal and informal learning.

In addition, Thornburg and Hill (2004) study found that technology used in physical education programs enhance motivation for material and learning, created a learning environment that encouraged students to be actively involved in the learning process, and was effective in facilitating learning and student interaction. Studies by Kachel, Henry and Keller (2005) and Oblender (2002) indicated that online learning in physical education using hybrid or blended models can also provide valuable web-based supplemental content through online assignments, readings, chat rooms and examinations, coupled with face-to-face, activity-based sessions. Similarly, research by DelTufo (2000) indicated that using the internet provided student with a global community to interact and learn from and with; made resources more readily available, stimulate critical thinking, increase computer literacy in students, and heighten enthusiasm for teaching among teachers.

Technology usage in the classroom is advocated by professional bodies in education such as the National Association for Sports and Physical Education (NASPE). In NASPE (2009) position statement, four guidelines were proposed for appropriate use of instructional technology in physical education. These guidelines were: a) use instructional technology as a tool for increasing instructional effectiveness; b) supplement, not substitute for effective instruction; c) provide opportunity for all students; and d) use as a resources for maintenance of student data. The National Education Technology Standard (2007) project also advocated for the appropriate use of technology in physical education and they suggested six standards that focus more on student's use of technology in the classroom. These standards were: a) technology inclusion should be based on student demonstration of proficiency in operation, systems, and concepts; b)

develop digital citizenship that exhibit a positive attitude for ethical and social issues relating to technology; c) use for demonstration of creativity and innovative thinking that leads to knowledge construction, products, and processes; d) use appropriately as a research and information fluency tool to gather, evaluate and utilize information; e) use appropriately as a communication and collaborative tool; and f) display competency in using it as a problem-solving, critical thinking, and decision making tool.

With the guidelines set forth by these agencies, physical educators are still reluctant to implement technology into their instructional programs. Therefore there were few studies that investigated how students and teachers view technology use and some of the approaches used to improve efficiency in teaching as a result of technology application in physical education and activity-based programs. In a recent study conducted by Goktas (2012) on a pool of collegiate students and pre-service physical education teachers' attitude towards information and communication technology, the researcher found that students and pre-service teachers had a positive attitude toward information and communication technology. Findings also indicated that there was a correlation between their attitude, gender, computer ownership, and computer instruction. When students were surveyed about whether they believed that technology enhances or increases time available to participate in physical activity there were varying responses. Some students believe that there is too much reliance on technology while others indicated that more time is available, there is an increase in fun and enjoyment, and learning is stimulated as a result of technology utilization in physical education (Scott, Martin, & Browning-Johnson, 2012).

Gibbone, Rukavina, and Silverman (2010) study was more explicit in its approach to understanding the reluctance to use of technology by physical education (PE) teachers. When examining PE teachers' attitude and practice with physical education, they discovered that

teachers had positive attitude toward technology integration, yet they did not use it. They identified that the teachers reluctance might have been in-part to barriers like budget, class size, and training. Additionally, André (2013) research conducted in physical education that undertook the issue of technology implementation. The researcher study investigated technology integration into a student design game unit of physical education. The participants were assigned to a technology and non-technology group. The finding from the study revealed some differences between the technology and non-technology group. The technology group had greater autonomy during the unit while enjoyment, interaction, and communication were greater in the non-technology group. There were also some differences in gender; the boys were focused on strategic games designs while the girl focused on logical games designs. Technology implementation into the unit allowed for equality among students because there were able to share their ideas through online discussions. In Sinelnikov's (2012) study that investigated how iPads were used during a sport education volleyball season to support learning among students, the researcher discovered that the use of the iPad allowed students to have some autonomy and become active participants in their learning. During the process, peer instruction increased while students became familiarized with the iPad, instructional videos, and apps.

Conceptual Physical Education in Higher Education

Beside the emergence of technology implementation in physical education, most colleges and universities physical education courses are still taught in the tradition way, that is, teaching activity and skill base courses that will enable students to participate in team or individual sports and leisure activities. Historically, the purpose for physical education was to “encourage students to develop and maintain healthy lifestyles and to introduce them to new skills for lifelong

participation in physical activity and sport” (Hardin, Andrew, Koo, & Bemiller, 2009, p. 72).

The physical education programs were referred to as a basic instruction program (BIP). BIPs are activity or skill-base courses that usually occur in a gymnasium, studio, swimming pool or a field-base setting and are aimed at fitness development, skill development, and or individual team sport participation” (Cardinal, Sorensen, & Cardinal, 2012, p. 507-508). However due to the demands for physical education to become more academically based and better address the health and wellness needs of the students and nation in general, a conceptual component was added to the BIP. This conceptual component was considered as Conceptual Physical Education (CPE). The CPE course generally consists of a skill and physical activity base component as well as a conceptual/cognitive component. This makes it appropriate for the implementation on a FCA unit because the FCA requires a cognitive component as well as time in class for practical application. To provide a better understanding of how the CPE courses are conducted, the content presented, and the benefits that student derived from these coursed were explained in the review of literature below.

Conceptual Physical Education Research

As collegiate climate change with the enormous encumbrance of becoming academic elitist and emphasizing the importance for high quality academically-incline programs, collegiate physical education programs started to encounter a rectification from BIP to CPE courses. Corbin and Cardinal (2008) were two of the first researchers to conduct studies about CPE course. After students were challenging the need of BIP requirements for graduation in the mid-1900s, the CPE courses were introduced to add some academic content to BIP in physical education and to make it more of an academic program that offered more credit hours.

Consequently, the CPE courses empowered student to become “independent consumers that are knowledgeable about their own health and well-being” (Kulinna, Warfield, Jonaitis, Dean, & Corbin, 2009, p. 128). The BIP courses that were traditionally one credit are currently two and three credit courses with the CPE component. Corbin and Cardinal (2008) extensive literature review of CPE courses expressed that the courses “emphasized the importance of knowing why physical activity was important as well as knowing how to perform activities” (p. 474).

There were some uncertainty about CPE in its early stages so the courses were not widely offered in colleges and universities. This sparked continued investigation into the courses. One of the studies conducted was that of Kulinna et al (2009). They concentrated on the “progression and characteristics of conceptual base fitness/wellness courses at American universities and colleges” (p.127). According to the responses from 161 faculty members that completed the conceptually based fitness/wellness course survey, the most commonly taught course content was nutrition while the least was movement fundamentals.

Strand, Egeberg, and Mozumdar (2010) also provide a basic overview of health related physical activity and fitness courses in colleges and universities. They described the two types of courses and how they are structured. A nationwide survey was administered to institutions that offered health related fitness and physical activity courses. The responses from one hundred and twenty eight, two and four years institutions indicated that the most frequently covered conceptual topics were physical activity, components of fitness, overweight and obesity, stress management, and nutrition, in that order. The authors identified a trend of CPE being offered via hybrid or blended format by several institutions. The assumption made is that it reduces class inactivity time by moving a significant part of the course online. They suggested that further

research must be done to answer the question of whether CPE content offered online can more effectively teach the “why” and “how” of lifelong fitness.

In a more recent study of CPE, Keating et al. (2012) analyzed higher education CPE courses. Class syllabus was collected from eighty-six colleges and universities. They argue that colleges and universities physical education program should focus on “health related fitness knowledge, skills, and values, experiencing regular participation in PA, and promoting healthy nutrition choices to achieve active lifestyles” (p. 38). These findings were very similar to what Corbin and Cardinal (2008) and Strand, Egeberg, and Mozumdar (2010) had reported in their earlier studies. CPE courses content comprised of nutrition, weight control, and physical activity and fitness which is consistent with content covered over the years. The argument is that course content should cover areas that will help students to adopt healthy behaviors. Keating et al. (2012) research has also shown that health related fitness knowledge has not translated into correction of physical activity behavior. They suggested that in order to foster physically active in students, content and assignments must be included in CPE courses. Focus should also be on skill-related fitness assessment along with physical activity and health related fitness assessments. This content should also teach student recent understandings about the knowledge and skills needed for lifelong physical fitness (p. 43). Although CPE courses focus on knowledge mastery, there is need to strengthen skill teaching and learning to help student to solve practical problems in their daily lives, for example joint pain and back pain could be alleviated with increase in flexibility and muscle strengthening exercises.

Jenkins, Jenkins, Collums, and Werhonic (2006) also investigated student perceptions of the conceptual physical education (CPE) courses. The participants were collegiate students enrolled in 10 CPE activity courses with critical incident response forms. The course format

was very identical to the multidimensional courses mentioned in earlier studies by Hensley (2000). There was a physical activity and a conceptual aspect to the course. The conceptual part of the course covered nutrition, health and wellness, behavioral, and sexual disease. The result from the study indicated that students perceived physical assessments and wellness assignments, pedagogical techniques, and peer interaction as vital to their CPE experience. Conversely, the class meeting time, classroom management, and unstructured team disrupted their experience. Due to the cognitive nature of the CPE courses, most of the research emphasis was on student health knowledge. Additional studies used descriptive statistics to assess student pre and posttest knowledge on nutrition and the health related fitness areas of physical education (cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition). The pre and post test results demonstrate that student knowledge in the physical activity and health improves significantly with CPE courses and that the knowledge is retained over their college years (Adams, Graves, & Adams, 2006).

Heinrich, Maddock, and Bauman, (2011) study went further than supporting the premise that CPE courses do improve student knowledge of physical activity and health. They explained that knowledge of physical activity guidelines does not necessarily translate into a conscious decision to be physically active. However, if individuals are knowledgeable and have certain outcome expectancies, then this will have some positive effects on their physical activity participation. In other words, it could be presumed that as student knowledge about physical activity improves as a result of CPE courses, it is likely that their self-efficacy toward physical education will increase and they will be better able to self-regulate their participation in physical activity as well. Therefore the promotion of health benefits due to being physically active is very vital in addition to the recommendations provided by experts.

Despite all of the benefits that were obtained from having CPE courses, there were still perpetual issues with physical education that needed to be addressed. Mohr, Sibley and Townsend (2012) in their research described detrimental aspects of physical education identified by students that enroll and engage in collegiate physical education courses. These negative aspects to physical education included “lack of variety in activities, failure to address certain content, poor classroom management, lack of physical and intellectual challenges by the course, and no connection with classmates” (p. 295).

In addition, Fox, Cooper and McKenna (2004) point out that traditional K-12 physical education courses is not long enough in duration to meet the daily activity requirements and that 25% of physical education time is spent in passive activities. Instruction time, while certainly a necessity, takes away from overall activity time which may also lead to students not always participating in physical education at a health enhancing level of intensity. These issues mentioned by Fox, Cooper and McKenna (2004) have filtered down to collegiate physical education in which lack of time was proven to have profound influence on the variation of lesson teacher delivered in class (Morgan & Hansen, 2008).

Integrating Flipped Classroom Approach to Collegiate Physical Education

In physical education there is need for a pedagogical approach that could be used to resolve the problem of lack of time to complete activity, lack of variety of physical activity in lesson plan, lack of technology implementation to enhance effectiveness in physical education and activity program, and inability to meet national guideline and requirement set forth by the National Association for Sport and Physical Education (NASPE, 2007) for university physical education instruction program. These guidelines states that:

A quality university physical activity instruction course should aim to promote appropriate behavioral changes method to improve health, enhance student intrinsic motivation to engage in physical activity, and facilitate the acquisition and development of skills and knowledge students need to practice a healthy lifestyle (p. 2).

The FCA review of literature provided immense support for the implementation of this approach to meet the above mentioned requirements and guidelines in physical education in the collegiate setting. This approach had been accredited for ‘freeing class time for interactive activities such as active, cooperative, and problem-based learning; for reinforcing course materials without sacrificing content; allowing educators to present course materials in a variety of format so as to engage student in a variety of learning styles and preferences; and help students to become active-learners and lifelong learners (Burge, & Helmick, 2007; Gannod, Burge, & Helmick, 2009; Lage, Platt, & Treglia, 2000; Zappe, Leicht, Messner, Litzinger, & Lee, 2009)

The FCA has a student center learning focus and could provide a stimulating and enjoyable learning environment for students. A trademark of this approach is that with the conceptual and skill based aspect of the class being available outside of class time, students will have autonomy over there learning and more time was available in class for physical activity. This approach allows students to self-regulate their participation in the unit by deciding when to watch online video, practice skills on videos, listen to online lecture, complete assignment, and participate in group activities, at their convenience and within the assigned timeframe that was given by the instructor.

In a synopsis, urgency is required in the traditional pedagogical approach delivering collegiate physical education and activity program course content and activities. Profound responsibilities are placed on practitioners and educators to help combat the disease of obesity that is plaguing our society, so the approach to collegiate physical education and activity calls for necessary changes. Therefore this study seeks to examine how the implementation of the FCA can impact the engagement of students and instructional delivery of collegiate physical education content. The effectiveness of the approach was assessed through the examination of the following questions:

1. Does the FCA instructional model, implemented during a collegiate physical education unit, impact physical activity skill development?
2. Does the FCA instructional model, implemented during a collegiate physical education unit, impact content knowledge acquisition and retention?
3. What are collegiate students' perceptions of the FCA instructional model during a collegiate physical education unit?
4. What are the teacher perceptions of the FCA instructional model during a collegiate physical education unit as it relates to pedagogical effectiveness?
5. Does student self-efficacy and self-regulation impact the FCA instructional model during a collegiate physical education unit?

Chapter 3: Research Methods

Introduction

The purpose of this research was to explore how the implementation of a Flipped Classroom Approach (FCA) unit impact on the engagement of students and the instructional delivery of collegiate physical education content. All across the United States, colleges and universities are advocating a physically active and healthy lifestyle among their young adults population due to proliferation in awareness of obesity. One major area of focus that is addressed to combat this issue is improving basic instruction programs (BIPs). The lack of time to complete activity, lack of variety in lesson plan, lack of technology implementation to enhance effectiveness in physical education and activity program, and the inability to meet national guideline and requirement for physical activity are among some of the common issues about BIPs that is reported in the research literature. The FCA is proposed in this research as an effective instructional approach to alleviate issues with BIP. This chapter explicates the research methods that was used in his study.

Research methodologists recommend that the procedures employed in research to collect and analyze data should be determined by guiding research questions and practical judgment to attain rich descriptive data within the research setting (Denzin & Lincoln, 1998; Strauss & Corbin, 1998a). They are several questions that were used to guide this research, they include: 1) does the FCA instructional model during a physical education unit impact skill development in collegiate physical education? 2) does the FCA instructional model during a physical education unit impact content knowledge acquisition and retention in collegiate physical education? 3) what are collegiate students' perceptions of the FCA instructional model during a collegiate physical education unit; 4) what are the teacher perceptions of the FCA instructional model

during a collegiate physical education unit as it relates to pedagogical effectiveness; 5) does student self-efficacy and self-regulation impact the FCA instructional model during a collegiate physical education unit?

As a result of the research purpose which focuses on, exploring a unit of the FCA in collegiate physical education, the researcher employed both the qualitative and quantitative case study methodology. The qualitative data was the center of the case in addition to significant quantitative data that was reported. In an attempt to provide a comprehensive description about the effectiveness of the FCA in collegiate physical education, student and teacher interviews, field observation, student skills rubrics, surveys, knowledge and fitness tests, pedometers, and audit trail are instruments that were utilized for data collection and analysis.

Research Design

Case study in education research is applied to acquire and expand deeper understanding of a phenomenon through exploration of the processes and context involved in the phenomenon (Merriam, 2001). For a research to be considered a case study it has to possess these characteristics: 1) is an analysis of a unit or bounded system, e.g. an individual, program, event, group, etc.; 2) include multiple sources of data, (e.g. observations, interviews, audiotapes, reported documents, etc.); and 3) be intensely descriptive (Creswell, 2007; Merriam, 2001). Case studies are frequently conducted in the field of anthropology, history, sociology, psychology, and education. As a result of case study profound contingent on multiple forms of data, both qualitative and quantitative research methodology could be employed with this approach (Yin, 2003). Several of the case study approach characteristics are embedded within this study. The study was bounded by the BIP's institutional context (i.e., curriculum, students, geographic

location, departmental policies, etc.); incorporated several sources of data such as interviews, observation field notes, rubrics, surveys, knowledge and fitness tests, pedometers, and audit trail; and is intensely descriptive based on the variety of aforementioned data.

The Case

This research was conducted at a southeastern research institution during the spring academic semester. A collegiate muscular strength, flexibility, and cardiorespiratory fitness physical education course with two sections were examined. This course was selected because it consist of both low and high level skills and physical activity movement, along with a conceptual aspect that makes it appropriate for the implementation of the FCA unit. The course was three days per week for 50 minutes. An FCA unit was designed and given to the teacher to be implemented into both section of the course. The unit was 12 weeks long and allowed for adequate time needs for students to learn through improvement and connectivity (Papert, 1996). In order for the participants to experience the FCA in its entirety time must be allocate for: 1) familiarization with the FCA, participate in peer and group activities (initial engagement); 2) use technology to learn skills acquisition and knowledge about exercise and health awareness, to create exercise routine, watch videos and audio lectures, access educational website, and discussion boards (concept exploration), complete tests and quizzes (critical thinking); and 3) design exercise routine (demonstration and application), see Figure 1.1. This process is similar to David Kolb's (1970s) experimental learning model's four elements that included concrete experience, observation and reflection of experience, using reflection to formulate abstract concepts, test new concept, and then repeating the elements over again.

The FCA unit consisted of thirteen major muscles exercises that included; 1) squat, 2) dead lift, 3) bench press, 4) calf raises, 5) bicep curl, 6) hip abduction, 7) back extension, 8) bent-

over rows, 9) push-up, 10) lunge, 11) triceps kick back, 12) sit-up, 13) shoulder press. The frequency and type of exercise was aligned with ACSM (2011) recommendations for resistance exercise for adults, 2-3 day per week working the major muscle groups. The skill acquisition and development of these exercise skills along with contextual knowledge about the exercises and its respective importance to maintaining a healthy and active lifestyle was delved into during this unit.

The FCA unit began with introducing and familiarizing participants to the FCA by providing an introductory video of what the FCA is and some rationale for the teacher implementation of the unit. A exercise skill, 3 minute step test, and a Health Related Fitness Knowledge (HRFK) pre-test assessment was conducted to gauge where the participants were currently in terms of their skill level, physical fitness, and their HRFK level. The students were also administered a pre-test self-efficacy and self-regulation survey to assess their behavior and attitude toward physical activity. Participants was paired with peers for physical activity sessions throughout the unit and skills was demonstrate using exercise videos online and practiced in class. This followed with week 2-11 participants actively being engaged in their learning by viewing online lecture about the HRFK of physical activity, watching videos of the thirteen major muscles exercises and demonstration of the correct techniques about how to perform these exercises, as well as learn about the importance function that the thirteen major muscles group exercises have in physical activity and health. To ensure that these online content were viewed, 10 short lecture quizzes and thirteen exercise quizzes were administered at the end of each lecture. During the unit students were also engage in practicing how to write their own personal exercise program.

Varying exercises were also incorporated into the class physical activity time to encourage group work and collaboration among students such as wheel barrow, farmers carry, a deck of cards, and circuit championship. Student were often placed in groups of 3-5 to complete these activities. Initially the unit required that at the midpoint the students was placed into groups to work together to create a one week exercise routine for a client with specific exercise goals. However, due to class unforeseen weather interruption of class time, the students were asked to write their own personal exercise program base on their weekly goals. At the beginning of each week students were required to turn in the log sheet that contained the length of time spent doing the exercise, intensity, type of exercise, and the goals that they had for the week. To assess the student physical activity level in the class, the students were given pedometers to wear for two weeks during class that measured their step count, activity time, and moderate to vigorous physical activity level.

Throughout the unit the teacher and students also engaged in discussion prior to the start of their exercise routine and at the end of class session. The discussions were informal and was centered on questions or concerns that the students had pertaining to their weekly goals or physical activity and health. Additionally, at the end of the unit an exercise skill test, 3 minute step test and a HRFK test was conducted to assess participants' skill proficiency of the thirteen major muscles exercises and acquisition and retention of their HRFK. The self-efficacy and self-regulation survey were also administered at the end to assess the change in students behavior and attitude towards physical activity. See Appendix A for a detailed description of the FCA unit

Figure 1.1. Student Progression Through the Flipped Classroom Approach

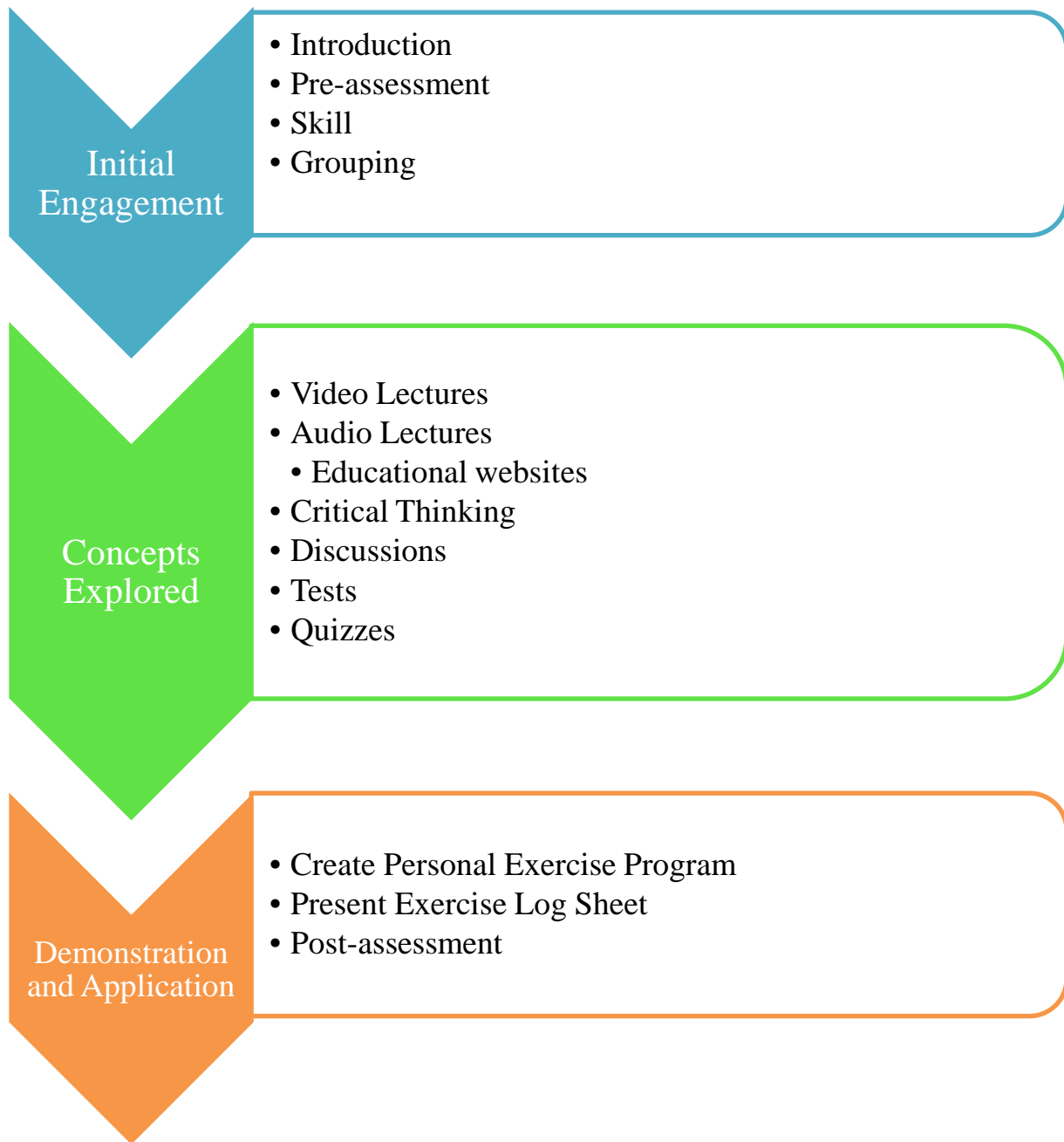


Figure 1. Student progression through the FCA unit begins with their initial engagement with the approach followed by conceptual exploration both inside and outside of the classroom. In the end student will apply and demonstrate what they have learned from the unit.

Participants

The participants in this study consisted of collegiate students and a teacher from an accredited southeastern university. Participants were both male and females over the age of 19. The program under investigation was a basic instruction program (BIP) that also offers conceptual physical education (CPE) courses that comprised of these components; muscular strength, flexibility, and cardiorespiratory fitness. For this research, a course that offered two sections and that was taught by the same instructor was selected. There were fifty six (56) students combined for the two section and of those forty five (45) students volunteered to participate in the study. The duration of the BIP/CPE courses was 50 minutes, three days per week. The instructor that taught both classes was a graduate teaching assistant, who was hired and trained by the kinesiology program coordinator (faculty member) in the department. The teacher also had some expertise in kinesiology, exercise, or sports.

As a result of the bounded nature of the study the recruitment of participants was done through convenient sampling. According to Merriam (2001), convenient sampling is an investigator deliberate attempt to select a population that has the most insightful information about the phenomenon being investigated and that are readily accessible. Therefore one course with two sections was selected. The students and teacher in this section was recruited by email followed with face-to-face interactions to explain the purpose and procedures of the study. Participants in the study were required to complete in class surveys with pseudonyms that they have selected. In addition to the in class surveys, there were also asked to participate in an informal semi-structured one-on-one interviews. In the teacher case, there were two informal semi-structured one-on-one interviews that was conducted one month into the unit and then at the end of the unit. The interviews participants were based on convenient sampling, that is, the

availability of volunteers obtained for participation in the interviews. There were fifteen (15) students that volunteered to participate in the interview.

Students were selected to participate in this study base on the following criteria: the student must be 19 years of age or older; be a collegiate student enrolled in a muscular strength, flexibility, and cardiorespiratory fitness course in the kinesiology program during the semester of the study; and was willing to participate in physical activity. The students that meet these criterions were selected to participate in this study. The volunteers were given an information letter about the study and an inform consent forms to sign that was approved by the Institution Review Board (IRB) of the institution.

Data Collection Team and Training

As a result of the rigor of the rubric assessments and the number of students that participated in the study, I received assistants in the data collection process from two of the graduate researchers within the field of kinesiology who were trained in the collection of data as it pertains to the exercise skill pre-test and post-test assessments. A one day training session was held so that the researchers could learn the thirteen movement skills and the criterions for performing those skills correctly.

Data Collection

The data collection process for this research will integrate the use of several instruments such as rubrics, surveys, interviews, field notes, and audit trail. The uses of these instruments throughout the study are contingent upon the guided-questions in the research. See Table 1.1 for a summary of the decision protocol. The research questions and instruments used are also described below.

Table 3.1

Summary of Research Decision Protocol

Research Components	Guided Questions	Data Collection		Data Analysis	
		Qualitative	Quantitative	Qualitative	Quantitative
Knowledge	Does the FCA unit impact content knowledge and retention in collegiate physical education?		HRFK Test Pre-test Test at the end of the unit		Mean SD Paired sample t-test
Skills	Does the FCA unit impact Skill Development in collegiate physical education?		13 Skills Rubrics Pre-test Test at the end of the unit		Mean SD Paired sample t-test
Student Perceptions	What are student perceptions of the FCA during a collegiate physical education unit?	15 Interviews		Transcription Open coding Comparisons Patterns Categories- Themes	
Teacher Perceptions	What are the teacher perceptions of the FCA during a physical education unit?	Middle, and End of unit Interviews		Transcription Open coding Comparisons Patterns Categories- Themes	
Additional Assessments		Teaching methodology survey pedometers 3 minutes step test		Transcription Open coding Comparisons Patterns Categories- Themes	Mean SD Paired sample t-test Univariate analysis
Student Self-efficacy Self-Regulation	Does student self-efficacy and self-regulation impact the FCA unit?	Self-Efficacy survey Self-Regulation Survey			Mean SD Paired sample t-test

Note. FCA represents Flipped Classroom Approach, HRFK represents Health Related Fitness content knowledge, and SD represents standard deviation

Does the FCA instructional model during a physical education unit impact skill development in collegiate physical education?

The exercise skills that were analyzed in this question was assessed using rubrics developed from the National Strength and Conditioning Association Manual (NSCA, 2012). The NSCA is the worldwide authority on strength and conditioning and the manual is created to increase knowledge, skills, and ability in strength and conditioning. The assessment rubrics measured thirteen exercise movements, that is, 1) squat, 2) dead lift, 3) bench press, 4) calf raises, 5) bicep curl, 6) hip abduction, 7) back extension, 8) bent-over rows, 9) push-up, 10) lunge, 11) triceps kick back, 12) sit-up, 13) shoulder press. The areas of the movement that the rubric analyzed were the 1) start position, 2) the grip position, 3) head and eye position, 4) foot position, 5) torso, and 6) decent. The areas of the movements were measured on a 2 point scale, one point for poor execution of the movement and two points for excellent execution of the movement. The maximum score per exercise were 10 or 12 points while the minimum were 5 or 6 points because some of the exercises did not require any grip position assessment.

Does the FCA instructional model during a physical education unit impact content knowledge acquisition and retention in collegiate physical education?

To answer this question the Health Related Fitness content Knowledge (HRFK) adopted from The FitSmart test (high school edition; Zhu et al., 1999) in physical education was administered twice. A pre-test was conducted at the beginning of the unit to assess the participant current HRFK in physical education and a posttest assessment was conducted at the end of the unit to measure whether participants knowledge had improve or didn't improve. The test comprises of 29 questions that measures five fitness content constructs; concepts of fitness,

scientific exercise principles, components of physical fitness, effect of exercise on chronic disease risk factors, and exercise prescription.

The FitSmart test was validated through several procedures. The test was calibrated by using the Item Response Theory (Spray, 1989) that was also used in the development process of the Graduate Record Exam and for the English as a Foreign Language test. The content validity was determined by a panel of physical fitness experts who searched the literature and aligned the content to important aspects of physical fitness. The overall all domains were then divided into the five fitness content areas mentioned above. Reliability was established by using the Item Response Theory (IRT) mathematical model of the difference between an examinee response and ability and by administering a pilot test to 600, 9-12 grade students of varying social economic background.

Supplemental resources were also obtained from the Fit and Well: Core concepts and labs in physical fitness and wellness instructor textbook by Fahey, Insel, and Roth (2010). The text provided supplemental resources that covered the basic principles of physical fitness, cardiorespiratory endurance, muscular strength and endurance, flexibility, body composition, nutrition and wellness, and creating personalized exercise program. The validity of the information in this text was established from books, articles, community resources, and experts in the field of health and physical activity. The reliability of the test was determined by physical educators and health practitioners administering the content to collegiate students.

What are collegiate students' perceptions of the FCA instructional model during a collegiate physical education unit?

In order to understand or interpret a phenomenon it is necessary to conduct interviews with the individuals who are living the experience (Merriam, 2001). Therefore in order to gain

an understanding of the effectiveness of the Flipped Classroom Approach (FCA) in a BIP course it was important to understand how students perceived the unit of FCA. There were fifteen (15) one-on-one interviews conducted, ranging from 20-30 minutes in length with the interest of obtaining in-depth description of the effectiveness of the FCA. The interviews were informal semi structured; open-ended, conversational type questions centered on preparation before attending each BIP education session and what goes on during the course, along with follow up questions. In the semi structured interview with open ended questions, the researcher was able to directly concentrate on the phenomenon with the responder views and new ideas on the subject matter (Merriam, 2001).

What are the teacher perceptions of the FCA instructional model during a collegiate physical education unit as it relates to pedagogical effectiveness?

A similar approach to that described for the students' perceptions was used to gain an understanding of how the teacher perceives the FCA. There were two informal semi structured one-on-one interview, with open ended questions that was conducted at the middle and end of the FCA unit. The first interview examined the teacher's philosophy and method of teaching along with an exploration into the teacher's current perspective of the FCA, more specifically difficulties that maybe encountered with the approach, usefulness of the FCA, and comments or suggestions that can be useful to improve the FCA. The end of the FCA unit interview investigated the teacher's overall perception of the FCA unit relative to its instructional effectiveness and student learning.

Does student self-efficacy and self-regulation impact the FCA instructional model during a collegiate physical education unit?

Self-Efficacy

The self-efficacy scale that was used in this research was adopted from Albert Bandura (2006) guide for constructing self-efficacy textbook. The self-efficacy to regulate exercise presented several barriers that could make it hard for individuals to exercise three or more times per week such as weather, personal problems, feel pressured, depressed, anxious, exercise injury, other commitment, and family problems just to name a few. The scale consisted of 18 questions and the scores were modified so that they range from 0-10 instead of 0-100. The zero on the likert scale represented cannot do it at all, 5 represented moderately can do it, and 10 represented highly certain can do it.

Self-Regulation

The Self-Regulation Questionnaire (SRQ) was developed to assess the ability of an individual to develop, implement, and maintain a behavior in order to attain a goal (Brown, Miller, & Lawendowski, 1999). This survey was a modified version of the questionnaire created by Brown, Miller, & Lawendowski (1999). The original questionnaire was creating and establishing a seven step model for self-regulation. They included, receiving, evaluating, triggering, searching, formulating/planning, implementing, and assessing. For this study only three of the models were used, planning, implementing, and assessing because it was more pertinent to the research. Content validity for the questionnaire was established by the concomitant measures of research studies (Aubrey et al., 1994; Brown, 1994; Brown, Baumann, Smith, and Etheridge, 1997). Reliability was established by administering the SRQ to 83 individuals with varying problem severities. The test re-test reliability for SRQ was ($r = .94, p < .001$) and internal consistency was ($\alpha = .91$).

In the study the SRQ consists of 27 items and the maximum scores on the SQR was 135. Each subscale consisted of 9 question each. The scores were measured on a 5 point likert scale; 1

being strongly disagrees, 2 disagree, 3 uncertain or unsure, 4 agree, and 5 strongly agree. The range of interpretation for the scores are (≥ 102) is equivalent to high self-regulation capability, 101-92 is equivalent to intermediate self-regulation capability, and (≤ 91) is equivalent to low self-regulation capability. This is going to bear some implications as to an explanation into why the FCA was effective or ineffective.

Demographic Survey

A basic class demographic survey was used to identify student age, gender, race/ethnicity, year in school (classification), major, and physical activity behavior. Pseudonyms were used to identify the participants in the study so that the information from student demographic survey so that an association could be made between the students characteristic and their perception and attitude towards the FCA. From this information some generalizations are made about various groups of students in relation to the FCA.

Other Assessments and Instruments

The other form of data collected conducted and instruments used in this study to provide richer description of students and teacher perception of the unit included a teaching methodology survey, three minute step test, and pedometers. The teaching methodology survey was adopted from Tosta (2012) and was modified to include 30 closed ended and 4 open ended questions that measured students satisfaction of the teaching methodology used in the FCA unit. The student responses on the survey were based on a likert scale. Scores ranged from 1-5, 5 being the highest very satisfied and 1 being the lowest very dissatisfied, along with the response N/A, not applicable that was assigned a zero. The validity and reliability of the instrument was established

by a panel of experts and with a cronbach's alpha coefficient of .984. The 3 minutes step test was used to measure student cardiorespiratory fitness prior to the start of the unit and at the end of the unit. The testing procedures followed the American College of Sports Medicine (ACSM) guideline for exercise testing and prescription.

In addition to the two assessments specified above, the Gopher FITstep™ Pedometers were also used for two weeks of the unit. The pedometers recorded students moderate to vigorous physical activity (MVPA) as well as their steps count and activity time. Pedometers were calibrated to determined MVPA level of the students with a one minute brisk walk. The range at which the pedometers were set after the calibration of the pedometers was level 1-4.

Data Analysis

This study explored the effectiveness of implementing the FCA unit in two courses that consisted of muscular strength, flexibility, and cardiorespiratory fitness components in collegiate physical education by the. The components of the guided-questions that were examined in the study are Health Related Fitness content Knowledge (HRFK), skill development, student perceptions, teacher perceptions, and student demographic relationship to their perception and attitude toward the FCA unit. To properly address these components of the guided questions, both qualitative and quantitative methods, were employed. Case study analytical procedures (Creswell, 2007; Merriam, 2001; Yin, 2013) and paired sample t-test analysis was used to analyze the data.

Does the FCA instructional model during a physical education unit impact skill development in collegiate physical education?

The rubrics for the pre-test and the test at the end of the unit for the thirteen skills movement was analyzed by calculating the mean and standard deviation for all students. The

data was then imputed into the IBM Statistical Package for the Social Sciences (SPSS) version 21 for further analysis that involved the paired sample t-test analysis to establish a comparison between the actual scores on the pre-test and the test at the end of the unit.

Does the FCA instructional model during a physical education unit impact content knowledge acquisition and retention in collegiate physical education?

Similarly, the rubrics for the pre-test and test at the end of the unit of Health Related Fitness content Knowledge (HRFK) was examined by calculating the mean and standard deviation for all students. The data was then imputed into SPSS for further analysis that involved the paired sample t-test analysis to establish a comparison between the actual scores on the pre-test and the test at the end of the unit.

What are collegiate students' perceptions of the FCA instructional model during a collegiate physical education unit?

The first step in the analysis process involved transcribing the interviews data by verbatim so that the data could be presented clearly for analysis. This was followed by open coding, the codes are defined in a code book; codes were compared between transcription, observation, and field notes, the list was then merged to derive pattern; and from the patterns, categories/themes were formulated (Merriam 2003; Yin, 2013). The names assigned to categories were derived from the researcher, participant, and literature. Atlas.ti 7 qualitative data analysis and research software was used as an assisted tool in the analysis process.

What are the teacher perceptions of the FCA instructional model during a collegiate physical education unit as it relates to pedagogical effectiveness?

The teacher perception data was analyzed in the same manner as the students' data. The data was transcribed, followed by open coded, making comparisons, establishing patterns, and deriving categories and themes that were derived from the researcher, participant, and literature.

Does student self-efficacy and self-regulation impact the FCA instructional model during a collegiate physical education unit?

To answer this question the students completed a self-efficacy scale and self-regulation questionnaire prior to and at end of the unit to provide a comprehensive understanding of their perceptions and attitude of the FCA. These instruments were assessed similarly to the exercise skills test and the HRFK test. The final section of this chapter explained the process of validity and reliability undergone by this study. The mean and standard deviation for all students were included in the initial calculation. The data was then imputed into SPSS for further analysis that involved the paired sample t-test analysis to establish a comparison between the actual scores on the pre-test and the test at the end of the unit.

Other Assessments and Instruments

The paired sample t-test analysis was the analysis process employed for the 3 minute step test. The SPSS version 21 was used to establish a comparison between the actual scores on the pre-test and the test at the end of the unit. The teaching methodology survey mean, standard deviation, and range for all students were included in the initial calculation. The data was then imputed into SPSS for further analysis that involved the univariate analysis of the data. For the pedometer, the analysis process involved calculating the mean and standard deviation of the student activity level for MVPA, step count, and activity time. In the next section the validity and reliability of the study is described.

Validity and Reliability

According to Kemmis (1983), “what makes a case study work ‘scientific’ is the investigator critical presence in the context of occurrence of phenomenon, observation, hypothesis-testing (by conformation and disconfirmation), triangulation of participants’

perceptions, interpretation, and so on” (p.103). As such, one of the major concerns when reporting scientific research is making sure that the data collection and analysis process was dependable and consistent (Lincoln & Guba, 1985). They are several strategies that can be employed to establish validity and reliability in a case study. Some of the strategies utilized to validate case study research are triangulation, peer-reviewing or debriefing, bracketing or bridling from the onset of the study, member checking, and external audit (Creswell, 2007; Merriam, 2001; Yin, 2013).

There internal validity for this study was established through triangulation that involved the use of multiple forms of data to corroborate research findings (Creswell, 2007). In this study one-on-one interviews, observation, and field notes were triangulated to provide internal validity. Peer debriefing in this study was done with the research team to check method, meaning, and interpretation of data collected and analyzed to ensure accuracy and uniformity within the research process (Lincoln & Guba, 1985; Merriam, 2001). This was one of the strategies that was used to establish validity and was incorporated at the end of the interview as a recap of what was said. Bridling is restraining of personal understanding due to one’s knowledge of the phenomenon and being open to having a whole understanding of the phenomenon in order to identify disconfirming evidence (Dahlberg, Dahlberg, and Nystrom, 2008). This strategy was employed throughout the entire analysis to enhance the rigor of the analysis process and to assist in identify the disconfirming evidence in the research. Peer debriefing was also done with members of the research team to validate codes and themes that emerged from the data. External validity was established through reader or user generalizability from data that was presented. Likewise, they are several strategies use to establish reliability of a case study. Some of these

strategies included detail description of field notes and developing a code book and audit trail which was employed in this study (Creswell, 2007; Merriam, 2001; Yin, 2013).

Ethical Consideration

Permission for this research was obtained from the Institution Review Board (IRB) of the institution that the study occurred. Students were provided with information and consent form that describes the details of the study. Participants were also advised that they can withdraw from the study at any time and take any or all data that belongs to them when exiting. See Appendix K for IRB Approval Forms.

Chapter 4: Findings

The findings of this research are systematically reported in five sections based on the questions that were investigated. The sections findings (knowledge, skills, self-efficacy and self-regulation, student perceptions, and teacher perceptions) were derived from the data analysis of both qualitative and quantitative methods. The quantitative analysis of the findings presented a framework of what occurred in the Flipped Classroom Approach (FCA) unit of the physical education classes. Findings from the qualitative analyses that proceeds substantiate the quantitative results and portrays the rich descriptive experiences of students and the teacher with the FCA unit.

FCA Instructional Model Unit Impact on Content Knowledge Acquisition and Retention

The FitSmart test (Zhu et al., 1999) measured students' aggregate Health Related Fitness concept Knowledge (HRFK) of five constructs: concepts of fitness, scientific exercise principles, components of physical fitness, effect of exercise on chronic disease risk factors, and exercise prescription. The five constructs were spread across a 29 questions test that surveyed the student HRFK. Structuring the test to generate the aggregate of students HRFK depicted a fuller measure of students learning outcome rather than examining the constructs individually due to the limited and uneven distribution of questions across the constructs. For uniformity of scores each item on the test was assigned 1 point, therefore the maximum points that students could score on either the pretest or post-test was 29 points. Each question had four options to choose from, A through D. An example of a test question included "What two substances supply most of the body's energy during vigorous physical activity." For all the other questions that were covered in the HRFK test, see Appendix B

To analyze the FitSmart test scores for the students, a paired sample t-test was conducted using the IBM Statistical Package for the Social Sciences (SPSS) version 21. Because the question focused on the improvement of students HRFK from pretest to posttest, the gain score analysis was calculated as recommended by Fitzmaurice, Laird, and Ware (2011). The results of the students HRFK test is presented in Table 4.1. Results from the paired-samples t-test showed that there was a significant difference in the scores of the students HRFK test for pre-test (M=22.09, SD= 2.68) and post-test (M=23.27, SD= 2.10); $t(44) = 3.15, p = .003$. Student scores on the pretest ranged from 12-27 and post test scores ranged from 18-27. The frequency distribute of students' scores are presented in Table 4.2.

Table 4.1

Comparison of Health Related Fitness concepts Knowledge Test in FCA Unit

Variable	Model	Mean (SD) Pre	Mean (SD) Post	t	p	η^2
HRFK test	FCA unit	22.09 (2.68)	23.27 (2.10)	3.15	.003*	.184

Note. Error $df = 44$. Maximum score for HRFK test=29

Table 4.2

Frequency Scores for HRFK Test

Range	Pretest Frequency	Post-test Frequency
<10	0	0
10-19.99	8	1
20-24.9	28	31
25-28.9	9	13

Note. The scores presented in the pretest and post-test columns represent the number of times a score occurred based on the range to the far left of the table.

Upon completion of the pretest, throughout the unit students were required to complete 23 quizzes that accompanied the online conceptual physical education (CPE) portion of the unit that was mentioned in chapter 2. These quizzes span across the five constructs that were included in the FitSmart test along with exercise technique and anatomy of muscles used to perform

exercise. For all the quizzes and questions that were administered in the FCA unit, see Appendix C. The results for these quizzes were performed using descriptive statistics that include the mean, median, mode, and standard deviation to provide a comprehensive view of the content covered within the unit. The results for these quizzes are presented in Table 4.3

Table 4.3

Student Scores for Constructs of FitSmart and Exercise Techniques and Anatomy Quizzes

Constructs of FitSmart	Mean/Total	Median	Mode	SD
Muscular Strength	9.59/11	10	10	1.50
Muscular Endurance	8.86/10	9	9	0.65
Cardiovascular Strength	10.01/11	10	11	1.33
Flexibility	7.39/8	8	8	0.74
Body Composition	11.02/13	11	11	1.59
Benefit of Exercise/FITT	8.48/9	9	9	0.80
Physical Wellness and Nutrition	9.58/10	10	10	0.94
Prescription for Wellness	9.25/10	9	9	0.77
Writing a Personal Exercise Program	11.09/12	12	11	1.52
Cardiorespiratory Endurance	15.12/17	16	17	1.69
Exercise Technique and Anatomy				
Squat	4.81/5	5	5	0.39
Bicep Curls	3/4	4	4	1.00
Lunges	3.37/4	4	4	0.82
Push-ups	3.85/4	4	4	0.36
Bench press	2.87/3	3	3	0.34
Bent-over rows	2.65/3	3	3	0.54
Triceps kick back	3.23/4	4	3	0.46
Standing shoulder press	3.25/4	4	3	0.69
Back Extension	3.89/4	4	4	0.35
Calf raises	3/3	3	3	0
Dead Lift	4.34/5	4	4	0.68
Hip Abduction	3.74/4	4	4	0.44

Note. The scores presented in Table 4.3 shows how well students perform on the FitSmart, Exercise Techniques, and Anatomy Quizzes. When looking at the mean scores for each component and the total scores for the quizzes, it is clear that the students performed exceptionally well on each quiz.

FCA instructional model unit impact on physical activity skill development

Similar to the knowledge test, skill test were also administered at the beginning and the end of the unit to measure students skill improvement within the FCA unit. There were thirteen skills that were assessed: squat, deadlift, bench press, calf raises, bicep curls, hip abduction, back extension, bent-over rows, push-up, lunge, triceps kick-back, sit-up, and shoulder press. The rubric for each skill was created from the Nation Strength and Condition Association (NSCA): Basics of Strength and Conditioning manual that addressed simple functional movement appropriate for the participants. Both the aggregate scores and the individual skill performance were calculated for the pretest and post-test to provide a more meaningful picture of student skills development in the FCA unit. A paired samples t-test was conducted to assess the improvement in skill development from pretest to the end of the unit.

The results for students exercise techniques were significantly different in the scores for pre-test ($M=126.36$, $SD =3.567$) and post-test ($M=131.05$, $SD =3.838$); $t(41) =10.078$, $p =.001$. When analyzing the thirteen exercise skill techniques individually, the squat, back extension, push-up, lunge, triceps kick-back, sit-up, and shoulder press were statistically significant. The students showed no statistically significant improvement from pretest to post-test for the deadlift, bicep curls, hip abduction, and bent-over rows. There were no differences in the bench press and calf-raises scores from pretest to post-test and as such, it created a standard error difference of zero. There were three participants' scores that were thrown out for the skills test because there were absent the day the assessment was administered and were unable to reschedule another day to complete the assessment. The complete results for students exercise techniques are presented in Table 4.4 below.

Table 4.4

Students Score for Exercise Techniques Assessed in the FCA Unit

<i>Exercises</i>	<i>Total</i>	<i>Mean Pre</i>	<i>(SD) Pre</i>	<i>Mean Post</i>	<i>(SD) Post</i>	<i>t</i>	<i>p</i>	<i>η²</i>
Squat	12	8.71	.71	9.17	.73	4.16	<.001*	.544
Dead-lift	12	9.79	1.03	9.76	.96	-.274	.985	.043
Bench press	12	12	.000	12	.000			
Calf-raises	10	10	.000	10	.000			
Bicep curls	12	11.79	.54	11.74	.52	-.573	.570	.089
Hip abduction	12	10.10	1.32	10.33	1.22	1.53	.133	.233
Back extension	12	9.52	1.19	9.95	1.12	2.87	.006*	.409
Bent-over rows	12	9.67	1.07	9.88	1.21	1.46	.152	.222
Push-up	10	8.43	.89	9.21	.68	5.36	<.001*	.642
Lunge	12	8.50	.92	9.67	1.07	5.56	<.001*	.656
Triceps kick-back	10	8.62	1.01	9.12	.83	3.43	.001*	.473
Sit-up	10	9.07	.95	9.43	.63	4.01	<.001*	.531
Shoulder press	12	10.17	1.12	10.79	1.05	3.44	.001*	.473

Note. In Table 4.4 the total number of points that could be obtained on each exercise technique assessment as well as the pre-test and post-test mean and standard deviation (SD) is provided for each skill. The other scores in the table include the t and p values and eta square

Self-Efficacy and Self-Regulation impact on the FCA instructional model unit

Another question of interest was whether the FCA unit impact student self-efficacy and self-regulation to exercise. The self-efficacy to regulate exercise survey by Bandura (2006) and a self-regulation questionnaire by Brown, Miller, & Lawendowski (1999) were also administered at the beginning and end of the unit to assess changes in student perceived behavior to exercise. The self-efficacy survey was measured on a 10 point likert scale. So for instance, one of the questions asked was whether students could perform exercise “When I am tired.” Students could answer from 0-10, 0 being the lowest score, 5 being moderate and 10 being the highest score. See Appendix D for complete self-efficacy survey.

Similarly, the self-regulation survey (Brown, Miller, & Lawendowski, 1999) was also measured on a likert scale. The questionnaire consisted of 3 subscales (planning, implementing,

and assessing) that investigated student perceived behavior and ability to regulate exercise. There were 27 items on the questionnaire, 9 for each subscale. To provide the instrument with some variety the first 15 questions were rated on a 5 points likert scale, the highest score being 5 (positive which indicate good self-regulation) and the lowest was 1 (negative which indicate poor self-regulation). On the second half of the questionnaire the scores were reversed 1 being the highest and 5 the lowest score. An example is “I get easily distracted from my plans” a score of five would be negative and a score of 1 will be positive in this instance. See Appendix E for complete self-regulation survey

The statistical analysis used to analyze the surveys was the paired sample t-test. The results for student self-efficacy and self-regulation to improve exercise behavior and ability within the FCA unit were not statistically significant. The self-efficacy results showed that there was no significant difference in the pre-test (M=104.51, SD =27.12) and post-test (M =110.53, SD =27.80); $t = 1.2$, $p = .238$. The self-regulation results also showed that there was no significant difference in the pre-test (M=93.69, SD =13.38) and post-test (M=96.89, SD =12.58); $t = .137$, $p = .178$. Upon examination of the self-regulation subscales (planning, implementing, and assessing) were also not statistically significant. The results for the self-efficacy and self-regulation instruments are presented in Table 4.5 below. While both self-efficacy and self-regulation reported no significant scores, there were gradual improvements in the students' score from pre-test to post-test. These small improvement could be seen in Figure 4.1 and 4.2 respectively.

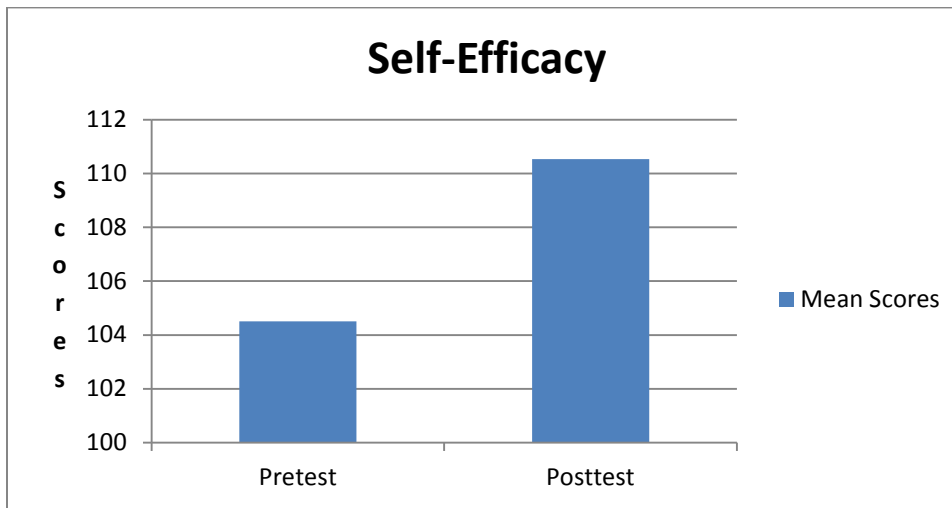
Table 4.5

Student Perceived Self-efficacy and Self-regulation Scores within the FCA Unit

<i>Variables</i>	<i>Mean (SD) Pre</i>	<i>Mean (SD) Post</i>	<i>t</i>	<i>p</i>	η^2
Self-efficacy	104.51 (27.12)	110.53 (27.80)	1.2	.238	.031
Self-regulation	93.63 (13.38)	96.89 (12.58)	1.37	.178	.041
Self-regulation Subscales					
Planning	31.16 (4.94)	31.76 (5.296)	.687	.496	.011
Implementing	30.53 (6.05)	31.89 (6.39)	1.26	.213	
Assessing	31.51 (5.08)	32.44 (3.30)	1.07	.289	.026

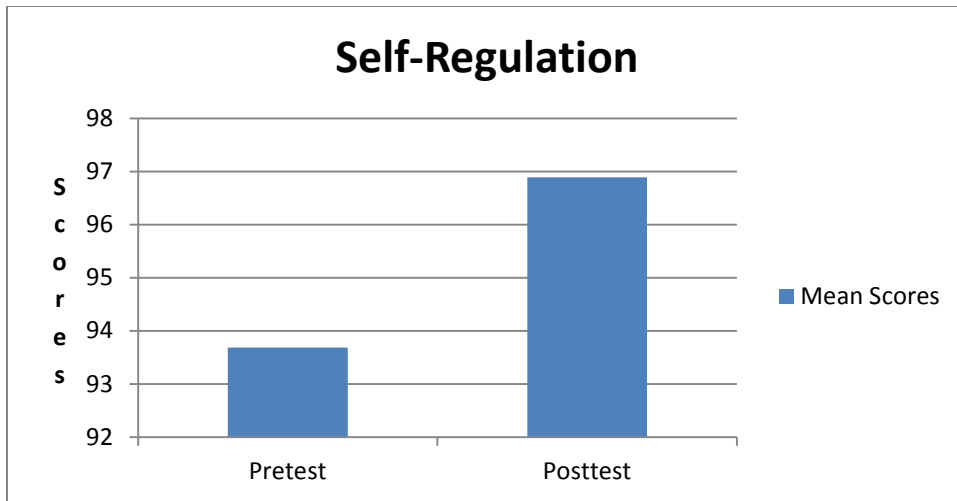
Note. Error *df* = 44 for self-regulation; *df* = 44 for self-efficacy. Maximum score for self-efficacy scale = 180; maximum score for self-regulation = 135

Figure 4.1 Self-Efficacy Mean Scores from Pre-test to Post-test



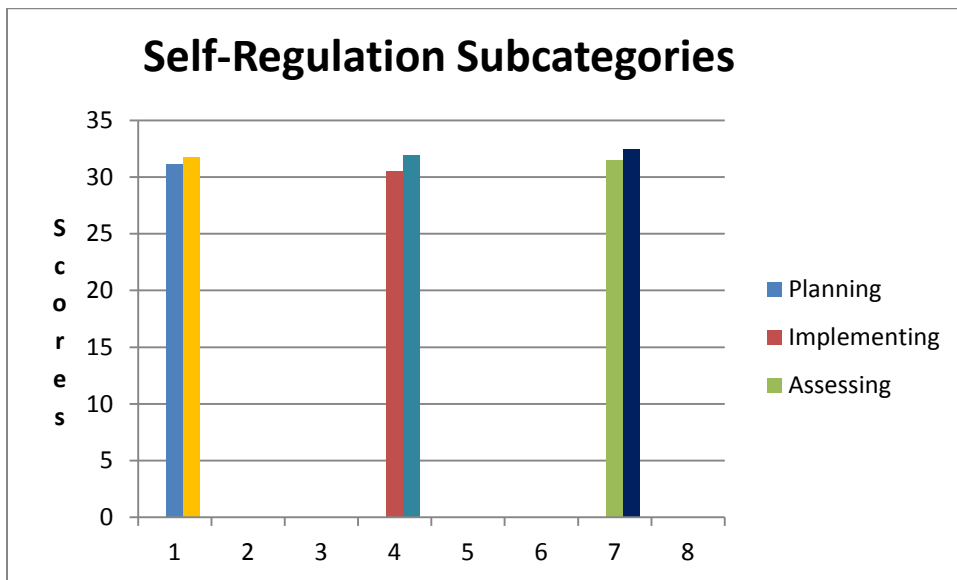
Note. Students difference in self-efficacy mean scores of pre-test and post-test. There is a small improvement from pre-test to post-test.

Figure 4.2 Self-Regulation Mean Scores from Pretest to Posttest



Note. Students difference in self-regulation mean scores of pre-test and post-test. There is a small improvement from pre-test to post-test.

Figure 4.3 Self-Regulation Subcategories Mean Scores from Pretest to Posttest



Note. Students difference in self-efficacy mean scores of pre-test and post-test. There is a small improvement from pre-test to post-test.

Summary

The meticulous quantitative data analysis in this study reveals that students content knowledge acquisition, retention, and physical activity skill development significantly improved during the FCA unit. When looking at the subscale for the technical skills test, the findings showed that seven (squat, back extension, push-up, lunge, triceps kick-back, sit-up, and shoulder press) of the skills were significantly while four (deadlift, bicep curl, hip abduction, and bent-over row) showed no significance. Two of the skills test (bench press and calf raises) had a standard error of zero because there was no correlation between the pretest and the posttest. Similar analysis of the self-efficacy and self-regulation test also reported no significance differences from pre-test to post-test during the FCA unit. The self-regulation subscales (planning, implementing and assessing) were also not significant but showed gradual improvement from pre-test to post-test.

The second portion of the analysis mainly addressed the qualitative aspect of the study and provides a richer description of how the FCA unit functions within a physical education environment. In this section both the students and teacher experiences with the FCA unit are described in details to expand on the quantitative analysis that was revealed earlier. To provide a systematic analysis of the teacher and students perspectives about the FCA unit the data analysis is presented based on two categories, the strength and the barriers of the FCA in physical education. As was mentioned in chapter 3, the exploratory case study approach method was employed for the qualitative data analysis process. I followed the guidelines that were proposed by Creswell (2007); Merriam (2001); and Yin (2013). Several sources of data collection were employed and triangulation was done to establish credibility within the data analysis process. As a result of my vested interest in the research project, I also followed the Dahlberg, Dahlberg, and

Nystrom (2008) approach of bridling that require the researcher to restrain one's personal understanding due to their knowledge of the phenomenon and be open to having a whole understanding of the phenomenon in order to identify disconfirming evidence.

Students Perceptions of the FCA instructional model Strengths

The students' data collection process occurred over the course of the semester. Several forms of data were collected. They included a basic demographic survey at the beginning of the study which provided detailed insight into the population under investigation. During the last two weeks of the unit, 15 students participated in one-on-one interviews. All the participants in the study completed a teaching methodology survey at the end of the FCA unit. The demographic findings of the student population is presented at the beginning, followed by the students' perceptions. The students' perceptions are presented in themes and are focused on the strengths and precautions of the FCA unit. Last but not least, the teaching methodology survey data is presented to substantiate and encapsulate students' experiences over the course of the semester in the FCA unit.

Demographic Survey

The participants in the study included 36 females and 9 males, 39 Caucasian Americans and 6 African Americans, ages 19-40. Of the 45 students, 11 were freshmen, 9 sophomore, 12 juniors, and 13 seniors. Student were from a wide range of academic programs that included education, science and mathematics, engineering, business, liberal arts, nursing, human sciences, and agriculture. Thirty nine (39) students indicated that they took the course as an elective while it was a requirement for the other seven (7) students. When the student were asked their reason

for enrollment, 41 indicated to improve fitness, 2 to improve GPA, because it fit semester class schedule, and 1 as a graduation requirement.

As it pertained to students' physical activity level, 17 students participated on a varsity, club, or intramural sport team at either the local, regional, or national level while 28 students were not a part of any sport team. When the students were asked how many days per week do they participate in physical activity outside of class when given a range of 1 to >3 days. See Appendix F for complete demographic survey. The responses showed that 21 students participated in physical activity outside of class 1 day per week, 5 students participated in physical activity outside of class 2 days a week, 5 student participated in physical activity outside of class 3 days per week, and 14 student participated in physical activity outside of class >3 days per week. A closer examination of the student population with the unit also revealed that 17 of the 45 students had previously taken a physical education course within the department before their participating in this study. The courses that the students enrolled in previously included weight training, aerobics, bowling, golf, and strength and flexibility courses.

Students' perceptions

As mentioned earlier the students' perception about the FCA unit was obtained during the two final weeks of the study. The individual interviews were conducted towards the end to obtain students overall experience with the FCA unit. See Appendix G for student interview questions. To provide an encapsulated view of the day to day structure of the FCA unit, the students participated in two sections of muscular strength, flexibility, and cardiorespiratory fitness courses. The classes were three days a week, for 50 minutes each. Students were required to attend class two days per week and exercise on their own for the third day. The day given to students to exercise on their own was also to provide them with the opportunity to review videos

and quizzes before coming to class. Students were also required to turn in an exercise log sheet of what activity they participated in on the day that there were not required to come to class along with their goals for each week. During class the teacher provided exercise routines that resulted in students working continuously throughout the sessions. For most of the class sessions students either worked in pairs or with a group. There were given a different exercise routine each day. To see a detailed description of the unit, see appendix A as mentioned in chapter 2.

In order to provide some structure to aid in guiding the analysis process, the students' perceptions of the unit were organized according to the strengths and barriers that were identified by the students in their shared experiences of the FCA unit. The strengths of the unit were classified as the positive attributes identified by students and the teacher in the FCA unit and the barriers were classified as the negative or hindrance identified by the students and teacher in the FCA unit. The data from the informal semi-structured interviews were initially analyzed using open coding that resulted in over 150 codes with the use of the ATLAS.ti 7 Qualitative Data Analysis and Research Software. This process was followed by the identify of a priori and emerging codes. From these codes the final analyses of the data led to the identification of 4 themes that were made up of several subthemes. The themes derived from the data are explained in details below. There were several instruments used to establish the credibility of the findings presented. The triangulation of data included student interviews, debriefing the students after the interview, demographic survey, peer review/debriefing, the teaching methodology survey, and a code book as well as an audit trail.

Theme 1- Unit Structure

To provide a logical and sequential understanding of the strengths of the FCA unit identified by the students, the first theme that I described is the students overall perceptions of the unit structure. The subthemes and direct quotes from the students are used along with my annotation of the subthemes to present a richer picture of the overall themes.

Subtheme 1. The classroom procedure and activities

The students divulged that the class exercise routines were organized so that they worked continuously throughout the sessions as one student expressed “we pretty much work continuously, we get water breaks between each main thing like after warm-up, before we start the main exercise, and then after the main exercise we’ll obviously have a huge break until the next class.” Students also revealed that there were given a variety of exercise routines throughout the unit which also made it very challenging, “I like the way it was structured so that we had different exercises we cycle through, I think it keeps it interesting and hard definitely.”

In addition to the continuous exercise, variety, and challenges that the unit presented in the classroom, the day off that was given to the students to exercise on their own also presents the student with other exercise options. On their day off students elected to participate in a variety of exercises that included weight lifting, running on trails, elliptical, treadmill, swimming, TRX suspension, Zumba, soccer, handball, basketball, hiking, aquatics, kick boxing, abs workout, tennis, rafting, biking, and roller blading just to name a few. Among the 45 participants in the study, 93% of the students indicated that they “like the day off to work out on their own.” The other strengths of the FCA unit that the students described are identified below.

Subtheme 2. Student Attitude towards the FCA Unit

The unit was designed in such a way that the quizzes and exercise skills videos were assigned to the students on the Wednesday or Thursday prior to the week they were doing the actual exercises in class. For instance, the students were given two exercise skills videos and two skills quizzes on the Thursday of each week to complete for the following Monday. The skills that the students focused on in the videos were incorporated into the exercise routine done in class that week. Due to the structure of the class the students' acknowledged that "the videos related to what was covered in class" which indicated that there was class alignment within the unit. When students were asked about their overall views of the FCA (which I referred to as the structure), one student responded:

"I enjoyed it, I like the way the class was set up so we didn't have to come in everyday and do a workout and when we were done we were actually quizzed on the form and technique of the movement and all of the components that go in to being physically healthy and not just coming to work out and then going home, in here you can take some of it with you so I like the way it was set up and then having the Friday off we can take what we learn and structure it into our own program and our own workout and apply it."

Another student also shared similar sentiments.

"I think this class was enjoyable. I took it last semester. It was mainly like workout focus the entire time. We didn't do a whole lot outside of class, there were a couple of assignments and we didn't have any day off but I think having the day off was good because we need to learn how to exercise on our own, I think the quizzes outside of class are necessary, and I loved doing the different exercises instead of one standard thing every class."

There were 13 exercise skills within the unit and there were incorporated into the daily exercise routine done in class for students to practice. The students "enjoyed the exercises." They also indicated that the "exercise routine was good" and that the routine presented "interesting exercise ideas." They perceived that the exercise routine done in class was also beneficial. The students that participated in the FCA unit "liked the class structure" and as such they "would recommend the course to others." Several of the students mentioned in the interview that they or

a friend that they recommended the course to, were trying to enroll in the course for next semester but the course was not being offered.

The unit was implemented three weeks after the class had started to get a consistent group of students to participate in the unit and that was my only rationale for starting the unit at this time. However, the students pointed out that they like that the unit started after the third week of class because it provided them with “a foundation of exercise before the FCA was implemented.” One of the concerns that I had about the unit was the requirements for the unit might have been too rigorous for a two credit hour course, this was quickly disconfirmed when the students indicated that the “class requirements were not overwhelming.” More specifically, the students thought that the “course content and requirement was adequate for course hours.” The requirement for the unit included both a classroom component and an online component. The online component is described below.

Theme 2- Perception of Online Component of the FCA Unit

Subtheme 1. Technology preferences/online learning preferences

All of the course content within the FCA unit was presented online. There were 95% of the students within the unit that enjoyed the online section of the class. They indicated that “the online content is better received than reading it.” There were however approximately 5% of the participants who did not like watching the videos and would prefer to “watch the skills in person than online.” The student interacted well with the online content. There were several indications of their interactions with the content. The students provided numerous account of why they watch the videos. They watched the videos that pertained to the class to make sure that their form was correct and learn the proper form before practicing the skills in class. They also watched the

exercises videos to learn the proper form so that they wouldn't get injured. They reviewed some of the videos like diet and nutrition, muscular strength and endurance, benefits of exercise, exercise prescription and wellness, planning exercise programs, cardiorespiratory endurance, and flexibility several times outside of what was required for the class. The videos were also reviewed when students were retaking the quizzes and as a means to obtain the most benefits out of the exercise videos. The students reviewed these videos several times because they thought there were interesting and knew they could “apply the lecture content to accomplish their goals.” The interesting lecture videos were also shared with family and friends. See Appendix J for a statistical description of how students interacted with the online content.

Subthemes 2. Students' attitude towards online content

The students in the study were presented with two types of online content, one consisted of lecture and the other consisted of the skill video content. They students had a positive attitude towards the overall class content in general. They indicated that they “like the topics that were covered in the videos.” One of the major purposes of implementing the FCA unit was the opportunity to provide student with HRFK concepts online so they could understand the importance of living a healthy and active lifestyle. The students also reported that they liked that the class emphasized healthy living, the information on videos was good, the videos provide more specific information compared to other physical education courses that they took, and the videos were interesting and helpful.

More specifically, when assessing students' attitude towards the lecture content and the skills content 84% of the students thought the lecture videos were good and “enjoy the lecture videos.” There were 16% of students who didn't like the lecture videos. They thought the lecture

videos were “boring and uninteresting” and that the nutrition video and flexibility video didn't apply to them personally. The students that were bored with the content indicated that they had prior experience with exercise and health content and had taken the class or other physical education courses before. Some of the students went on to say that they remembered the “general knowledge but not specific knowledge about health” while the information was repetitive to others because there were health and science majors and were familiar with the lecture content.

On the other hand, the students' attitude towards the skills content was very positive. Even though some of the students were familiar with the exercise routines, they stated that the exercise videos were “enjoyable and helpful.” They perceived that the videos help with form, how to do exercises, correct and improve technique, improve bad exercise habit, with developing strategies to improve skills, and also to learn the content. Some of the exercise videos that they enjoyed were the squat, dumbbell shoulder press, and lunge video because it was more applicable and those were the exercises that they would do most frequently. They didn't like the bicep and calf raises video only because they thought that the “exercises were simple” and didn't require them to pay much attention to the technical details.

The students also displayed a positive attitude towards the quizzes and assessments even though there were some hesitation among some of the students about when they watch the videos. In most cases the students indicated that they either watch the videos on the Sunday or Monday morning before the quiz was due. However, they indicated that they liked the idea of doing “quizzed on the technique of movement” and “component of physical fitness.” The students also liked that there were given an opportunity to retake the quiz if they didn't perform well the first time because the “second chance on quiz provided opportunity for learning.”

Subtheme 3. Online content organization

One of the key elements to implement this unit was the online delivery of the content. A wiki page was created to present the online content. The link to the webpage was uploaded to a Canvas server through which the course information was disseminated. To access the wiki page the students had to sign on to canvas and click on the link. Students expressed that the online “content was easy and convenient to access.” They indicated that the website was convenient in that it provided reminders for when assignments were due, it was user friendly, and quizzes were easily accessible. They also liked that video presentations were “practical” and that it showed them “how to do the exercises.” The online component of the course was the responsibility of the students to complete. How students managed this responsibility is described in the section below.

Theme 3- Student Autonomy

In this theme I began with students perceptions of the benefit of exercise because I believe that this has some important effect on students’ responsibility to be engaged in the unit.

Subtheme 1. Student perception of exercise benefit

The student cognition, ability, and classroom environment played a pivotal role in how the students perceived the FCA unit. The exercise benefits the students described that they obtained from being physically active were that physical activity help to improve class performance, exercise is fun, gives them energy, and it makes them feel healthier. As a result of the known health benefits all students were physically active inside the class and 50% of them were physically active outside of what was required for the class. One of the first requirements of the unit outside of the pre-tests conducted was that the students turn in a weekly exercise log sheet of their weekly goals and of the activity they did for the day when they exercise on their

own. The students were able to create their “personal goals” and attend each class session with an objective in mind. Some of the students admitted that there were “not big exercise planners but the log sheets did help.” The students indicated that planning goals for exercise helped, their personal goals were tied to what was done in class, and they accomplished their goals. One student indicated that “my personal goal was to lose 5 pounds over the course of the semester, at least one pound every two weeks and to be able to run a lap back and down because I am not good at running, now I am able to run continuously but the pounds I am still working on that along with my eating habits.”

Subtheme 2. Student opportunity to exercise independently

As mentioned earlier when describing the structure of the unit, students were given one of the three class days to exercise on their own. During the individual interview the students mentioned that exercising on their own was good and they felt good to be able to set aside time for exercise. They also enjoyed that there were given the option to “choose their own exercise during warm-up” and like the option to choose some of the exercises they did in class. On the days where exercises were done independently, they participated in exercises that they thought were “beneficial and fun.” The students really enjoyed the “flexibility to exercise at their own convenience” with having the day off to exercise on their own. Being able to have the day off to exercise independently, helped with learning how to exercise on your own, structuring workout and, changing up the exercise program. This provided diversity to the activities that the students participated in throughout the unit. Likewise, having the option to actively participate in the decision of what exercise to do in class provided some “freedom” and as expressed by the students, being given the option to contribute “showed that the teacher cared.” The students’ autonomy was also reflected in other components of the unit such as the classroom socialization.

Theme 4- Student classroom socialization

The FCA unit provided a collaborative learning environment for the students. Throughout the unit the students were asked to work with a peer or in a group of three to five students. The students had the autonomy to select the members of their group. When the students were given the option to contribute to an exercise session, these decisions were made as a group. Students were given some time to discuss among the group about what exercises they wanted to do. The students indicated that they like working out together with peers and that “working in groups was fun.” The benefits that students derived from working out in groups during class were that there were able to accomplish goals together, finish what they started together. It was motivating to be in a group, group work makes the work-out not boring, and working in groups help to encourage completion of exercises. However, there were 8% of the students who revealed that while working in groups were enjoyable and beneficial it was frustrating at times to work with students at different skill levels because in some instances they had to coordinate activities and the students with the low skill sometimes hinder the exercise progress. They explained sometime they themselves or someone else in the group were the ones that hinder the exercise progress based on the skill level of the others in the group.

Barriers to implementing the FCA unit

There were lots of positive attributes which derive from the results that illustrated the strengths of the FCA unit. However, there were also some weaknesses in the FCA unit that derived from the analysis of the data and is described in terms of the barriers to implementing the FCA unit. The students indicated that they “did not prepare immediately before coming to class” and they often watch the videos the day of or before coming to class. The quizzes that were required for submission at the beginning of the week were also approached in the same manner,

some of the students completed their quizzes the day before or on the day that there were due. The presentation of the online content also created some hindrance to student enjoyment of the unit. Approximately 17% of the students indicated that the “long videos were uninteresting” because there were unable to focus for long periods of time at home. There were also approximately 5% of the students that did not like the idea of watching the skills videos online but prefer a face to face classroom environment where the Teacher is the one that is demonstrating the skills. Equally, the structure of the class also posed a problem for approximately 7% of the students. They revealed that they did not like having a day off to do exercise on their own and they prefer to be in a class where they are “given some structure” and being “told what to do.” For a summary of themes that derived from student perceptions of the FCA unit, see Figure 4.4 below.

Figure 4.4 Summary of Themes Relating to Student Engagement with the FCA Unit

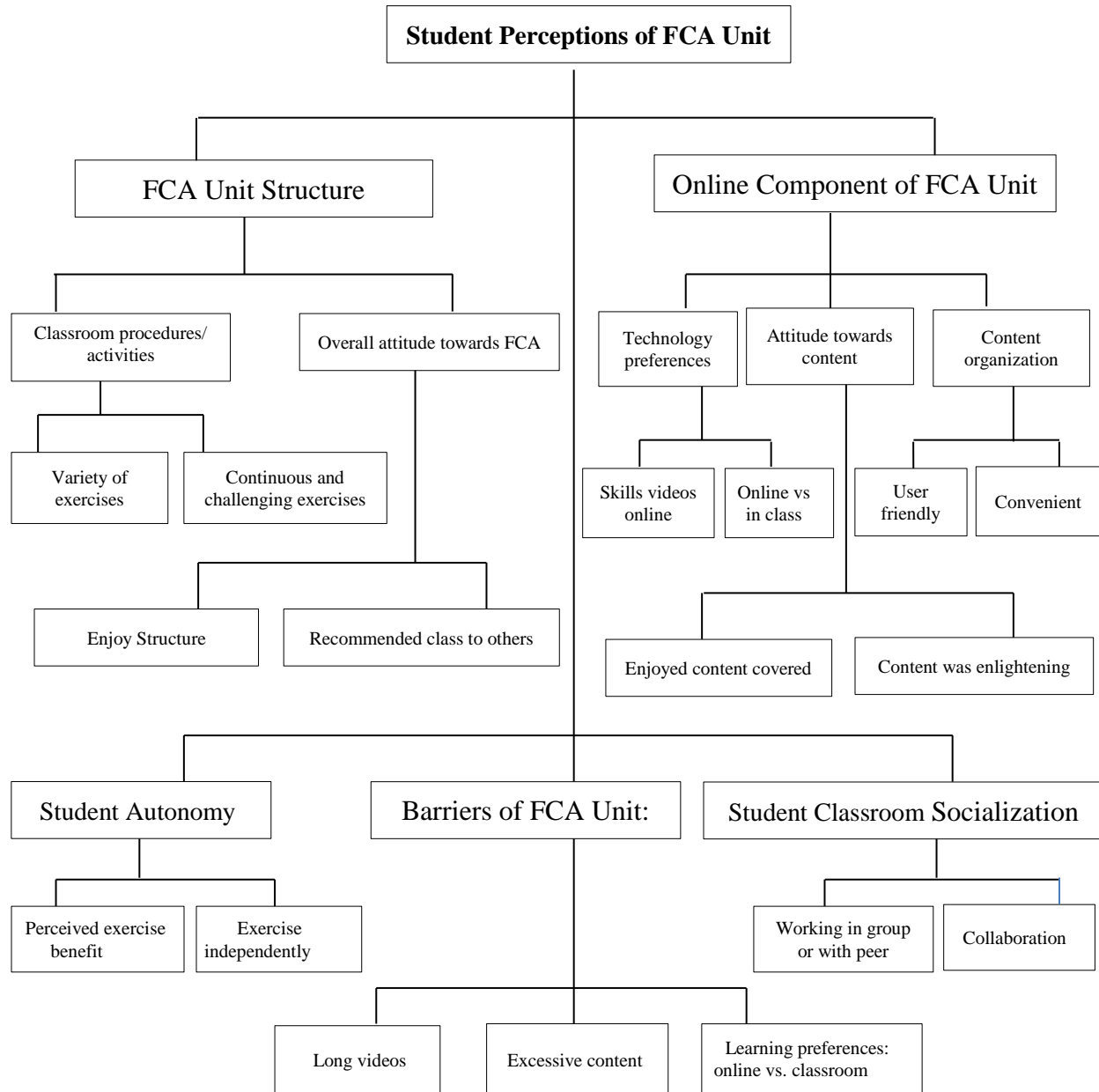


Figure 4.4 provides a summation of the themes derived from students' perception of the FCA unit. Synthesized within the four themes and the barriers are also the subthemes or important points that were mentioned.

Teaching methodology survey

To provide a more accurate account of the student perceptions of the FCA unit in addition to the individual interviews and demographic survey, a teaching methodology survey was also administered during the last week of the study. The survey was adopted from Tosta

(2012) and was modified to include 30 closed ended and 4 open ended questions that measured students satisfaction of the teaching methodology used in the FCA unit. The student responses on the survey were based on a Likert Scale. Scores ranged from 1-5, 5 being the highest (very satisfied) and 1 being the lowest (very dissatisfied), along with the response N/A, not applicable that was assigned a zero. For instance an example of the question included, were you “satisfied with the unit content?” To view the complete teaching methodology survey with the questions, see appendix H.

To analyze the teaching methodology survey, a univariate analysis was conducted using the IBM Statistical Package for the Social Sciences (SPSS) version 21. The highest score that could be obtained on the survey was 150 and the lowest was 30. The findings of the survey indicated that students were satisfied with the teaching methodology, that is, the FCA unit employed. The scores for the teaching methodology survey were significant ($M=136.95$, $SD=13.28$), $p < .001$. Scores on the student satisfaction of the FCA unit range from 110-150. See table 4.6 for a detail description of the range in which the scores occurred.

Table 4.6

Frequency of Scores from Student FCA Teaching Methodology Survey

Measure	Range	Frequency
Student Satisfaction with FCA	<110	2
	110-119.99	2
	120-129.9	8
	130-139.9	7
	≥ 140	23

Teacher Perception of the FCA instructional model

This next section of the results focuses on the teachers perceptions of the FCA unit. In the FCA unit the focus is on a student centered learning environment and the teacher mainly serves as the facilitator. In order to present a rich description of the teacher perspective two informal semi structure interviews were conducted. The first interview was conducted one month into the implementation of the unit and the other was conducted at the end of the unit. It was my intention to conduct three interviews with the teacher, a pre-interview, a mid- semester interview, and a post-interview. However, due to unforeseen delays, the pre-interview and mid-semester interviews were combined into one interview. The central themes of the teacher interview questions focused on the teacher style of teaching, rationale for implementing the FCA, the teacher perception of students learning outcome, and the barriers to implementing. For instance, an example of the questions included “tell me about your experiences with using this pedagogical approach thus far.” See appendix I for details on the teacher interview questions.

Similar to the analysis of students interview, the data from the mid and post informal semi-structured interviews were initially analyzed using open coding with the use of the ATLAS.ti 7 qualitative data analysis and research software. This process was followed by the identification of a priori and emerging codes. From these codes the final analyses of the data led to the identification of 4 themes that were made up of several subthemes. In presenting the instruction experience and perception of the FCA unit I described the teacher teaching philosophy, rationale for implementing the FCA unit, effect of the unit on the students, and the barriers that could be encountered in the unit in four themes below.

Theme 1- Teacher teaching philosophy

The teacher facilitating the unit indicated that her style of teaching is geared towards more “functional movement” with the focus of increasing the day to day quality of life for everyone. As a certified personal trainer, the teacher emphasized that the trajectory of personal training is focused on functional movement due mainly in part to the idea that these types of exercises caused less injuries. Two of the objectives for the class that the teacher had were to prevent injuries and increase the muscle strength of the students in the course. Another objective for the course was to incorporate more weekly activities and assignment with the goal in mind of equipping students with the necessary tools “to have a better understanding of movements” upon completion of the course.

In addition to incorporating functional movement into the exercise routines, the teacher “didn’t like the one minute rotation at each station” which is the traditional form of circuit training and that is a common practice by circuit training teachers and practitioners. The teacher began the course with body weight and then later transitioning into “weighted exercise.” She also incorporation a variety of exercises, creating competition among students, by placing them in groups, providing different structure and variety to avoid repetition, and apply the principle of overload to workout routines. These strategies are related to some of the philosophies that govern the teacher style of teaching. The teacher belief that students don't need weights for a good workout and that the exercises could still be challenging without weight support earlier. Based on the teacher philosophy of functional movement, the essential goal of the class was to provide students with exercises that are applicable to their everyday lifestyle. This is the approach that the teacher had practiced over the semesters that she had taught the course.

Theme 2- Teacher rationale for implementing FCA

The teacher had taught the course several semesters consecutively, as mentioned earlier, wanted to incorporate more weekly activities and assignments into the course. Therefore implementing the FCA unit was an interesting approach to incorporating the change that the teacher thought was needed. The concept of the FCA was familiar to the teacher and the previous courses that she taught in past semesters also offered an online section. The online component of the course provided the students with general information about health and wellness. So the idea of online learning was not completely obscure to her but she indicated that she had never implemented the FCA into any of the courses she taught before.

After the FCA unit was explained and the teacher began the implementation, the first interview revealed that, beyond the scope of the FCA being an interesting idea to implement more weekly activities and assignments, the teacher also “like the idea of students watching the videos individually and that the videos were available for student to watch on their own time at their convenience.” The teacher explained that it was her opinion that watching the videos individually provided the students with “more one on one attention to learn the exercises.” Watching the skills videos “individually was also better than the general demonstration” she had given in the classroom, in front of 30 students. The past in class demonstration often resulted in some students having difficulty seeing what she was demonstrating which frequently led to her spending a large portion of the class time repeatedly modeling a particular exercise for students. Taking those aspects of how the information is disseminated to the students into consideration the teachers believed that it would be easier for the student to connect with the FCA.

Some of the other obstacles that the teacher encountered in teaching the previous semesters which influenced her decision to implement the FCA unit were that “it was hard to see

and correct everyone in the class, it was difficult to see and get everyone doing the same thing, harder to correct the form of all of the students because excessive time was being spent to correct the technique of the same group of students.” So with implementing the FCA unit where the students viewed videos of the skills that there were going to do that week was “good to have them come in with a foundation on how to perform exercises.” The teacher admitted that one of the most intriguing aspect of the FCA, is the “students outcome will be based on the student skill and interest in putting in the work to obtain the benefits that they need out of the course.”

Theme 3- Student perceived benefits from the FCA Unit

At the conclusion of the unit, the post interview also revealed some very insightful information about the teacher experience with the FCA unit. Throughout the FCA unit the teacher observed the unit kept the students interested, stating, “the students seem involved and connected to what was being done in class even towards the end of the semester.” The teacher attributed the engagement of the students to how well the FCA unit catered and tailored to what was being done in the class, she said, “the FCA was applicable and related to class content on a weekly basis.”

When addressing the online content that was presented, the teacher indicated the “detail exercise video helped student to learn the exercises and the quizzes helped students to understand the movement.” There is clear improvement in the student knowledge of health and wellness when looking back at the pretest scores of the students’ HRFK test which was given at the beginning compared to their present performances on the quizzes. The teacher said “the students appear to have gain knowledge from the quizzes.” The Teacher pointed out that lecturing within

the physical education structure “takes away from activity time” so as a result of implementing the FCA unit, “the content were more in-depth” that the students received.

It is the perspective of the teacher that the FCA instructional approach is good for exercise courses because it provides a “personalized experience.” One of the major strengths of the FCA unit was the students were able to “watch the videos as many times as they choose and at their own convenient.” As oppose to a “general demonstration” of skills in the classroom to a large group of students. The Teacher suggested “the students might not pay attention to a classroom demonstration,” but if they are accessing an online video at their own convenience then it is most likely they are intending to watch the video.

Similarly, the teacher expressed the FCA unit catered to all levels of students within the class including “students who may not understand the movement and might have been fearful of asking question in class.” It is the perception of the teacher the FCA instructional approach provided a more “streamlined and directed approach to exercise classes” and with adequate assessments incorporated into the course, it “fine tunes student knowledge.” This was the equivalent approach to what was offered in the unit with the “exercise quizzes and content quizzes.” The teacher also perceived the FCA instructional approach could also be beneficial to those students with a “low skills level.” She stated “student improving some if interested in putting in the work but some students wouldn't improve at all due to their inability to perform the skill despite the method use.”

When the teacher was asked about her experiences and perceptions of the FCA she stated:

“Yes I do like it because I like that they have a video to watch, that they can do it on their own time, and if they wanted to do it again they can see it again. I just think it is more individualized so they could learn easier than me standing in front of 30 kids at once trying to explain something. But watching a video where someone breaks it down, I feel

that help them learn the exercise. It is nice that they came in with a little bit of foundation of how to do those things. I didn't have to be at the front of the classroom giving a general explanation for what I want to see and what I don't want to see, scrambling around trying to correct people and you know trying to keep an eye on everyone and trying to get everyone doing the same thing. The students also seem to be more involved and connected with what we're doing."

Theme 4- Instructional barriers to implementing the FCA

Some of the barriers the teacher identified that could hinder the effective implementation in the FCA unit in a physical education course is that, when the information is being offered online, some teachers might statur the student with "too much information," and at that point, it could become "overwhelming for the students." Another barrier was some teachers might solely depend on the videos to teach the students the skill. The teacher indicated that she had some doubts about whether the students had adequate demonstration of the various skills. She said, "I was sort of questioning whether I should have done some more classroom demonstration of the skills." The teacher also had some concerns with cheating, lack of online monitoring, and students not taking the time to review the exercise video and lecture content. However, she identified that "similar issues could occur in a regular classroom structure," so these issues are not necessarily negated if it is done in the regular classroom that is often offered by most basic instruction programs (BIP). As it pertained to the preparation and organization of the course, the teacher indicated it appears to be very time consuming at the time the unit was first explained and presented to her. Her reaction was, "it must have taken you a lot of time to put this together." With all the preparation being done prior to the class, the teacher realized she was better able to cater to students' specific needs as they pertained to the course on a day to day basis. For a summary of themes relating to the teacher perception of the FCA unit, see figure 4.5 below.

Figure 4.5 Summary of Themes Relating to Teacher Implementation of the FCA Unit

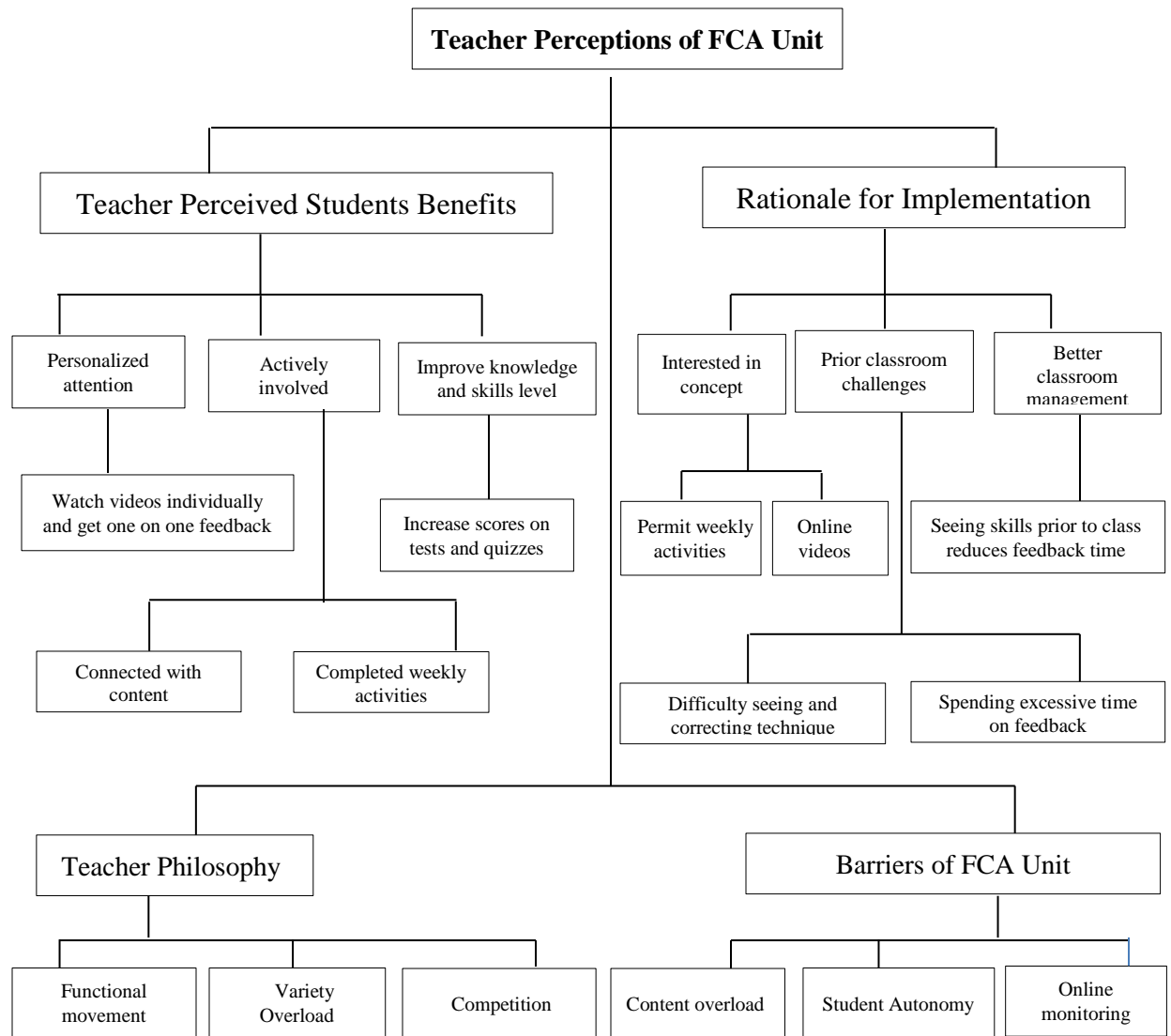


Figure 4.5 provides a summation of the themes derived from teacher perception of the FCA unit. Synthesized within the four themes are also the subthemes or important points that were mentioned.

Classroom observation of Teacher

In this section I will provide the details of my experience with observing the teacher in the field. Throughout the course of the unit I also observed the teacher within the classroom. The observation of the teacher was conducted for the entire duration of the study, 12 weeks. A systematic approach was taken to observing the teacher in the day to day classroom progression and organization throughout the unit. The teacher observation is presented in a narrative based

on my account of what I observed during the day to day events of the classes. The narration is presented in a similar manner to the order of events in the classroom. As a result of the unit being implemented a few weeks after the semester had started, it appeared as though the teachers had already developed a good rapport with some of the students during those weeks. For instance, when students arrived to class early they would converse with the teacher. The teacher would take roll as students arrive because by now the teacher knew the name of the students in each of the sections. The first 5 minutes of class was used for questions, turning in exercise log sheets to me if it was a Monday or Friday, taking class roll, describing the exercise routine for the day that was written on the board for the students to see, and to instruct students on what to do for warm-up.

Students' warm-up for exercise routine varied depending on what exercise they did that day. Most days, students were given the option to choose their own warm-up. On the days the teacher facilitated the warm-up, the students would do for instance with six one-minute shuttle runs beginning with a 30 seconds run from one point to another once, then progressively increase the number of times they run to the point and back. The students rested for 30 seconds each time they got to a minute. Other warm-up exercises consisted of jogging, stretching, free weight squats, lunges, push-ups, wall sits, and bear crawls.

Following the warm-up, students will often be paired in groups or with a peer to complete the exercise routine for the day. At various times throughout the unit, the teacher would ask each group to provide an exercise or number of exercises for the class to do, and the teacher would assign the number of repetitions for each exercise. For instance, the teacher also assigned groups the total number of repetitions they have to do for an assigned group of exercises, and they have to decide among themselves who would do what exercise and how much repetitions each person

in the group would have to complete. This strategy was often incorporated when she wanted to integrate some competition within the class. The groups that completed the exercises first, and maintained the intensity through the exercises, were given an incentive.

Before students began the exercise routine, the teacher would explain each exercise and ask the students if they would like the exercises to be demonstrated or if there were any questions about how to perform any of the exercises. If not, the students went directly into the exercise routine for the day. Each day, the students were given a different exercise routine. Some days, students began with free weight exercises and progressed into weighted exercises, other days they started with light weights and progress into heavier weights or they also did cardiorespiratory and abdominal exercises. A list of exercises is presented in Table 4.7 below. While students were completing their exercises the teacher was often seen walking around the room observing the students execution of the skills. If a skill or group of skills were being performed incorrectly, the teacher would do one or two things. Sometimes the teacher would either correct the individual by providing verbal cues such as keep your leg at a 90° angle when doing the wall sit or if it is a group of students then she would make an announcement to the class. I also observed sometimes during the class sessions some of the students requested the teacher demonstrate some of the more complex exercises such as an exercise that she calls the “farmers carry,” to them even after demonstrating it several times before.

Table 4.7

Types of Exercise Routine done in the FCA Unit

Types of Exercises	Function of Exercise	Number of Session Exercise Incorporated Into
Squats: variation of squats	Strengthening/Group/Individual	24
Wheel Barrow	Strengthening/Group/Individual	3
Burpees	Strengthening/Group/Individual	20
Lunges: variation of lunges	Strengthening/Group/Individual	19
Overhead hold	Strengthening/Group/Individual	10
Plank	Strengthening/Group/Individual	6
Walking with kettlebells	Strengthening/Group	6
Jump Rope	Endurance/Group/Individual	8
Head Cutters	Strengthening/Group/Individual	4
Jogging/Running laps	Endurance/Individual	24
Push-up	Strengthening/Group/Individual	10
Upright-row	Strengthening/Group/Individual	5
Farmers carry	Strengthening/Group	3
Overhead press	Strengthening/Group/Individual	4
Bicep curls	Strengthening/Group/Individual	3
Bent-over rows	Strengthening/Group/Individual	2
Bench press	Strengthening/Group/Individual	2
Shoulder press	Strengthening/Group/Individual	7
Calf raises	Strengthening/Group/Individual	2
Sit-up	Strengthening/Group/Individual	5
Hand stand hold	Balance/Group	1
Mountain climbs	Strengthening/Group/Individual	5
V-ups	Strengthening/Group	2
Bicycle	Strengthening/Group	5
Hip abduction	Strengthening/Group	1
Triceps kick back	Strengthening/Group	1
Dead lift	Strengthening/Group	1
Stadiums	Endurance/Individual	1

Note. Table 4.7 includes some of the types of exercises that were performed in the FCA unit, the function the exercise served, and the number of times the exercises were incorporated into an exercise routine.

In my observation of the teacher, I was also able to observe the social aspects of the classroom environment. As mentioned earlier, the Teacher interacted with the students prior to the beginning of class. They often discussed what they did for the weekend, activity that they completed on their log sheet, or questions pertaining to exercise. For instance, students asked the teacher questions like “what sort of stretches do you do if you’re having back pain” or for

stretching a particular muscle. During exercise there were a lot less interaction with students and teacher compared to what was observed prior to class and after class. Students would work continuously throughout the session, only taking water breaks when they decided to do so and sometimes after the teacher give them a break in between the circuit. Usually, students were seen talking among group members or peers during water break or while resting and dancing to the music that was played over the wireless speakers in the classroom. In some instances, when students were competing in groups for incentives, there were often seen encouraging their group members by clapping or saying “let’s go, finish, you’re almost there.”

The class sessions often concluded with the teacher indicating to the students they have 5 minutes before the class concluded or with the students completing all the exercises and then taking the remaining class time to cool-down on their own. Some students remained after class to complete the exercise routine if there were unable to do so within the 50 minutes of class time. Depending on the length of the exercise routine, if the students completed all of their assigned exercises for the day, and there were a few minutes remaining after the students cool-down, the teacher would use those few minutes at the end of the class to notify students of quizzes or any other class announcements. After the class concluded, a few students would remain behind to ask questions or to interact with the teacher.

Overall Effectiveness of the FCA Unit

To substantiate the results of the skills test, students account of the physical activity done within the FCA unit and my observation of the course, two types of physical activity assessments were conducted. The students were assigned the Gopher FIT step™ Pedometers for two weeks of the unit. The pedometers recorded students moderate to vigorous physical activity (MVPA) as well as theirs steps count and activity time. Pedometers were calibrated to determined MVPA

levels of the students with a one minute brisk walk. The range at which the pedometers were set after the calibration of the pedometers was levels 1-4. The results for the students step count, activity time and MVPA varied according to the type of activities that were done. When students participated in circuit activities that consisted of weighted exercises their step count, activity time, and MVPA were lower than when they participated in cardiorespiratory circuit training exercises such as running stadiums. The differences in scores are illustrated in table 4.8 below.

Table 4.8

Student Physical Activity Level in the FCA Unit

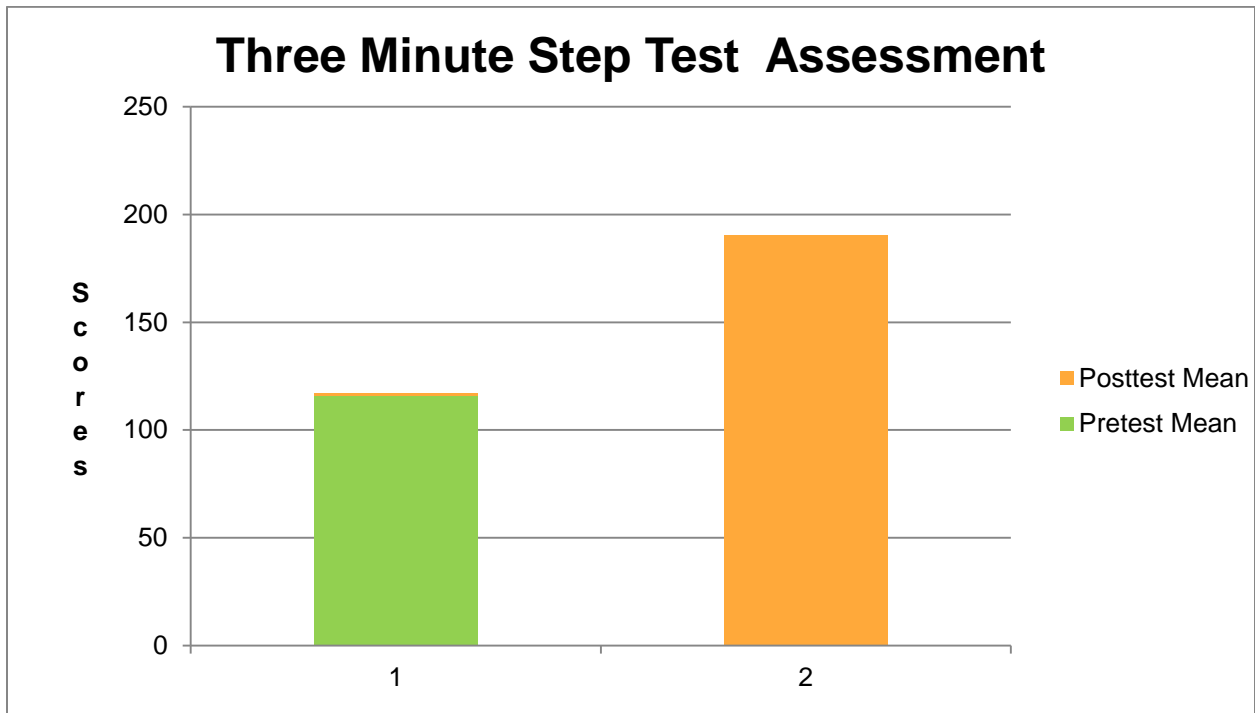
Measures	Mean Week # 1	SD Week # 1	Mean Week # 2	SD Week # 2
Step Count	1653	271.83	4625.56	1438.25
Activity Time	11.98	2.07	35.17	8.86
Moderate to Vigorous Physical Activity	9.47	1.55	32.59	8.67
Exercise Mode	Weighted Exercises		Cardiorespiratory Exercise	

Note. Table 4.8 described students' physical activity level during the FCA unit as it pertained to two exercise modes, weighted exercises and cardiorespiratory exercises.

In addition to the pedometers used to measure the students activity engagement in the unit, the students' cardiovascular fitness was also assessed using the 3 minutes step test. The step test was administered at the beginning (pre-test) of the unit and at the end of the unit (post-test). To analyze the 3 minutes step test for the student cardiorespiratory fitness, a paired sample t-test was conducted using SPSS version 21. There were significant differences in student cardiovascular fitness scores for the pre-test (M=115.79, SD =28.115) and post-test (M =190.53, SD =21.486); $t(37) = 15.740, p = <.001$. There were seven participants scores that were thrown out for the skills test because there were absent the day the assessments was administered and

was unable to reschedule another day to complete the assessments. A graphic description of students differences in the step test scores for the pre-test and post-test is illustrated in Figure 4.6.

Figure 4.6 Step Test Mean Differences from Pretest to Posttest



Summary

The qualitative findings in this section that were reported included the students and teacher perceptions of the FCA unit, classroom observation of the teacher, the students physical activity level in the FCA unit that was measured with the FITstep™ pedometer, and the minute step test. The students' perceptions of the unit were derived from one-on-one informal semi-structured interviews, demographic surveys, and a teaching methodology survey. The finding from these instrument revealed that students enjoyed the FCA unit, participated in physically activity outside of what was required for the class, and also included four themes that conveyed the strength of the unit. These themes and subthemes were unit structure (classroom procedures

and activities, and students attitude towards the unit); perception of online component of the unit (technology/online learning preferences, students' attitude towards online content, and online content organization); students' autonomy (students' perceptions of exercise benefit and student opportunity to exercise independently); and students classroom socialization. The barriers of the FCA unit included long videos, excessive content, and awareness of students learning preferences.

Likewise, the teacher perception of the unit was derived from two informal semi-structured interviews that were conducted. The themes derived from the data included teacher philosophy that emphasized functional movement, variety, overload, and competition. The teacher rationale for implementing the unit included her interest in the FCA concept, prior classroom challenges, better classroom management, students perceived benefits, for instance personalized attention, actively involved, and improve knowledge and skills level. The barriers identified by the teacher were content overload, online monitoring, and student autonomy.

The classroom observation of the teacher, the pedometer assessments and the 3 minutes step test (pre-test and post-test) were conducted to complement the thick rich description from the findings of the students and teacher experiences in the FCA unit. The pedometer assessment indicated that student activity level in the unit was highest during cardiorespiratory exercises (step count= 4625.56, activity time =35.17, Moderate to Vigorous Physical Activity =32.59) while weighted exercises were lower (step count= 1653, activity time =11.98, Moderate to Vigorous Physical Activity =9.47). There were significant differences in student cardiovascular fitness scores for the pre-test (M=115.79, SD =28.115) and post-test (M =190.53, SD =21.486); $t(37) = 15.740, p = <.001$. In chapter 5, these findings will be discussed in detail and the

conclusion, limitation, and practical implications and suggestion for future as it pertains to the effectiveness of FCA unit in physical education will be presented.

Chapter 5: Discussion and Conclusion

Discussion

In this chapter, the research project and key findings of the study are encapsulated and succinctly explained according to the central focus of five research questions: content knowledge acquisition and retention, skill development, student perceptions, teacher perception, and self-efficacy and self-regulation. In addition to the summary, I present conclusions based on research and theories presented in earlier chapters.

This study explored the implementation of the FCA in a collegiate conceptual physical education course. In other words, what happens when a physical education course is “flipped.” In the flipped classroom approach (FCA), health related fitness concepts were covered along with a skill section often referred to as conceptual physical education (CPE). The FCA was integrated to provide students with a stimulating and engaging learning environment. The health related fitness concepts aspect of the course was covered online with detailed videos on how to correctly perform 13 exercise skills. During class, the students spent their time engaging in physical activity and collaborative learning based on the concepts and skills introduced in the course. I wanted to investigate how the FCA unit influenced, 1) functionality in collegiate CPE course; 2) students’ knowledge acquisition, retention, and skills development; 3) teacher and students’ perceptions; and 4) self-efficacy and self-regulation.

The study investigated two classes consisting of muscular strength, flexibility, and cardiorespiratory fitness components. The information for the course was disseminated through a wiki page on the institution Canvas system. The health concepts were presented in videos and voice over power point that offered practical examples and detailed explanation of the concepts. This information was also accompanied with skills videos that explained and demonstrated the

correct technique for 13 of the exercise skills practiced in the classroom. Students were assigned weekly quizzes and were engaged in group activity (in pairs or no more than 5 students) during class time. The activities were often collaborative and competitive based.

The data collected in this study was obtained by myself and my data collection team. At the beginning of the investigation, several pre-tests were conducted. Students were given a health- related fitness knowledge concepts test, skills test, and a self-efficacy and self-regulation survey to complete. At the end of the study, student these instruments and tests were re-administered along with one-on-one informal semi-structured interviews and pedometer assessments. There were two one-on-one informal semi-structured interviews conducted with the teacher that taught both courses as well as classroom observation of the teacher for the duration of the study.

The data in this research was analyzed using both the quantitative and qualitative approach. The quantitative analysis approach was employed for the pre-test and post-test health related fitness concepts test, skills test, and self-efficacy and self-regulation survey. The process involved performing a paired sample t-test with the IBM Statistical Package for the Social Sciences (SPSS) version 21. The statistical analysis produced the mean, standard deviation, and identified whether there were significant relationships between pre-test and post-test. The qualitative data was analyzed using the case study method. The process involved open coding, deriving a priori and emerging codes, and comparing codes across data. The final processes involved identify patterns to derive categorizing and themes. Throughout the data analysis process I reviewed the codes numerous times, did peer debriefing with the other members of the research team, and bridled my personal knowledge and understanding of the phenomenon.

The findings from the analysis revealed that students enjoyed their overall experience in the FCA unit and were actively engaged in the learning process. The FCA unit had a positive influence on student skills development, knowledge acquisition and retention of health related fitness knowledge concepts (HRFK), and self-efficacy and self-regulation to participate in physical activity. There were several strengths and barriers to implementing the FCA as a pedagogical approach in collegiate physical education courses that were identified by both the students and the teacher.

Impact on Content Knowledge Acquisition and Retention

The students in the FCA unit attained significant improvement in the acquisition and retention of HRFK concepts. The positive learning outcome obtained from the implementation of the FCA unit was similar to those described by several studies, conducted in the science, mathematics, and engineering fields, that implemented the FCA as a pedagogical approach in their courses (Marcey and Brint, 2012; Mason, Shuman, and Cook's, 2013; Walker, Cotner, & Beermann, 2011). They are several aspects of the FCA that may have led to such positive learning outcome. As a result of the FCA having an online component, the students were exposed to more in-depth HRFK concepts that were presented to help students adopt healthy behavior, values, and healthy nutritional choices for a better-quality of life. The FCA unit included CPE content similar to those reported to have stimulated the interest of the students and were normally covered by collegiate CPE courses (Corbin and Cardinal, 2008; Keating et al., 2012; Strand, Egeberg, and Mozumdar, 2010). The content covered included the five components of fitness, benefits of exercise, exercise principles, physical wellness and nutrition, prescription for wellness, and writing personal exercise program along with exercise technique

and anatomy content. Even with the vast array of content disseminated, students were still able to enjoy their 45 minutes of physical activity because the information was offered online and did not impede on their physical activity in class.

Impact on physical activity skill development

Similarly, the approach undertaken in the FCA unit to assist in the student skill development also yielded positive results. The student skills improved significantly over the course of the unit. For each of the thirteen skills taught in the unit, a detailed video of the correct technique, the biomechanics of the skill, and the anatomy of the muscles involved to perform the skills was provided. They are a few attributes of the FCA unit that may have impacted these results. One of the attributes was the skills videos were provided online for students to access at their own convenience. Furthermore, with the videos being online and the students having to complete quizzes on exercise technique before coming to class, it provided students with an understanding and foundation for the movement.

Lastly, the students had adequate time in class to practice the skills in addition to further demonstration and feedback from the instructor. These findings support Bergmann and Sams (2012) suggestion was the FCA would be an appropriate pedagogical approach for teaching student the rules of the game and skills without taking away from their physical activity time. The success of skill demonstration through video modeling may not be the most common approach to skills development in physical education because the videos are the only source of skill demonstration that students might receive. However, if the videos are used in conjunction with supplemental instructions and feedback from an instructor, then the method could be quite

successful in improving skill acquisition and performance level as was previous study indicated (Smith, 2004).

Impact on Self-Efficacy and Self-Regulation

The self-efficacy and self-regulation constructs were essential facets of the FCA unit. They are key constructs of the theoretical framework, social cognitive theory (Bandura, 1986) and social constructivism (Vygotsky, 1978) that governed this research. The FCA, as mentioned earlier, is a student centered learning approach that focuses on the methodology of constructivism. In the FCA unit, I incorporated these theoretical frameworks to create a stimulating and engaging learning environment for the students through the activities and structure of the unit. They permitted student engagement, critical thinking, and the demonstration and application of skills and knowledge acquisition and maintenance in the unit. The initial aspect of the unit familiarized students with the FCA and provided activities so students could participate with their peers and in a group.

The second aspect of the unit focus on learning skills acquisition and knowledge about exercise and health awareness, learning how to create an exercise routine, watching videos and lectures online, accessing educational websites, discussing and exploring health concept and issues with the teacher, and completing tests and quizzes. Throughout the unit, the students were required to design their own exercise routine once a week to demonstrate there were able to apply the information learned online to create an exercise program. At the end of the unit students were required to demonstrate and apply the skills and knowledge attained through assessment.

Despite the fact, self-efficacy and self-regulation pre-test and post-test findings indicated these two constructs did not significantly influence students' perceptions of the unit, the students' self-efficacy and self-regulation scores slightly increased over the duration of the unit. Research indicated, student self-efficacy to exercise is sometimes dependent on the learning environment in which they are placed (Liang, Motl, McCauley, and Konopack, 2007). The FCA unit required students exercise on their own for one day each week and create personal exercise goals. This approach presented a physical activity environment where students had the option to either have a high or low self-efficacy to exercise on their own. Creating their weekly personal goals encouraged some emotional arousal and sense of performance accomplishment among the students.

Similar to the findings in this research, studies have reported that while self-efficacy is a core construct for exercise adherence among collegiate students, when students participated in moderate physical activities like those sometimes offered in the unit, the self-efficacy construct was not a significant predictor of physical activity behavior (Doerksen, Umstattd, and McAuley, 2009; Liang, Motl, McCauley, and Konopack, 2007). The fact the course offered both moderate and vigorous physical activity may have accounted for the sluggish increase in students' self-efficacy within the unit.

The findings also report that there were also no significant differences in students' self-regulation pre-test and post-test scores in the FCA unit. These findings were inconsistent with those of Anderson, Wojcik, Winett, and Williams (2006); Joseph et al (2011) who reported significant increases in self-regulation with an internet-based approach. The social constructivist believes individual learning and development is dependent on their ability to self-regulate (Vygotsky, 1978). In the FCA unit, self-regulation was pivotal to students' success in the course.

How well students perform in the course was based on their ability to self-regulate the online component (skill and knowledge videos) as well as effectively perform physical activity on their own. Further examination of the subcategories within the self-regulation measure indicated at the beginning of the unit, students were engaged in more planning and assessing than there were with implement physical activity. However, at the end of the unit the post-test self-regulation survey reported students were almost equally engaged in the planning, implementing, and assessing phase of physical activity within the unit. The largest gain was seen in the implementation subcategory which may delineate the effectiveness of the FCA unit in enhancing students' physical activity behavior to exercise on their own.

There may be a few rationales for why students self-regulation did not improved over the course of the unit even though they were assigned a class day to exercise on their own. The exercise log sheets which students submitted each week indicated that most students participated in exercise at a moderate intensity and might have approached the activity with one commitment in mind, completing the task for the day. Some students might have been so focus on the action of completing their exercise on that assigned day to the point where it could have depleted their ability to self-regulate their behavior. Another assumption is the possibility of some students not participating in any physical activity on the day they were assigned to participate in exercise on their own.

Students Perceptions

Since the FCA has been classified as a student centered approach to learning (Bergmann & Sams, 2012; Enfield, 2013; Johnson, 2013), students learning outcome is contingent on the student participation in the learning process. As such, the unit was created to provide an

engaging and stimulating learning environment for the students. The students indicated they enjoyed the FCA unit and all that it offered. The strengths of the unit that the students pinpointed were the unit structure, online component, student autonomy, and classroom socialization. When examining the structure of a physical education classroom, studies have reported limited activity time, lack of variety in activities, failure to address HRFK content with practicality and application to everyday life, lack of challenges, and dissatisfaction with their physical education experience (Fox, Cooper and McKenna, 2004; Mohr, Sibley, and Townsend 2012).

In spite of these earlier studies, the structure of the FCA unit proved otherwise. The students were presented with a variety of exercises throughout the unit which provided them with the necessary challenges they needed. Effective classroom management by the teacher and the students' prior knowledge of how to perform the exercises as a result of watching the videos online provided the students with adequate activity time in class. The pedometer findings that showed high moderate to vigorous physical activity, activity time, and step count during cardiorespiratory exercises are also a very positive indicator students were meeting their 30-60 minutes of daily physical activity requirements recommended by American College of Sport Medicine (ACSM) during class sessions. However, when students performed weighted exercises at a vigorous level they did not meet the ACSM requirements. This may be a result of the nature of the exercise (less movement) and the instruments ability to only measure footfall. Last but not least, the HRFK content covered online was reported to have been practical and applicable to students' lives.

The online component, like other segments of the unit, was dependent on students' technology preference and learning style. These students are 21st century learners and are often considered digital natives. As such, they enjoyed the online component of the course. There were

about 5% of the students that were hesitant to the idea of learning the skills online and this was due to their preference for a face-to-face in-class demonstration. There were also 17% who were bored with the lecture content due to their exposure and prior knowledge about the information covered. Even though this aspect of the unit did not meet the students' expectations they still enjoyed the unit due to the in-class activities. This suggested, with engaging and varying classroom activity, students will enjoy their physical education experience. The online organization and presentation of the videos was also highly acceptable. The students enjoyed the convenience of the wiki web page and Canvas server. The pages were user friendly, easily accessible, and provided them with the necessary reminders about quizzes and tests. The online quizzes and tests the unit presented were also positively received by the student because of its alignment with what was done in the course.

The online component of the FCA unit also provided students with the autonomy to complete the conceptual and skill-based aspects of the course on their own time. The students enjoyed the autonomy the unit provided. The videos of the lecture and exercise skills were available online for them to view at their convenience and as frequently as they choose. In the unit, the students also enjoyed the autonomy to create their own exercise routine and workout on their own for one day each week throughout the duration of the unit. The knowledge and skill students attained from the online content was able to equip them with the skills needed to create their personal exercise program on days that they work out on their own. This aspect of the course took on the assumption of the social cognitive theory that learning occurred in the unit through observation and modeling of the online skills videos in the classroom. The students perceived benefits of exercise, I believe also had some influence on student autonomy to participate in physical activity. The findings in this research were similar to Bathker (2013) and

Bergmann and Sams (2012) which showed with the conceptual and skill-based aspects of the class being available outside of class time, students had autonomy over their learning, received more personalized attention, and they thought more critically about the material.

Additionally, in the classroom students were also given the opportunity to contribute to exercise routine and workout with peers or in groups. Engaging students in the decision making process of the course provides them with a sense of ownership over the activities were done in the class. The students enjoyed the collaboration with their peers and groups because they could motivate each other and work together towards a common goal, which are common attributes attained from the implementation of the FCA unit. Classroom socialization influenced student perceptions of the unit and was considered as one of the strengths of the unit.

The barriers of the FCA unit which were identified were the length of some of the lecture videos, the possibility of disseminating excessive information because the content is online, and meeting students learning preferences at all levels. The two lecture videos that were twelve to fifteen minutes long were considered too excessive in length and hard for students to view at home. It may be inferred students are unable to focus for more than 10-15 minutes at a time in various environments and under certain circumstances. There are studies that support this premise (Bunce et al. (2010); Wilson and Korn, 2007) but the students in these studies were not totally disconnected in the environment over that period, there were just lapses in their attention after every 10-15 minute time span. It is my suggestion if the longer lecture videos were more interactive, consisting of embedded questions after 3-5 minutes of the video, and interesting graphics that capture students' attention, they would have been more positively received. The 5-8% of the students that preferred to learn the skills in the classroom and meet in class to participate in physical activity everyday could be met by providing adequate supplemental

demonstration in class and reinforcing to students that the day to participate in physical activity independently is good practice for cultivating the habit of practicing exercise on their own, beyond their enrollment in the course.

Teacher Perceptions

Although the FCA focuses on a students centered learning environment and the students' learning outcome is dependent on their engagement in the learning process, the teacher still have the responsibility to provide pedagogical content that is stimulating and engaging for the students. The NASPE (2007) guidelines require a quality collegiate physical education program should be able to promote an appropriate behavioral method to improve health, enhance student intrinsic motivation to engage in physical activity, and facilitate the acquisition and development of skills and knowledge students need to practice a healthy lifestyle. It is the teacher's responsibility to implement pedagogical approaches to address these areas.

In the FCA unit, the teacher was receptive to the idea of implementing a different approach so she could enhance pedagogical quality, student engagement, and learning outcome of the course. The teacher's style and philosophy that govern her pedagogical approach may have also been contributing factors to the effectiveness of the unit. Her focus was equipping the students with physical activity skills and knowledge that are practical and applicable to practicing a healthy and active lifestyle. This, she believed could be attained through functional movement, variety, overload, and classroom competition.

There were several strengths of the FCA unit that the teacher identified. Due to the advance preparation of the course content and the online component of the course, the teacher was able to present students with a variety of lessons that increased students' satisfaction with

the unit. This eliminated earlier concerns reported by Morgan & Hansen (2008) about lack of time having a profound influence on the variation of lesson content and activities the teacher delivered in class and students' satisfaction with their physical education experience. Another notable strength of the FCA unit was the online content provided the students with a foundation for the proper skills techniques taught in class, which made it easier for the teacher to better manage the classroom and provide students with more personalized attention.

The teacher also pointed out an important facet of the FCA unit is the online content provided enhanced students' skills' and knowledge about HRFK concepts. Similar to previous research (Walker, Cotner, & Beermann, 2011) and students' perception of the FCA, the teacher also indicated the unit was pivotal in enhancing students' learning. The quizzes and tests were used to aid in the learning process so students could become more educated consumers as it pertains to their health and wellbeing. The FCA unit worked well for the course because most of the students were exposed to some form of online learning or a hybrid classroom structure, so there was no resistance to idea of the course requiring them to work at home, as was identified by Herreid and Schiller (2013) in their study.

Conclusion

A student centered learning environment fosters a healthy classroom atmosphere for both the teacher and the student. In light of the knowledge of the obesity epidemic, and the emphasis on improving physical education pedagogy to encourage physical activity levels among college students, this study was designed to contribute to the understanding of effective pedagogical approaches employed to encourage engagement and enthusiasm in CPE courses in basic instruction program (BIP) among college students. Investigation into the research on FCA as a pedagogical approach in collegiate physical education revealed no prior implementation of this

approach. The focus of this current study was employing the FCA as a pedagogical tool to stimulate and engage students in the learning process with the integration of online content outside of class.

These findings suggest several courses of action for the curriculum, pedagogy, and assessments. The success of the FCA, a student centered approach, suggest that students at the collegiate level require a more personalized curriculum. While most students enroll in PE courses to improve fitness, students also have specific goals in mind that they want to accomplish especially in the spring semester. Therefore, providing students with the opportunity to be autonomous and to have a voice (as it pertains to what they will do in the physical education courses) in the activity offered in classes will lead to students being more personally connected and having a vested interest in what they are doing.

The FCA could assist physical educators and graduate teaching assistants with catering to the individual needs of the student by teaching students to create physical activity goals and incorporating activities to remind and keep students accountable for those goals. Pedagogical practices such as this contribute to the establishment of a personalized experience for students. An enriched personalized experience could lead to students encouraging their friends and classmates to enroll in PE courses.

In this research, the initial supposition was the online component of the FCA unit was effective in disseminating the HRFK and skills content to the students. It is obvious that the use of technology is pivotal to the functionality of the unit. The diversity of content available, and the various technological tools used in the unit, provides an engaging learning environment for the students. The online (technology) component was the information hub of the course and it only received its functionality from students' interaction and its ability to support the

enhancement of student learning outcome. The content enabled students to develop their physical activity skills and acquire and retained knowledge about HRFK concepts. The dissemination of information in the FCA unit could empower students to become autonomous consumers, knowledgeable, and physically active throughout their college years and later life.

The advance preparation and organization of the online aspect of the FCA could be demanding for instructors, especially if the instructors belong to the digital immigrant group. However, the information presented in the FCA could be obtained from a variety of educational resources and other professionals in the field. There may not be need to implement the FCA for an entire course but to aspects of the course requiring more in-depth information and practical application to enhance understanding. All of the videos may not need to be created by the teachers but videos on the content being covered on YouTube, Ted talks, and other educational resources are also useful if they are appropriate for the course. As a result of the advance preparation when the FCA unit began, what was left to do was class alignment, facilitate students in the activities, and provide feedback. Due to the student centered nature of the FCA, it may sometime be difficult to have a fixed content organized for the course because the course content is often driven by the students' comprehension of the information. Nonetheless, the content being readily available online gives students the accessibility to review it at any time and frequency as they desire.

Secondly, using the FCA unit did not constrain students' time to participate in physical activity; it increased variety in classroom activities and supported both a formal and informal learning environment. In the student centered learning environment, the autonomy provided could lead to the acquisition and maintenance of behavioral patterns by students to be lifelong participants in physical activity. If implementing the FCA in the same manner as this study,

where students were given a day off to exercise on their own, students should be given a few weeks to acclimatize to fundamental exercise skills and planning of exercise programs before doing exercise on their own and before implementing the FCA in physical education. Even though the FCA was unsuccessful in effectively enhancing students perceived self-efficacy and self-regulation to participate in physical activity, these behaviors may increase with prolonged intervention and follow-up. Incorporating the SCT (Bandura, 1997) and social constructivist theory (Vygotsky, 1978) into classroom pedagogy could be one of the strategies used to enhance students learning, behavior, and overall classroom environment.

Thirdly the teacher in the FCA unit adapted the role of the facilitator. The unit was effective because the teacher had a student centered learning style. The role of a facilitator may not align with some teachers' style of teaching, which might make the FCA a difficult pedagogical approach to implement for some in physical education. It is necessary to understand, being the facilitator did not eliminate the teacher's duties. During the class the teacher provided supplemental demonstration and feedback when necessary and guided the students through their exercise routine. The online content was never intended to be used to teach the students but to supplement what they were doing in the classroom.

It is my belief that a physical educator or practitioner would implement the FCA as a pedagogical approach into their learning environment for the follow reasons. The FCA fosters a student centered classroom, provides personalized experience, and the content can be disseminated online and presented in short segments. Likewise, the FCA diminishes common problems such as lack of exercise variety, inadequate class time to perform exercise, and difficulties addressing the needs of everyone due to the time being monopolized by the same group of students. The FCA also uses technology to bridge the divide between the students

(digital natives) and the teacher (who are sometimes digital immigrants), integrating the digital language of students, providing videos for educational use and easy accessibility, and engaging the learner through practical application.

The FCA as a pedagogical approach is implementable in many fields of study and has been proven to be an effective method for enhancing learning outcome in the fields of science, mathematics, and engineering. Both the institution and their BIP could benefit from the implementation of the FCA in physical education. The fitness centers, intramural sports programs and the BIP have the opportunity to collaborate through a common goal: having a healthy and physically active campus. The BIP offering FCA courses where students receive conceptual knowledge and physical activity two days per week with the third class day being assigned for students to participate in physical activity at an on-campus fitness center or on an intramural sport team, will provide diversity to physical education programs. It will also expose students to the types of services being offered by the institution's fitness centers and intramural sports teams on campus.

Limitations of the study

The limitations in this study included the small sample size of the population investigated in the study, which could create some adversity as it pertains to making a generalization to populations outside of the ones being investigated. Another limitation included the use of the of pedometers to obtain student activity time during their physical activity session. The pedometer only measures the students' footfall; as such, it was unable to provide a true measure of students' activity time when doing weighted exercise. Weather interruption also did not allow for sufficient time to complete some of the activities as planned, losing almost 2 weeks of data

resulted in some modifications to the unit such as excluding classroom activities and the group project that the unit initially required.

Recommendations for Future Research

The transference of college physical education from basic skills-based courses to incorporating a conceptual aspect to physical education has encouraged the implementation of various pedagogical approaches. The conceptual aspect, as mentioned previously, was created to equip students with the knowledge need to be autonomous consumers about their health and wellbeing (Kulinna, Warfield, Jonaitis, Dean, & Corbin, 2009). In recent years, there has been a limited number of investigations into collegiate student autonomy and engagement in physical education. Likewise, there has been a gap in the literature with regards to effective pedagogy which fosters such classroom environments. The evidence in this research clearly indicates the effectiveness of the FCA in engaging, stimulating, and nurturing a student centered classroom learning environment. This study employed an exploratory case study approach; there is, however, need for more quasi-experimental research in physical education.

It is recommended that future quasi-experimental research be undertaken to examine the effectiveness of the FCA in comparison to a traditional CPE course and also how the classroom ecology differs. This would provide further understanding into the necessity for implementing the approach in physical education. More research is required to determine how students with high and low self-efficacy and self-regulation interact with the FCA with a prolonged intervention and follow-up of collegiate students. It would also be interesting to assess how the different genders interact with the FCA because a large component of it is online, and research (Heafner, 2014; Mitts, 2008; Weber & Custer, 2005) has indicated males and females respond

differently to technology. Understanding the different gender response not only to technology but with different technological tools, would be important to getting students more engaged and enthusiastic about their learning and physical activity.

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Appendix A

Flipped Classroom Approach in a Resistance Training Unit

Overview

The resistance training Flipped Classroom Approach (FCA) unit will provide students with the opportunity to use classroom time specifically for practice and gain a great deal of knowledge about why it is important to be physically active and what is required for them to live healthy and active lives. The content knowledge will be available online in the form of videos and voice over power-points for students to access outside of class time. The students will be required to complete pretest and posttest of 14 skill movements in class and a pretest and posttest of Health Related Fitness Knowledge online. The course will be three days per week for 50 minutes. The students will meet 2 day for class and the extra day the class will not meet. On the day that class is not held students will be required to attend group fitness activity or an activity of their choice at the wellness center. In order for the participants to experience the FCA in its entirety time must be allocate for: 1) familiarization with the FCA, participate in peer and group activities (initial engagement); 2) use technology to learn skills acquisition and knowledge about exercise and health awareness, to create exercise routine, watch videos and audio lectures, access educational website, and discussion boards (concept exploration), complete discussion post, tests, and reflections; and 3) create individual exercise program (demonstration and application).

The FCA unit consisted of thirteen major muscles exercises containing 1) squat, 2) dead lift, 3) bench press, 4) calf raises, 5) bicep curl, 6) hip abduction, 7) back extension, 8) bent-over rows, 9) push-up, 10) lunge, 11) triceps kick back, 12) sit-up, 13) shoulder press. The frequency and type of exercise was aligned with ACSM (2011) recommendations for resistance exercise for adults, 2-3 day per week working the major muscle groups. The skill acquisition and development of these exercise skills along with contextual knowledge about the exercises and its respective importance to maintaining a healthy and active lifestyle will be delved into during this unit.

The FCA unit began with week-1 introducing and familiarizing participants to the FCA by providing an introductory video of what the FCA is and some rationale for the teacher implementation of the unit. A pre-test assessment was conducted to gauge where the participants were currently in terms of their skill level and Health Related Fitness Knowledge. Participants were paired with peers for physical activity sessions throughout the unit and skills will be demonstrate using technology and practiced in class. This was followed with week 2-11, participants actively being engaged in their learning by viewing online lecture about the HRFK of physical activity, watching videos of the thirteen major muscles exercises and demonstration of the correct techniques about how to perform these exercises, as well as learn about the importance function that the thirteen major muscles group exercises have in physical activity and health. To ensure that these online lectures are viewed, short quizzes were administered at the

end of each lecture. During the unit students were also engage in discussion board posts and reflection activities.

Varying activities were also incorporated into the class physical activity time based on the skill development progression. At the midpoint of the unit participant were placed into groups to work together to create a circuit training routine for the class. Throughout the unit students were required to create personalized exercise program and submit a log sheet of those exercise. Additionally, at the end of the unit post-test of the skills and HRFK content were conducted to assess participants' skill proficiency of the thirteen major muscles exercises and cognition of their HRFK.

Objectives and Skills that will be accomplish by the end of the unit

- Students will demonstrate how to operate exercise equipment and free weights.
- Students will explain concepts and benefits of resistance training.
- Students will identify muscle names, their actions, and exercises to train those muscles.
- Students will development and submit a circuit training routine, incorporating the basic training concepts.
- Students will identify and demonstrate how to work and measure the cardiovascular system.
- Students will explain health Related Fitness Knowledge, styles of training, flexibility concepts, and amending workouts.

Equipment

- Exercise equipment

Safety

- Post and review the “rules of the workout area.”
- Keep a medical kit in the workout area during all classes.
- Stress that students need to stretch before each exercise.
- No horsing around with equipment or while exercising will be tolerated.

Relation to NASPE Learning Standards

Adopted from Matthew Cummiskey (2013), *Fitness Programs & Curriculum for Schools* and Flynn, D., & Johnson, A. (2013). *Unit Plan for weight training*. Acne High School, CA

1. Demonstrate competency in a variety of physical activities:
 - Exhibit correct form for all exercises listed on the resistance exercise charts.
2. Know that motor skills progress in complexity:
 - If a student or students has mastered the basic technique for skills, teach the more complex version. Examples include technique variations to focus on a different area of the muscle, plyometric ... etc.
3. Adjust technique based on feedback, including self-assessment:
 - Have a student self-analyze their technique and compare their critique against the teachers.
 - Use videotaping on iPad to assist self-assessment or analyze a partner's performance during an exercise.
4. Understand the relationship between physical activity and the prevention of illness, disease, and premature death:
 - Demonstrate proper technique in various skills to prevent injury.
 - Relate how improper form on various exercises can result in injury.
 - Discuss the prevalence of shoulder injuries, knee discomfort, and tendonitis among lifters.
5. Recognize the importance of safe physical conditions:
 - Have students keep work area clear and store equipment in right place after use.
6. Develop skills of cooperation, as well as fairness, sportsmanship, and respect for others.
 - Discuss weight room etiquette such as no screaming while lifting, no spitting in the drinking fountain, re-racking all used weights, allowing those using a circuit the right of way ... etc. .
 - Show respect to all persons regardless of ability and acknowledge the achievements of others through positive support.
7. Understand the role of sport as a balance between cooperative and competitive behaviors and as a tool to sharpen leadership and problem solving skills:

- Set up teams/groups and create a competition based upon which each group competes to obtain the maximum reps of a particular exercise or set of exercise within an allotted time. Another option is to assign a certain amount of time to each member of the group so that everyone could play an active role.

Assessments

- Pre-test of upper body exercise skills, lower body exercise skills, and 3-minutes step test.
Post-test of upper body exercise skills, lower body exercise skills, and 3-minutes step test.

Integration with other Curriculum

- Math: Calculating exercise workload (intensity) which involves basic arithmetic and percentages.
- Physics: Explain why certain muscular angles during exercise make the workload most difficult e.g. full extension and full flexion.
- Health: Explain excellent muscular endurance training with proper conditions and cardiovascular training.
- Technology: Use technology to access health resources

Technology Integration

- iPads and personal computers were used for viewing of skills demonstration, recording student skills execution and providing immediate feedback, record keeping, providing class announcement, and to complete quizzes.

Modified Conditions

- Show the video documenting proper form on how to perform various exercise skills. Show other videos of experts or high profile sports figures performing exercise.
- Cardiovascular day of jogging around campus

Miscellaneous Information

- Before exercise lesson begins students performed a warm-up to prepare for exercise.
- Each session began with a quick review of the skill/techniques that was used in the exercise lesson.

- Throughout each lessons students worked individually, in pairs, or in groups depending on their tasks.
- Between exercise sets students were given 2-3 minute rest base on the intensity and length of set. During this time students were reminded that they should get water if needed and rest.
- Lesson concluded with stretching of the muscle groups trained. This may be students lead or be done by the instructor.
- Videos of exercise skills and proper technique required to perform the skills was posted online before the start of the first lesson.

Sample Lesson Plans

Week 1

- **Lesson 1-** Introduce and familiarization to the Flipped Classroom Approach resistance training unit with an online videos. Discuss were to access videos and what is required of them. Discuss student individual goals for the course. Pre-test was conducted on students.
 - Warm-up
 - Activity: upper body exercise skills test.
 - Cool-down with stretches
 - Complete Health Related Fitness Knowledge (HRFK) test online outside of class time.
- **Lesson 2-** Discuss HRFK test, student pre-test assessments continues
 - Warm-up
 - 3-minute step test
 - Activity: Circuit/flexibility
 - Review online videos of concepts of fitness, short and long term goals, planning exercise program outside of class time, and answer short quiz at the end.
- **Lesson 3-** Discuss concepts of fitness, student pre-test assessments continues
 - Warm-up

- Lower body exercise skills test
- Cool-down with stretches
- Discuss the skills incorporated in lesson for next week.
- Students review videos of skills and scientific exercise principles online and answer short quiz at the end outside of class time.

Week 2-11

- **Lesson 4-** Discuss scientific exercise principles and skills viewed on videos online
 - Warm-up
 - Activity: Upper body exercise and abs lesson
 - Cool-down
- **Lesson 5-** Class will not meet. Students are encouraged to use class time to participate in group fitness activity or activity of one's choice. Turn in an activity sheet of what was done. Review videos of lower body skills and exercise benefits and answer short quiz at the end.
- **Lesson 6-** Discuss exercise benefits and the skills viewed on videos online
 - Warm-up
 - Activity: Lower body exercise lesson
 - Cool-down with stretches
 - Discuss the skill that will be incorporated in lesson for next week.
 - Students review videos of skill and components of physical fitness and answer short quiz at the end
- **Lesson 7-** Discuss components of physical fitness and skills viewed on videos online
 - Warm-up
 - Activity: Cardiorespiratory exercise and abs lesson
 - Cool-down
- **Lesson 8-** Class will not meet. Students are encouraged to use class time to participate in group fitness activity or activity of one's choice. Turn in an activity sheet of what was

done. Review videos of lower and upper body skills, cardiovascular fitness, and answer short quiz at the end.

- **Lesson 9-** Discuss cardiovascular fitness and skills viewed on videos online
 - Warm-up
 - Activity: Whole body circuit lesson
 - Cool-down with stretches
 - Discuss the skills that will be incorporated in lesson for next week.
 - Students review videos of skill and flexibility concepts and answer short quiz at the end

- **Lesson 10-** Discuss flexibility concepts and skills viewed on videos online
 - Warm-up
 - Activity: flexibility/abs lesson
 - Cool-down

- **Lesson 11-** Class will not meet. Students are encouraged to use class time to participate in group fitness activity or activity of one's choice. Turn in an activity sheet of what was done. Review videos of skills and effect of exercise on chronic disease risk factors and answer short quiz at the end.

- **Lesson 12-** Discuss effect of exercise on chronic disease risk factors and skills viewed on videos online
 - Warm-up
 - Activity: Upper body exercises lesson
 - Cool-down with stretches
 - Discuss the skills that will be incorporated in lesson for next week.
 - Students review videos of skill, exercise prescription, how to create an exercise program, and answer short quiz at the end

- **Lesson 13-** Discuss exercise prescription, how to create an exercise program, and skills viewed on videos online
 - Warm-up

- Activity: Lower body exercise lesson
- Cool-down with stretches
- **Lesson 14-** Class will not meet. Students are encouraged to use class time to participate in group fitness activity or activity of one's choice. Turn in an activity sheet of what was done. Review videos of upper body skills and answer short quiz at the end.
- **Lesson 15-** Discuss amending workout and skills viewed on videos online
 - Warm-up
 - Activity: Upper body exercises and abs lesson
 - Cool-down with stretches
 - Discuss group project and post the groups that student are assign to online
 - Discuss the skills that will be incorporated in lesson for next week.
 - Students review videos of skill, styles of training, and answer short quiz at the end
- **Lesson 16-** Discuss styles of training and skills viewed on videos online
 - Warm-up
 - Activity: Student exercise of choice
 - Cool-down with stretches
- **Lesson 17-** Class will not meet. Students are encouraged to use class time to participate in group fitness activity or activity of one's choice. Turn in an activity sheet of what was done. Review videos of various exercise skills, normative exercise measures, and answer short quiz at the end.
- **Lesson 18-** Discuss amending workout and skills viewed on videos online
 - Warm-up
 - Activity: Abs lesson
 - Cool-down with stretches
 - Discuss progress of group project
 - Discuss post-test skills assessment for next week and HRFK test.
 - Students review videos of skill

- **Lesson 19-** Discuss HRFK content
 - Warm-up
 - Activity: upper body exercise skills test.
 - Cool-down with stretches
- **Lesson 20-** Discuss upper body exercise goal attainment
 - Warm-up
 - 3-minute step test and 1-minute sit-up test
 - Activity: flexibility/conditioning
- **Lesson 21-** Discuss whether students attained goal for overall course
 - Warm-up
 - Lower body exercise skills test and sit and reach test
 - Cool-down with stretches
 - Complete Health Related Fitness Knowledge (HRFK) test online outside of class time.
- **Last week or 2 of the semester post assessment.**

Cognitive Information

This information is distributed to all students at the beginning of the unit. Students were asked to view online videos or voice over power-points of specific sections that will be addressed each day and a short discussion will be done about the videos prior to exercise. The videos and voice-over power-point was available for students to view at any time.

Workout Chart: Why use one?

1. Tracks progress or lack thereof. The data is the impetus for changing a workout or maintaining the current one.
2. The weight for the next workout can be written in ahead of time considering the ease or difficulty of the current set.
4. They organize your workout *so* that you follow a logical pattern of what you did on certain day and serve as a reference exercise outside of class time and after the class has concluded.

Concepts

1. Challenge muscles - students should try and feel a burning sensation in the muscles upon completion of their set. If this occurs before or after the number of desired repetitions, make some adjustments accordingly because the repetitions are a constant, the weight or intensity should change. For example, if it takes 20 repetitions to feel the desired “burn”, increase the weight.
2. Mass versus toning program - If you wish to increase the strength and size of a muscle, use high weights with low reps (6-8) and continue until failure. If you wish to increase strength without an increase in muscle size (toning), use lower weights with higher reps (12- 15) and do not continue until failure.
3. A muscle should never undergo weight training two days in a row.
4. Muscle imbalances - Antagonistic muscles should be trained equally because muscle imbalances lead to injury. For example, the quadriceps and hamstring perform opposite actions and therefore should be equally strong.
5. Flexibility loss - Resistance training tends to decrease muscle flexibility. Therefore it is essential that muscles which undergo weight training be stretched before and after lifting.
 - a. Stretching decreases muscular soreness, prevents injuries, increases performance and offsets the flexibility loss often incurred during resistance training.
6. Exercise sequencing - A workout has five definite stages which consisting of the warm up, stretching, the workout itself, a cool down, and stretching. If a workout consists of both weight training and cardiovascular training, the weights should be done first to prevent injury.
7. Cardiovascular exercise - Can be done every day, doesn't need a day to rest, and is an excellent method for reducing body fat.
8. VARIETY - The body feeds upon challenges and overloads to the system. A program should be changed approximately three months to prevent gains from plateauing.

Benefits

1. Strength - Adequate resistance training will improve both muscular strength and endurance.
2. Appearance - Proper resistance training will result in a more defined and ‘cut’ body.
3. Metabolism increase - A person's daily caloric expenditure will increase because muscle is an active tissue requiring more energy to sustain itself.
4. Body fat reduction - The added muscle tissue will “burn” more calories and will reduce a person's body fat or slow the accumulation of it.

5. Increased athletic performance - An athlete will be able to generate greater slow twitch fiber power. His or her explosive abilities will be mostly unaffected.
6. Increased bone density - The body's skeletal system will respond to the increased demands by depositing more bony material on the bones being used during resistance training.
7. Increased energy - Resistance training has been reported to increase energy in the course of a day and lead to individuals becoming tired less easily.

Actions

1. Flexion - A decrease in the joint angle.
2. Extension - An increase in the joint angle.
3. Abduction - A body segment moves away from the body.
4. Adduction - A body segment moves towards the body.

Cardiovascular

1. Define - Cardiovascular is the condition of one's heart and vascular system.
2. Resting heart rate - A normal adult's resting heart rate is between 60 and 80.
3. How improve - Cardiovascular endurance improves with moderate intensity, long duration exercise which incorporation the body's large muscles such as swimming, jogging, bicycling ... etc. A method commonly employed to determine whether or not a person is exercising sufficiently intense to improve their cardiovascular endurance is by comparing their heart rate to their target heart range (THR). A person using the THR method tries to keep their pulse rate between two numbers.
4. Target heart range - Target heart range is calculated by:
 - a) Finding a person's maximum heart rate which is 220 minus their age.
 - b) Multiplying a person's maximum heart rate by a training range which is determined by how "in shape" you are.
 - 1) Below 60% - not cardiovascular conditioning except for the grossly out of shape.
 - 2) 60 and 75% - good cardiovascular training for people new to cardiovascular training but in relatively OK condition.
 - 3) 70 and 85% - good cardiovascular training for people already

in relatively good shape.

4) Above 85% - anaerobic conditioning, not cardiovascular conditioning.

c) Example: Determine the target heart range of Pete. He's 20 years old, in OK shape, and really wants to lose a few pounds.

1) Maximum heart rate: $220 - 20 = 200$

2) Target heart range lower number: $200 \times 60\% = 120$ beats per minute

Target heart range upper number: $200 \times 75\% = 160$ beats per minute

3) Therefore this person's target heart range is 120 - 160

4) For Pete to accomplish his goal of losing weight, he should exercise a minimum of thirty minutes three times a week in his target heart range.

5. Importance - Heart disease is the greatest killer in America and exercising one's cardiovascular system lessens the likelihood of such problems and increases the lifespan.

Styles of Training

1. Styles of Training

a) Toning program - low weights, high reps, 12-15 reps with moderate "burn" upon commencement of last rep.

b) Mass program - high weight, low reps, and failure achieved between 6th and 8th rep. Additional spotter supported repetitions suggested.

2. Concentric versus eccentric contractions

a) Concentric contractions are when a muscle shortens under tensions. For example, the biceps shortens to produce flexion at the elbow.

b) Eccentric contractions are when a muscle lengthens under tension. For example, you've just completed a bicep curl and the elbow is completely flexed. The biceps gradually lengthens to allow the arm to straighten. Note that biceps raises and lowers the weight even though extension at the elbow is normally associated with the triceps.

c) Another example: During a squat, the quadriceps lengthen eccentrically to allow your knees to bend then shorten concentrically to allow your knees to extend making you stand up.

Flexibility Concepts: To improve flexibility,

1. Frequency - Every day each week to improve flexibility, three times per week to maintain flexibility.
2. Time - Hold each stretch for 30 seconds to improve flexibility, 10 seconds to warm up prior to activity.
3. Intensity - The stretch should feel a burning sensation in the relevant muscle. There should at no time be any pain. It is helpful to achieve the maximum range of motion your flexibility will allow, and concentrating on relaxing the muscle, go a bit further.
4. Ballistic or bouncing stretching should be avoided due to potential injury.

Amending Workout: Weight training a muscle two consecutive days is detrimental to strength improvement. Some people inadvertently do so without realizing some exercises incorporate muscles used the day prior. Therefore, different programs exist which allow for one full day of rest for a muscle.

1. Day on, day off - Exercise your whole body one day, then take the next day off.
2. Upper body, lower body - Exercise the muscles in your upper body one day, the next day exercise those in your lower body.
3. Muscle pairings - May be combined into a two day or three day rotation
 - a) Back/Biceps - lats, rhomboids, posterior deltoid, trapezius, low back, and biceps
 - b) Chest/Triceps/Shoulders - pectoralis major (upper, middle, and lower portions), deltoids, and triceps.
 - c) Legs, abdominals - Quadriceps, hamstring, gastrocnemius, hip flexors, hip extensors, abdomens, obliques.

Fitness Testing

1. Measuring a person's skill development using skills rubric criteria.
2. Measure a person cardiovascular fitness using the 3-minute set test

Normative Exercise Measures

1. Body fat for women
 - 0 - 10% - Unhealthy
 - 10-30% - Normal

>30% - Obese

2. Body fat for men

0 - 5% - Unhealthy

5 - 25% - Normal

>25% - Obese

3. Blood Pressure: mmHg

Diastolic: blood pressure while heart rests

<80 Healthy

80 - 90 Borderline

>90 High

Systolic: blood pressure while heart beats

<130 Healthy

130-140 Borderline

>140 High

4. Resting Heart Rate: beats per minute

60 - 80 Normal adult

80 - 100 Normal child

100 - 120 Normal infant

Health Related Fitness Knowledge Test

The HRFK test comprises of 29 questions that measures five fitness content constructs; concepts of fitness, scientific exercise principles, components of physical fitness, effect of exercise on chronic disease risk factors, and exercise prescription.

Muscular Strength

Sample Resistance Training Exercises Skill Cues

Leg Exercises:

Squat- 1. Focus your mind on your thigh muscles.

2. Feel yourself pushing through your heels.

Instructions:

1. Position your body in the squat rack so that the barbell rests behind your head on your shoulders and trapezius, not on your neck. Have a little bend in your knees, and take a comfortably wide grip on the bar.

2. Straighten your legs to lift the bar and then take one step backward

3. Stand with your feet about shoulder width apart with your toes pointing forward at their natural angle

4. Maintain the natural curve of your spine by tensing your abdominal and lower back muscles. Keep your head up, looking forward, throughout the exercise

5. Squat down until your thighs are slightly below parallel to the floor, being sure to keep your torso fixed in the most erect position possible throughout the movement and your knees moving out in the same direction as your feet

6. Reverse the movement and return to the starting position

7. The entire motion should be done in a smooth, controlled manner that lasts about 4 seconds, with the downward movement no faster than the upward

8. Do not bounce at the bottom of the movement and never lock your knees at the top

Chest Exercises:

Barbell Bench Press- 1. Focus your mind on your chest (Pectoral) muscles

2. Feel yourself pushing through the inside of your elbows

Instructions:

1. Lie on a flat bench with your feet on the ground and your shoulders about 3-4 inches down the bench from the uprights

2. Grip the bar about 3-4 inches wider than shoulder width and space your hands evenly using the markings on the bar

3. Lift the bar off the rack to a point directly above your shoulder joints

4. Lower the bar to the center of your chest (Pectorals) with your upper arms moving directly out to the sides; touch your chest lightly
5. Press the bar up to the starting position; do not lock your elbows at the top
6. The entire motion should be done in a smooth, controlled manner that lasts about 3 seconds, with the downward movement no faster than the upward
7. Do not bounce the bar off your chest and always keep your buttocks on the bench

Arm Exercise:

Bicep Curls- 1. Focus your mind on your Biceps muscles

2. Feel yourself pulling through the inside of your wrists

Instructions:

1. Hold the barbell along your upper thighs with a shoulder width grip and palms facing forward
2. Stand with your feet shoulder width apart with a slight bend in your knees and maintain the natural curve in your low back throughout the movement
3. Curl the barbell up towards your chest until it is close to your chin, being sure to keep your elbows and upper arms fixed against the sides of your torso throughout the movement
4. Reverse the movement and return to the starting position
5. The entire motion should be performed in a smooth, controlled manner that lasts about 3 seconds with the downward movement no faster than the upward

Triceps Kickback- 1. Focus your mind on your Triceps muscle

2. Feel yourself pushing through the outside of your wrist

Instructions:

1. Grab the dumbbell with your left hand and place your right foot forward and your left foot slightly behind you
2. Place your right hand on a flat bench and bend over until your torso is parallel with the floor. Lean on right arm for support
3. Keeping your left arm against your body, your left upper arm parallel with the floor, and your left palm facing your body, bend your left arm to form a 90 degree angle

4. Straighten your left arm and hold it there a moment
5. Return the dumbbell to the starting position
6. The entire motion should be done in a smooth, controlled manner that lasts about 3 seconds, with the downward movement no faster than the upward
7. After completing your reps for one side, reverse sides and repeat

Bench Dips- 1. Focus your mind on your Triceps muscles

2. Feel yourself pushing through the back of your elbows

Instructions:

1. Place two flat benches in a parallel position, about 2+ -3 feet apart
2. Put your feet on one bench and your hands behind you on the other, about 7-8 inches apart
3. Starting with your arms straight, lower your torso as far as possible between the benches
4. Press your body back to the starting position
5. The entire motion should be done in a smooth, controlled manner that lasts about 3 seconds, with the downward movement no faster than the upward

Back Exercises:

Dead Lifts- 1. Focus your mind on your lower back (Spinal Erector) muscles

2. Do not let your knees go out past the tips of your toes

Instructions:

1. Take a shoulder width grip on the barbell with an alternating palm grip (one palm up and the other palm down)
2. Your feet should be about shoulder width apart and your knees should be bent at the starting position
3. Your lower and upper back should remain straight and your head up throughout the movement
4. Begin by sticking your chest forward to properly align your back. Straightening your legs and then erect your torso, as if you were standing up from a chair; you should end the movement in the standing position with your chest sticking out

5. Return to the starting position by slowly lowering the weight toward the ground
6. The entire motion should be performed in a smooth, controlled manner that lasts about 4 seconds, with the downward movement no faster than the upward

Muscular Endurance

Abs Session

The instructor will conduct an abdominal strength training class involving all the major muscle groups. Students should be able to see and feel a difference at the conclusion. The “ab blast” sessions can continue if the students request so. Be sure to properly stretch at the conclusion of each session.

Pre-class instructions:

- 1) Ask if anyone has lower back problems.
- 2) Provide mats for those needing them.

Variations on activities:

- 1) Hold
- 2) Pulse
- 3) Half up, half down

Activities by portion of abdominals: choose from the following

Upper/Mid Abdominals - crunches

- eccentric slow lowering of upper body
- long crunch

Entire abdomens

- circle crunches
- arms to middle
- frog
- air bike
- full up

Obliques

- alternate knee to elbow
- lay knees to side
- cross legs
- up, right, middle, right, middle

Lower abs

- heels to ceiling
- rocking horse
- reverse crunch

Stretches

- all fours, look over shoulder
- sit down backwards
- elongation - leaning willow

Cardiovascular Endurance

3- Minutes Step Test

Format:

1. Demonstrate the alternating (Up 1-2 and Down 3-4) stepping cadence to the subject.
2. Allow the subject to practice the stepping to the metronome cadence which is set at 96 bpm (4 clicks = one step cycle) for a stepping rate of 24 steps per minute.
3. The subject will step up and down on a 12-inch bench for 3 minutes. They will count the total amount of steps that they have attained during the three minutes
4. Immediately after the 3-minute stepping exercise, the students tested their heart rate at the radial artery for one minute. The full minute count reflects the heart's rate at the end of the exercise plus its ability to recover.
5. The total one-minute post-exercise heart rate is the subject's score for the test. The number of steps that the students obtained were also used as scores on the test.

Compare Step Test Norms

Men						
	Age					
<u>Classification</u>	15-25	26-35	36-45	46-55	58-65	Over 65
Excellent	70-78	73-79	72-81	78-84	72-82	89-95
Good	82-88	83-88	86-94	89-96	89-97	89-95
Above Average	91-97	91-97	98-102	98-103	98-101	97-102
Average	101-104	101-106	105-111	109-115	105-111	104-113
Below Average	107-114	109-116	113-118	118-121	113-118	114-119
Poor	118-128	119-126	120-128	124-130	122-128	122-126
Very Poor	131-164	130-164	132-168	135-158	131-150	133-152
Women						
	Age					
<u>Classification</u>	15-25	26-35	36-45	46-55	58-65	Over 65
Excellent	72-83	72-88	74-87	76-83	74-92	73-86
Good	88-97	91-97	93-101	96-102	97-103	93-100
Above Average	100-106	103-110	104-109	106-113	106-111	104-114
Average	110-116	112-118	111-117	117-120	113-117	117-121
Below Average	118-124	121-127	120-127	121-126	119-127	123-127
Poor	125-137	129-135	130-136	127-133	129-136	129-134
Very Poor	142-155	141-154	143-152	138-152	142-151	136-151

Personal Exercise Program Project

Exercise Training Routine

Each student was asked to develop weekly personalized individual exercise training routine. The exercise training routine should best address their fitness needs, meet them at their skill level, and be age appropriate. The four areas of health related fitness must be addressed:

- Muscular strength
- Muscular endurance
- Cardiovascular endurance
- Flexibility

In addition, to satisfying the health related fitness component during the exercise training routine, the routine should also address the FITT principle:

- Frequency
- Intensity
- Time
- Type

The exercise training routine must focus on areas to improve their overall physical fitness and stimulate enjoyment and engagement in the activity.

Appendix B

Health Related Fitness Test

Instructions: Answer the questions to the best of your ability. Circle the answer that applies.

1. The most accurate indicator of cardiorespiratory fitness is
 - A. percent body fat.
 - B. maximal oxygen uptake.
 - C. resting heart rate.
 - D. vital capacity.

2. An individual's heart rate immediately after exercise indicates
 - A. the recovery rate of the heart.
 - B. the strength of the heart.
 - C. the intensity of the exercise.
 - D. all of the above.

3. Which of the following occurs to muscle fibers with regular weight training?
 - A. Increase in number
 - B. Increase in size
 - C. Increase in length
 - D. Increase in fat

4. After several months of endurance training, a person's heart rate is expected to
 - A. increase.
 - B. decrease.
 - C. remain unchanged.
 - D. become irregular.

5. With regular moderate activity, such as walking half an hour, one can maintain
 - A. sufficient health fitness.
 - B. sufficient performance but not health fitness.
 - C. continual improvement in performance.
 - D. neither performance nor health fitness.

6. Which of the following exercises will most likely lead to an increase in muscle size?
 - A. Weight lifting
 - B. Walking
 - C. Running

D. Bowling

7. Which one of the following types of activities burns the most calories?

- A. Resistance exercises
- B. Stretching exercises
- C. Calisthenics
- D. Aerobic exercises

8. Which of the following is LEAST likely to be an aerobic activity?

- A. Jogging
- B. Rope skipping
- C. Weight lifting
- D. Swimming

9. Shortness of breath after moderate physical activity most likely indicates limitations in

- A. body composition.
- B. muscular fitness.
- C. cardiorespiratory fitness.
- D. speed.

10. Exercising your muscles repeatedly against a resistance requires

- A. strength.
- B. flexibility.
- C. coordination.
- D. muscular endurance.

11. The best definition of muscular strength is

- A. the ability to run the fastest, jump the highest, and throw the farthest.
- B. the maximal amount of force that a muscle or a group of muscles can exert in a single contraction.
- C. the ability to carry out heavy workloads over extended periods of times.
- D. the maximal power released within a unit of time.

12. What is the ability to move a body part through all or part of the full range of motion?

- A. Endurance
- B. Strength
- C. Flexibility
- D. Agility

13. People who exercise for six to eight weeks may actually gain weight because of an increase in
- A. appetite.
 - B. muscle size.
 - C. body fat.
 - D. metabolism.
14. Which health problem is associated with obesity (a high percent of body fat)?
- A. Diabetes
 - B. Hypertension
 - C. Lower exercise tolerance
 - D. All of the above.
15. Which activity best fits a 5 day a week, 30 minutes a day exercise schedule to maintain minimal good health?
- A. Golf
 - B. Bowling
 - C. Walking
 - D. Archery
16. The primary purpose of circuit training, a systematic approach to rotating the muscle groups in weight training, is to
- A. maintain variety in the exercise program.
 - B. make the training enjoyable.
 - C. provide an unique program of exercise.
 - D. delay the onset of fatigue.
17. The pulse on the wrist is found on the
- A. thumb side when the palm is turned down.
 - B. thumb side when the palm is turned up.
 - C. little finger side when the palm is turned down.
 - D. little finger side when the palm is turned up.
18. Which of the following is a varied program of conditioning exercises?
- A. Endurance training
 - B. Circuit training
 - C. Interval training
 - D. Strength training
19. What two substances supply most of the body's energy during vigorous physical activity?

- A. Vitamins and proteins
 - B. Proteins and fats
 - C. Carbohydrates and fats
 - D. Fats and vitamins
20. The American Heart Association recommends that dietary cholesterol be limited to not more than 300 mg per day because cholesterol
- A. is constipating.
 - B. is fattening.
 - C. isn't essential to the body.
 - D. may be a risk factor in heart disease.
21. The best way to stick to your daily food calorie goals is to
- A. change your daily schedule.
 - B. stay out of the kitchen.
 - C. plan your weekly menus in advance.
 - D. don't think a lot about food.
22. Muscle stretching should be undertaken
- A. before exercise only.
 - B. after exercise only.
 - C. both before and after exercise.
 - D. either before or after exercise, if muscle stiffness is felt.
23. If nausea is experienced after exercise, one should
- A. extend the warm-up period and maintain the intensity of exercise.
 - B. extend the warm-up period and reduce the intensity of exercise.
 - C. reduce the intensity of exercise and increase the cool-down period.
 - D. increase the intensity of exercise and increase the cool-down period.
24. The body adapts to a gradual increase in the amount of exercise is the definition of?
- A. progressive overload
 - B. specificity of training
 - C. the principal of reversibility
 - D. the principal of assessment
25. Cardio respiratory endurance is best measured in terms of?
- A. maximal oxygen consumption
 - B. minutes per mile
 - C. maximal pounds lifted

D. blood pressure

26. The most important exercise factor for achieving training effects is?

- A. duration
- B. repetition
- C. frequency
- D. intensity

27. Recommended treatment of minor soft tissue injuries includes all of the following except?

- A. rest
- B. elevation
- C. ice
- D. massage

28. Mini-goals help a physical fitness program by?

- A. adding variety to a fitness program
- B. keeping a program on track
- C. identifying new exercises
- D. providing help in the beginning

29. Keeping a record of daily progress will help maintain a physical fitness program by all of the following except?

- A. reinforcing your commitment
- B. providing a sense of accomplishment
- C. monitoring your goals
- D. determining the right exercise

Appendix C

Quizzes Administered in the FCA unit

Quizzes for FCA Videos

10 Health Related Fitness Knowledge

1. Flexibility

1. Good flexibility has been shown to convey all of the following benefit except?

- a. improve performance in sports
- b. prevention of injuries
- c. prevention of muscles soreness
- d. improve body composition

2. Which of the following is not true about over stretching?

- a. It can be a benefit to all people
- b. It can increase risk of injuries
- c. It can lead to flexibility
- d. It is stretching a muscle to extreme

3. Flexibility is determined by all of the following except?

- a. mitochondria
- b. heredity
- c. joint structure
- d. muscle elasticity

4. Which of the following is not one of the common stretching techniques?

- a. ballistic stretching
- b. bounce stretching
- c. static stretching
- d. proprioceptive neuromuscular facilitation

5. The stretching technique most commonly recommended by expert is?
- a. static stretching
 - b. ballistic stretching
 - c. proprioceptive neuromuscular facilitation
 - d. passive stretching
6. Back pain can result from all of the following except?
- a. sudden injury
 - b. increase flexibility
 - c. weak muscles
 - d. poor posture
7. Component of flexibility for workout include all of the following except?
- a. alignment
 - b. control
 - c. bouncing
 - d. breathing
8. Flexibility is best described as?
- a. the ability to move without pain during exercise
 - b. the ability to move the joints through their full range of motion
 - c. sustain motion without resistance
 - d. the ability to move rapidly during exercise

2. Benefit of Exercise/ F.I.T.T Principle

1. The best treatment for chronic disease is?
- a. exercise
 - b. medication

- c. surgery
 - d. supplement
2. All of the following are benefits of regular exercise and physical fitness except?
- a. increased resistance to fatigue
 - b. decrease risk of adult onset obesity
 - c. decrease fat free mass
 - d. improve self-image
3. The most effective way of dealing with disease is?
- a. medication
 - b. exercise
 - c. rehabilitation
 - d. surgery
4. The weakest plan for changing health behavior is the one that attempts to?
- a. initiates an exercise program
 - b. eliminate smoking
 - c. reduce fat consumption
 - d. change several problem behaviors simultaneously
5. Specificity of training is best shown by which one of the following example?
- a. weight training to develop Cardiorespiratory endurance
 - b. doing push-ups to develop arms strength
 - c. running to develop flexibility
 - d. bicycling to develop back strength
6. The amount of overload needed to maintain or improve one's fitness level is determined in terms of all of the following except?
- a. duration

- b. intensity
- c. frequency
- d. specificity

7. Which of the following is true regarding exercise intensity?

- a. the intensity level required to obtain health benefits is greater than the need to improve fitness
- b. fitness benefit occurs when a person exercise harder than his or her normal level of activity
- c. the appropriate intensity is the same for all people
- d. to develop flexibility, a person must stretch the muscles to the same length each time

8. The duration for a muscular strength program is?

- a. the same for a Cardiorespiratory fitness program
- b. less than for a Cardiorespiratory fitness program
- c. more than for a Cardiorespiratory fitness program
- d. based on the number of repetition

9. The minimum length an exercise session needs to be to improve one's cardiovascular endurance is?

- a. 10 minutes
- b. 20 minutes
- c. 40 minutes
- d. 60 minutes

10. Which of the following does not decrease with a regular exercise program?

- a. blood pressure
- b. asthma attacks
- c. body composition
- d. bone density

3. 5 Components of Fitness

1. All of the following are components of health related fitness except?

- a. muscular strength
- b. flexibility
- c. speed
- d. Cardiorespiratory endurance

2. Heart disease is linked most closely with?

- a. low Cardiorespiratory fitness
- b. low muscular strength
- c. poor flexibility
- d. poor reaction time

3. Muscular strength is the?

- a. the ability to sustain the given level of muscular strength over time
- b. ability to move the joint through a full range of motion
- c. amount of force a muscle can produce with a single maximum effort
- d. amount of force a muscle can produce repeatedly over 60 seconds

4. Muscular endurance is?

- a. ability to substance a given level of muscular tension over time
- b. ability to move the joint through a full range of motion
- c. amount of force a muscle can produce with a single maximum effort
- d. amount of time required to contract a muscle completely

5. Flexibility is best described as?

- a. the ability to move without pain during exercise
- b. the ability to move the joints through their full range of motion
- c. sustain motion without resistance

- d. the ability to move rapidly during exercise
6. Healthy body composition is characterized by a?
- a. high proportion of muscle and bone and a low proportion of fat and water
 - b. high proportion of muscle and fat and bone and low proportion of water
 - c. high proportion of bone, fat, and water and low proportion of muscles
 - d. high proportion of muscle, bone and water and a low proportion of fat
7. All of the following are considered sport-specific fitness except?
- a. coordination
 - b. flexibility
 - c. balance
 - d. agility
8. Cardiorespiratory endurance is developed best by activities that?
- a. involve continuous rhythmic movement of large muscle group
 - b. alternate between periods of maximum exertion and rest
 - c. gently extend joints beyond their normal range of motion
 - d. involve working with weight or against resistance
9. Muscular strength and endurance are developed best by activities that?
- a. involve continuous rhythmic movement of large muscle group
 - b. gently extend joints beyond their normal range of motion
 - c. involve working with weight or performance calisthenics exercises
 - d. decrease body fat
10. Flexibility is best developed by?
- a. stretching only when muscles feel tight
 - b. stretching once a month
 - c. stretching only a few muscles

d. stretching major muscle groups

4. Cardiovascular Fitness

1. The leading cause of death in the United States is

- a. unintentional injury
- b. cancer
- c. cardiovascular disease
- d. AIDs

2. Much of the incidence of cardiovascular disease is due to?

- a. lifestyle factors
- b. environmental pollutants
- c. HIV exposure
- d. infections

3. All of the following cardiovascular disease factors are modifiable except

- a. cholesterol levels
- b. cigarette smoking
- c. family history of cardiovascular disease
- d. physical inactivity

4. High blood pressure contributes to cardiovascular disease by?

- a. displacing oxygen in the blood
- b. scarring and hardening arteries
- c. increasing stroke volume of the heart
- d. increasing the number of red blood cells

5. While cholesterol is important for many body functions, excess cholesterol is hazardous to health because it is deposited

- a. in fat cells

b. on artery walls

c. in cell membranes

d. around nerves

6. Which one the following cholesterol profiles would place someone at greatest risk for heart disease?

a. low HDL and low LDL

b. high HDL and high LDL

c. low HDL and high LDL

d. high HDL and low LDL

7. Exercise alters cholesterol level by?

a. raising LDL levels

b. lowering LDL levels

c. raising HDL levels

d. lowering HDL levels

8. Which of the cardiovascular disease factors do not seem to be inherited?

a. high cholesterol

b. diabetes

c. obesity

d. Type A personality

9. Which of the following blood pressure readings would be considered healthy for a young adult?

a. 110/70

b. 120/88

c. 135/92

d. 144/90

10. The number-one risk factor for heart disease that you can control is?

- a. smoking
- b. inactivity
- c. elevated cholesterol
- d. high blood pressure

5. Muscular Strength and Endurance

1. Increased muscular strength and endurance lead to all of the following except?
 - a. increased physical performance
 - b. decreased metabolic rate
 - c. reduced chance of injury
 - d. enhanced self-image
2. Strength training improves body composition by?
 - a. decreasing body weight
 - b. increasing muscle mass
 - c. increasing fat weight
 - d. decreasing muscle mass
3. Muscular strength is best defined as?
 - a. the maximum amount of force the muscle can produce in a single maximum effort
 - b. the maximum amount of force the muscles can produce in 10 repetitions
 - c. the ability to exert a submaximal force repeatedly over time
 - d. the ability to exert force rapidly
4. Muscular endurance is best defined as?
 - a. the maximum amount of force the muscle can produce in a single maximum effort
 - b. the maximum amount of force the muscles can produce in 10 repetitions
 - c. the ability to exert a submaximal force repeatedly over time

d. the ability to exert force rapidly

5. Hypertrophy is defined as?

a. an increase in muscle fiber size

b. a decrease in muscle fiber size

c. an increase in muscle fiber number

d. a decrease in muscle fiber number

6. Isometric exercise is best described as applying force?

a. with movement

b. at a constant speed

c. without movement

d. while a muscle is lengthening

7. Training intensity for weight training is determined by?

a. number of sets

b. number of weight lifted

c. number of repetition

d. amount of time lifting

8. The recommended amount of resistance and number of repetition for improving muscular endurance is?

a. 40-60% RM and 15-20 repetition

b. 40-60% RM and 1-5 repetition

c. 70-90% RM and 10 repetitions

d. 80-100% RM and 5 repetitions

9. The minimum number of training days per week for gaining strength is?

a. 2-3

b. 3-4

c. 5-6

d. 6-7

10. In weight training, a set is a?

a. group of exercise

b. group of repetition

c. group of similar exercise

d. single muscle contraction

6. Cardiorespiratory Endurance

1. Which of the following is not one of the functions of the cardiorespiratory system?

a. to transport oxygen

b. to pick up waste product

c. to transport nutrients

d. to produce ATP

2. Which of the following is not a component of the cardiorespiratory system?

a. the brain

b. the heart

c. the blood vessels

d. the lungs

3. Adenosine Triphosphate (ATP) is defined as?

a. the stored form of protein

b. the stored form of glucose

c. the stored form of fat

d. the basic form of energy used by the cells

4. An example of an activity that primarily use the immediate energy system is?

- a. running a marathon
 - b. weight training
 - c. walking
 - d. in-line skating
5. Maximal oxygen consumption (VO_{2max}) is?
- a. the best measure of the capacity of the cardiorespiratory system
 - b. the velocity of oxygen flowing through the blood
 - c. solely determined by genetics
 - d. very difficult to predict
6. Which of the following is not a response to exercise?
- a. increase blood flow to the skin
 - b. increase ventilation (breathing)
 - c. increase heart rate
 - d. increase blood flow to the liver and kidney
7. As a result of regular endurance exercise, resting heart rate is often?
- a. up to ten beats per minute lower
 - b. 10-20 beats per minute lower
 - c. up to ten beats per minute higher
 - d. 10-20 beats per minute higher
8. Which of the following is not increased by endurance exercise?
- a. insulin sensitivity
 - b. functional stability of the cell
 - c. number and size of free radical
 - d. number and size of mitochondria
9. Endurance exercise can help to increase?

- a. HDL
- b. LDL
- c. triglycerides
- d. glucose

10. Regular endurance exercise contributes to better control of body fat by?

- a. decreasing calorie requirement
- b. decreasing daily energy expenditure
- c. increasing calorie intake
- d. increasing daily energy expenditure

7. Body Composition

1. Healthy body composition is characterized by a?

- a. high proportion of muscle and bone and a low proportion of fat and water
- b. high proportion of muscle and fat and bone and low proportion of water
- c. high proportion of bone, fat, and water and low proportion of muscles
- d. high proportion of muscle, bone and water and a low proportion of fat

2. Essential fat is best defined as?

- a. lipid primarily within fat cells
- b. fat found incorporated into muscles
- c. lipids incorporated into the organs
- d. fat found primarily under the skin

3. Among men, obesity is defined as having body fat greater than?

- a. 9% total body weight
- b. 15% total body weight
- c. 25% total body weight

d. 33% total body weight

4. Among women, obesity is defined as having body fat greater than?

a. 9% total body weight

b. 15% total body weight

c. 25% total body weight

d. 33% total body weight

5. Which of the following are acceptable ranges of percent body fat for men?

a. 1-5%

b. 5-11%

c. 12-20%

d. 21-25%

6. Which of the following are acceptable ranges of percent body fat for women?

a. 3-8%

b. 8-19%

c. 20-30%

d. 31-33%

7. People who tend to gain weight in the abdominal area are at greater risk for all of the following except?

a. coronary heart disease

b. muscle wasting

c. diabetes

d. stroke

8. A woman may experience amenorrhea if her percentage of body fat is less than?

a. 5%

b. 8%

c. 15%

d. 22%

9. A man may muscle wasting and fatigue if his percentage of body fat is less than?

a. 5%

b. 8%

c. 15%

d. 22%

10. Which body composition assessment technique is based on the concept that a person's weight should be proportional to his or her height?

a. underwater weighing

b. body mass index

c. skinfolds

d. bioelectrical impedance

8. Writing a personal exercise program

1. The first step in creating a successful fitness program is to?

a. determine your training intensity

b. assess your current fitness level

c. set specific fitness goals

d. plan your fitness program

2. Long-lasting commitment and attainment of physical fitness goals are most successful when the goals?

a. require considerable material rewards

b. are linked to your peers perceptions

c. is clear and important to you personally

d. focus on the long term rather than the short term

3. The first step in developing a personal fitness plan is to?
 - a. select activities
 - b. set target intensity
 - c. set target duration
 - d. set goal
4. An example of a long term fitness goal would be?
 - a. doing 15 push-ups
 - b. lowering your BMI to 24
 - c. lowering your risk for chronic disease
 - d. lowering cholesterol to 200
5. An example of a short-term fitness goal would be?
 - a. increasing strength
 - b. jogging 2 miles in 19 minutes
 - c. having more energy
 - d. improving posture
6. Cardiorespiratory endurance is developed by all of the following except?
 - a. cycling
 - b. walking
 - c. strength training
 - d. aerobic dance
7. Healthy body composition is obtained with all of the following except?
 - a. stretching
 - b. sensible diet
 - c. Cardiorespiratory exercise
 - d. strength training

8. The recommended total duration for a cardiorespiratory endurance program is?

- a. 10-20 minutes
- b. 20-60 minutes
- c. 60-120 minutes
- d. 100-150 minutes

9. An appropriate frequency for a Cardiorespiratory endurance program is?

- a. 1-2 times
- b. 2-3 times
- c. 3-5 times
- d. 5-7 times

10. A general strength training program includes?

- a. 1 set of 3-6 repetition of 6 exercises
- b. 1 set of 8-12 repetition of 8-10 exercises
- c. 3 set of 3-6 repetition of 6 exercises
- d. 3 set of 3-6 repetition of 8-10 exercises

9. Physical Wellness and Nutrition

1. The best way to lose body fat is through

- a. crash diets
- b. exercise alone
- c. diet pills and supplements
- d. sensible diet and regular exercise

2. All of the following nutrients supply the body with energy except?

- a. fats
- b. vitamins

c. carbohydrates

d. proteins

3. Proteins supply the body with how many calories of energy per gram?

a. 2

b. 4

c. 7

d. 9

4. Fats supply the body with how many calories of energy per gram?

a. 2

b. 4

c. 7

d. 9

5. All of the following are high in monounsaturated and/or polyunsaturated fats except?

a. canola oil

b. sunflower oil

c. peanut oil

d. coconut oil

6. Recommended dietary fat intake is no more than?

a. 66% total calories

b. 50% total calories

c. 30% total calories

d. 10% total calories

7. Of total calories intake, saturated fat should contribute less than?

a. 5%

b. 10%

c. 20%

d. 30%

8. The recommended percentage of total calories from carbohydrates in a healthy?

a. 15%

b. 30%

c. 55%

d. 85%

9. All of the following are good sources of dietary fiber except?

a. avocado

b. hamburger

c. oatmeal

d. winter squash

10. The primary function of vitamins is to?

a. serves as an important component of muscles

b. provide texture and flavor to food

c. supply energy to body cells

d. promote chemical reaction within cells

10. Prescription for wellness

1. Factors involved in wellness?

a. never interact

b. often interact

c. are different to identify

d. always improve the quality of life

2. An example of proper reward for good behavior would be?

- a. eating your favorite food
 - b. drinking alcohol
 - c. seeing a movie
 - d. buying an expensive outfit
3. Strategies that can aid in behavior change include all of the following except?
- a. withholding reward
 - b. analyzing your plan
 - c. substituting behavior
 - d. having social support
4. Which of the following is not true regarding the relationship between physical activity and health?
- a. people of all ages benefit from regular physical activity
 - b. a modest increase in physical activity can improve health
 - c. vigorous or long activity can lead to greater health
 - d. women receive more benefit than men from regular exercise
5. The best way to lose body fat is through
- a. crash diets
 - b. exercise alone
 - c. diet pills and supplements
 - d. sensible diet and regular exercise
6. The key to improving fitness is to?
- a. exercise very hard
 - b. exercise consistently
 - c. choose the best form of exercise
 - d. exercise for long period of time

7. All of the following increases risk for cardiovascular disease except?
- a. diabetes
 - b. low socioeconomic status
 - c. stress
 - d. high educational attainment
8. The recommended proportion of fat calories in the diet that should come from monounsaturated fats is?
- a. one-tenth or more
 - b. one-third or more
 - c. one-half or more
 - d. all
9. Which one of the following is a good source of dietary fiber?
- a. meats
 - b. fish
 - c. eggs
 - d. legumes
10. A dietary change that would help prevent cardiovascular disease is to increase the intake of foods?
- a. high in soluble fiber
 - b. high in saturated fat
 - c. high in coconut oil
 - d. high in palm oil

12 Exercise Skill Video Quiz

1. Squat

- A. Where should the barbell be placed in preparation for the squat?

a) Below the shoulder b) top of back and shoulder c) on the neck d) all of the above

B. What help your back to stay in the neutral position?

a) Pulling in your belly button b) stick your hip out c) arch your back d) none of the above

C. Which muscles does the squat target?

a) Quads b) gluts c) hamstring d) all of the above

D. When performing the squat, the varying body positions include?

a) Knees behind toes b) body parallel and in line c) hand grip shoulder width apart or wider d) all of the above

E. When doing the squat it is best to?

a) Gradually add weights b) pick up from where you left off c) start at a lighter weight and progress d) a and c

2. Back Extension

A. When performing the Back extension, the start and end positions are?

a) Body in a straight line b) hip bone above pads c) legs extended d) all of the above

B. Which muscles does the back extension targets?

a) Upper back b) lower back c) leg d) all of the above

C. When performing the back extension, you should not?

a) Hyperextend the back b) use momentum to lift upper body c) use weight plates d) a and b

D. Which exercise is a modify version of the back extension?

a) Superman b) plank c) good morning d) none of the above

3. Hip Abduction

A. Which muscles does the hip abduction targets?

- a) Lateral muscles and gluts b) back c) abdomen d) a and c

B. When performing the hip abduction, the varying body positions include?

- a) Body upright b) toe pointed c) leg extended d) all of the above

C. When doing hip abduction it is better to start with?

- a) Higher weight/lower reps b) lower weight/high reps c) low weight/low reps
d) none of the above

D. When performing the hip abductor?

- a) The leg with the cable are the only ones being worked b) the stabilizer muscles in the stationary leg is being worked
c) both legs are being worked d) none of the above

4. Calf Raises

A. When performing calf raises, the body positions include?

- a) body vertical and shoulder square b) standing on toes c) hands forward on object for support
d) all of the above

B. The muscle/s that is mainly targeted by calf raises are?

- a) gastrocnemius b) gluts c) soleus d) A and C

C. To increase the intensity of the calf raises?

- a) increase reps b) add weights c) A and B d) none of the above

5. Dead-lift

A. When performing the dead-lift, the body positions include?

- a) Standing with feet shoulder width a part b) knees bent c) hand grip shoulder width a part
d) all of the above

B. To maintain a neutral spine during the dead lift you should?

- a) Draw your belly button in b) arch back c) keep your torso and head up and forward
d) a and c

C. When performing the dead-lift your spine should be?

- a) Arched b) in a straight line c) upright d) none of the above

D. The dead-lift targets and strengthens the muscles in the?

- a) Hip b) knee c) trunk extension d) All of the above

E. The muscles and joint actions involved in the dead-lift include?

- a) Flexion (Hamstring and quads) b) Extension (gluts and hip flexors) c) Stabilization (Trapezius, abdominal, lats) d) none of the above

6. Bench Press

A. When performing the bench press, the body positions include?

- a) Knees bent at 90 degrees b) feet planted on floor shoulder width apart c) head under the bar with back and shoulder straight and flat on the bench d) all of the above

B. Throughout the bench press the bar should be?

- a) Controlled and steady b) fully extended above the body c) just above lower chest d) all of the above

C. The bench press targets the muscles in the?

- a) Chest b) back c) abdomen d) all of the above

7. Standing Shoulder Press

A. When performing the standing shoulder press, the body positions include?

- a) Hip shoulder and ears align b) feet shoulder width apart c) Knee slightly bent d) all of the above

B. All of the following are correct technique when performing the standing shoulder press except?

- a) chin sticking out b) excessive curving of the back c) arms lifted in front of or behind ears d) none of the above

C. Standing shoulder press is done to increase?

a) chest strength b) shoulder and arm strength c) back strength d) all of the above

D. The muscles use in the standing shoulder press is?

a) deltoids b) pectoral c) triceps d) a and c

8. Lunge

A. When starting the lunge, the feet should be?

a) Together b) shoulder width apart c) pointed out d) none of the above

B. The muscle mainly targeted during the lunge is the?

a) Quad b) hamstring c) gluts d) a and c

C. When performing the lunge the knee of the leg use for stepping forward should be?

a) Over the toe b) behind the toe c) in line with the toe d) all of the above

D. The lunge is also good for improving?

a) Flexibility b) agility c) balance d) endurance

9. Bicep Curls

A. When performing the bicep curls, the upper arm should be?

a) To the side while lower arm is flexed b) remain stable c) away from the body
d) a and b

B. To get maximum extension of the bicep?

a) You should flex the triceps b) fully extend arms to the side c) keep arm directly parallel to the floor
d) all of the above

C. To get maximum flexion of the bicep?

a) Elbows should be up b) arms parallel to shoulder c) fist close to ear as possible
d) all of the above

D. The muscles targeted during the bicep curls are?

a) Bicep b) triceps c) front deltoids d) a and b

10. Push-up

A. When performing the push-up, the body positions include?

- a) Head looking forward
- b) flat back in plank position
- c) arms shoulder width a part or wider
- d) all of the above

B. The muscles targeted during push-up are?

- a) The pectoralis major
- b) anterior deltoid
- c) triceps
- d) all of the above

C. The push-up is also good for?

- a) Flexibility
- b) stability
- c) agility
- d) none of the above

D. Which of these would be considered as an incorrect push up form?

- a) Hip elevated
- b) reach with your chin
- c) head forward
- d) a and b

11. Bent-over Rows

A. When performing the bent-over row, the body positions include?

- a) hips are shifted backward
- b) back straight and chest up
- c) arms squared with elbows leading
- d) all of the above

B. The muscles targeted during the bent-over row are?

- a) latissimus dorsi
- b) anterior deltoid
- c) triceps
- d) none of the above

C. When performing the bent-over row all of the following are incorrect technique except?

- a) head up and forward
- b) being on the heel
- c) knees bent
- d) none of the above

12. Triceps Kick Back

A. When performing the triceps kick back, the body positions include?

- a) One knee on the bench, one off
- b) arm on bench below shoulder
- c) upper arm parallel to floor
- d) all of the above

B. The muscles targeted during the triceps kick back are?

a) The pectoralis major b) anterior deltoid c) triceps d) all of the above

C. When performing the triceps kick back, all of these is correct except?

a) Lower arm kick back b) head align with spine c) rocking arm back d) none of the above

D. When performing the triceps kick back, you should?

a) Hold your breath b) exhale when lifting the arm and Inhale when bring the arm down
c) Inhale when lifting the arm and exhale when bring the arm down
d) b and c

Appendix D

Self-Efficacy Survey

Instructions: A number of situations are described below that can make it hard to stick to an exercise routine. Please rate in each of the blanks in the column how certain you are that you can get yourself to perform your exercise routine regularly (three or more times a week).

Rate your degree of confidence by recording a number from 0 to 10 using the scale given below:

0	1	2	3	4	5	6	7	8	9	10
Cannot					Moderately					Highly

Questions	Confidence (0-10)
When I am feeling tired	
When I am feeling under pressure from school	
During bad weather	
After recovering from an injury that caused me to stop exercising	
During or after experiencing personal problems	
When I am feeling depressed	
When I am feeling anxious	
After recovering from an illness that caused me to stop exercising	
When I feel physical discomfort when I exercise	
After a vacation	
When I have too much work to do at home	
When visitors are present	
When there are other interesting things to do	
If I don't reach my exercise goals	
Without support from my family or friends	
During a vacation	
When I have other time commitments	
After experiencing family problems	

Appendix E

Self-Regulation Survey

Instructions: A number of situations are described below, please rate in each of the blanks in the column how you respond to these situations. All items are answered on a 5-point Likert scale with the following scale points:

1 Strongly disagree, 2 Disagree, 3 Uncertain or Unsure, 4 Agree, 5 Strongly Agree

Scale	Items	Likert Scale (1-5)
A	I reward myself for progress toward my goals.	
A	I change the way I do things when I see a problem with how things are going.	
A	I don't seem to learn from my mistakes.	
A	I usually only have to make a mistake one time in order to learn from it.	
I	I can stick to a plan that's working well.	
I	I have a lot of willpower.	
A	When I'm trying to change something, I pay a lot of attention to how I'm doing.	
I	I am able to resist temptation.	
A	I set goals for myself and keep track of my progress.	
P	Once I have a goal, I can usually plan how to reach it.	
I	I have rules that I stick by no matter what.	
A	If I make a resolution to change something, I pay a lot of attention to how I'm doing.	
P	I usually think before I act.	
A	I feel bad when I don't meet my goals.	
P	Before making a decision, I consider what is likely to happen if I do one thing or another.	
Reverse Scale: 5 Strongly disagree, 4 Disagree, 3 Uncertain or Unsure, 2 Agree, 1 Strongly Agree		
P	When it comes to deciding about a change, I feel overwhelmed by the choices.	
I	I have trouble following through with things once I've made up my mind to do something.	
I	I get easily distracted from my plans.	
P	I have a hard time setting goals for myself.	
P	I put off making decisions	
I	Little problems or distractions throw me off course.	
I	I have so many plans that it's hard for me to focus on any one of them	
P	I can come up with lots of ways to change, but it's hard for me to decide which one to use.	
I	I give up quickly.	
A	I usually decide to change and hope for the best.	

P	I have trouble making up my mind about things.	
P	I have trouble making plans to help me reach my goals	

Appendix F

Demographic Survey

Please answer the questions below by circling the response/s that applies.

1. Sex/Gender:

Female Male Transgender Prefer not to respond

2. Age:

19-20 21-23 24-26 27-29 30 and above

3. Race/Ethnicity:

African American/Black Asian/Pacific Islander White Multiracial
Native American/American Indian Hispanic/Latino Other (please specify)

4. Class Status:

Freshman Sophomore Junior Senior
Graduate student Continuing education student

5. College:

College of Agriculture College of Architecture, Design & Construction
College of Education College of Business
College of Human Sciences College of Engineering
College of Liberal Arts School of Forestry and Wildlife Sciences
School of Pharmacy College of Sciences and Mathematics
School of Nursing College of Veterinary Medicine

6. Was this course required or an elective?

Required Elective

7. Why did you choose to take this class?

Teacher reputation Improve fitness PE Program reputation Graduation requirement
Interested in the activity Class fit schedule Improve GPA Other:

8. Do you perform at a high level in any aspect of PE outside of College?

Yes

No

9. Which level?

Local Level

County District Level

National Level

10. Outside of school do you take part in a Community Sports Club e.g. Football/Rugby Club, Swimming, Track and Field etc.?

Yes

No

11. How many days per week do you take part in physical activity?

a. less than 3 days

b. 3 days

c. 4 days

d. 5 days

e. more than 5 days

12. How many days per week do you take part in physical activity outside of class time?

a. 0 day

b. 1 day

c. 2 days

d. 3 days

e. more than 3 days

13. Outside of this course, are you currently taking or have taken another PE course with the School of Kinesiology?

Yes

No

14. If yes, which course and did it require you to do a portal or online assignments about health and wellbeing?

15. Would you be willing to participate in an interview and/or focus group about your experience with the course organization?

Yes

No

If YES, please provide your email and participant number:

Thank You for Taking This Survey!

Appendix G

Student Individual Interview Script

Themes that will be addressed:

1. Tell me about your routine in preparation for physical activity class?

Follow-up questions

2. Tell me about a day in your physical activity class, what do you do in the class?

Follow-up questions

3. Tell me about time spent outside of class that may be related to the course?

Follow-up questions

Other questions:

4. Tell me about how planning week goals for physical activity benefited or didn't benefit you (did you meet your goals for the class)?

5. Tell me about what you liked and disliked about the exercise and lecture videos?

6. Tell me about your opinion of the topics covered by the videos?

7. How interesting were you in the topics covered in the lecture videos, which one resonated with you more?

8. What was your favorite video? Why?

9. Did you view any of the videos outside of what was required for class (e.g. to practice exercise skills, show family or friends, during exercise outside of class time)?

10. Describe what it was like to be given one of your assigned class days to do exercise on your own?

11. What class day were you doing exercise on your own? Did you think that taking that day off was beneficial or not beneficial to you and what you were trying to accomplish out of the class?

12. Tell me about your views on the structure of the class (exercise routine, quizzes, test, assessments, etc.)?

13. What was the most number of times that you revisited or reviewed a video? Why did you review the video?

14. Tell me about what it was like working in groups or with peers during class?

15. Did you ever have the opportunity to choose the exercises you would be doing for the class session? Tell me about your contribute and what you liked or dislike about the idea of choosing the exercise?

16. What did you think could have been excluded from the class structure?

17. What do you think could have been included, done better, or need improving?

18. Would you recommend this course with this type of class structure to a friend or someone else? Why?

19. Do you have any additional suggestion or comments that might be vital to better serve students in physical education courses?

Appendix H

Satisfaction Survey with Teaching Methodology

Instructions: Below is a list of questions that measure your satisfaction with the teaching methodology. Please read carefully each one and mark (X,✓) the option that best describes your opinion using the following scale.

Scale: 5= very satisfied (VS), 4= satisfied (S), 3= somewhat satisfied (SS), 2= Dissatisfied (D), 1= Very Dissatisfied (VD), and Not Applicable (N/A)

Variables to measure satisfaction	5 (VS)	4 (S)	3 (SS)	2 (D)	1 (VD)	N/A
1. Satisfied with the unit content						
2. Satisfied with the way the unit content was taught						
3. The unit content was organized						
4. Unit curriculum provided clear and achievable objectives						
5. Your goals for the unit were met						
6. The unit material was clearly explained						
7. The unit material was presented at the right speed						
8. Like techniques used by the teacher to teach the unit						
9. Unit design met your learning styles						
10. Student and teacher interaction increased						
11. Student-to-student collaboration increase						
12. Communication between teacher and student improved						
13. Group work was beneficial						
14. Homework delivery time was appropriate						
15. The assignments were useful in helping to understand the unit material						
16. The unit assignments provided some challenge						
17. Unit had the right amount of assignments						
18. The online delivery format was appropriate for unit materials						
19. The online section fit in with the other parts of the unit						
20. Proper use of technology within the unit						
21. Initial instructions on the use of technology was helpful						
22. Enjoyed using technology resources available in the unit						
23. Enjoyed autonomy that the unit provided						
24. Enjoyed activities used in the unit						
25. The success in the unit depend upon the student						
26. Would take another course that use this unit						
27. Would recommend a course that offer this unit to a friend						
28. Enjoyed the unit						
29. Learning was enhanced with online content/material						
30. Unit allowed for enough time to practice in class						

31. Which videos were most useful? Why?

32. Which videos were least useful? Why?

33. Which assessments/tests were most useful? Why?

34. Which assessments/tests were least useful? Why?

Appendix I

Teacher Individual Interview Script

Middle of Study

Themes that will be addressed:

1. Tell me about your experiences with using this pedagogical approach thus far?

Follow-up questions

2. Tell me about some of the benefits that you have notice as a result of using this pedagogical approach?

Follow-up questions

3. Tell me about some of the weaknesses/deficiencies that you have experiences with using this pedagogical approach?

Follow-up questions

4. What are some suggestions that you might have to improve the effectiveness of this pedagogical approach?

Follow-up questions

Teacher Interview Script

End of Study

Themes that will be addressed:

1. Now that you have completed your implementation of this approach, tell me about your experiences and perceptions of the pedagogical approach that you implemented into your course?

Follow-up questions

2. Tell me about if this approach has or will influence your teaching style and philosophy?

Follow-up questions

3. Tell me about the overall benefits that you and your students have obtained as a result of using this pedagogical approach?

Follow-up questions

3. Tell me about the overall weaknesses/deficiencies that you have experiences with using this pedagogical approach?

Follow-up questions

4. What are some suggestions that you might have to improve the effectiveness of this pedagogical approach?

Follow-up questions

5. What are some concerns that you might have as it relates to the use of this pedagogical approach?

Follow-up questions

Appendix J



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Appendix K



AUBURN UNIVERSITY

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(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMATION LETTER for a Research Study entitled

“The Exploration of Pedagogical Approaches Effectiveness to Engage Students in Collegiate Physical Education Courses”

You are invited to participate in a research study to assist in the identification of effective pedagogical approaches that the instructors of the School of Kinesiology Physical Activity and Wellness Program (PAWP) courses and physical educators in general could use to engage, encourage, and enhance active participation of student in physical education courses. The study is being conducted by Michelle Vaughn, Doctoral student, under the direction of Dr. Jared Russell, Associate Professor in the Auburn University School of Kinesiology. You were selected as a possible participant because you are currently enrolled as a student on record of one or more of the Physical Activity and Wellness Program courses and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete three in class surveys that will take approximately 5minutes each. Classroom observation will also be done as part of the research. Some of the classroom sessions will be videotaped to observe how the instructor is implementing the pedagogical approaches.

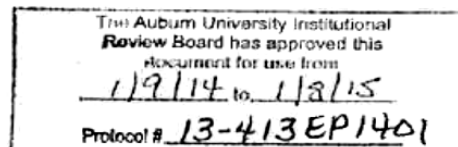
Are there any risks or discomforts? The risks associated with participating in this study are minimal beyond what you may experience in your course. In order to keep your information confidential, you will be assigned a pseudonym for your surveys. Field notes will be used for classroom observation. To keep you from being identified, the researcher will make every effort to videotape so that the video only capture the back of your head and the audio will be muted. No identifiable data will be provided to instructors.

Are there any benefits to yourself or others? No personal benefits are expected as a part of participating in this study. In your course, you will experience different pedagogical approaches in physical education so that you can identify the ones that are effective in keeping you motivated and actively engaged in physical activity. Likewise, the instructors will be able to identify the pedagogical approaches that are effective in keeping students actively engaged and encouraged to participate in physical activity. The study will also serve as an evaluative resource for the School of Kinesiology as it relates to improving PAWP and enhancing the services they provide to the student population here at Auburn University. We/I cannot promise you that you will receive any or all of the benefits described.

Will you receive compensation for participating? Although no compensation is provided for participating in this study, we thank you for your time.

Are there any costs? You will not incur any cost as a participant in this study.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the School of Kinesiology or your outcome in this course.



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301 Wire Road, Auburn, AL 36849-5323; Telephone: 334-844-4483; Fax: 334-844-1467

w w w . a u b u r n . e d u / k i n e

Any data obtained in connection with this study will remain confidential. We will protect your privacy and the data you provide by using pseudonyms and codes, in addition to storing the information in a secure area. Information collected through your participation will be used to fulfill an educational requirement of a dissertation and for the furtherance of the field of Kinesiology through published research articles in professional journals and presentation at professional meetings and conferences.

If you have questions about this study, please ask them now or contact Michelle Vaughn at 334-844-7481 or vaughma@auburn.edu or Dr. Jared Russell, at russej3@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. THIS LETTER IS YOURS TO KEEP.

Investigator's signature Date

Print Name

Co-Investigator Date

Printed Name

The Auburn University Institutional
Review Board has approved this
document for use from
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Protocol # 13-413 EP1401

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INFORMED CONSENT

for a Research Study entitled

“The Exploration of Pedagogical Approaches Effectiveness to Engage Students in Collegiate Physical Education Courses”

You are invited to participate in a research study to assist in the identification of effective pedagogical approaches that the instructors of the School of Kinesiology Physical Activity and Wellness Program (PAWP) courses and physical educators in general could use to engage, encourage, and enhance active participation of student in physical education courses. The study is being conducted by Michelle Vaughn, Doctoral student, under the direction of Dr. Jared Russell, Associate Professor in the Auburn University School of Kinesiology. You were selected as a possible participant because you are currently enrolled as a student on record of one or more of the Physical Activity and Wellness Program courses and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to participate in a one-on-one interview that will be recorded using both audio and videotape. You will also be asked to wear a pedometer during class to record your physical activity level. Your total time commitment will be approximately 30-45 minutes per session.

Are there any risks or discomforts? There are few risks associated with participating in this study beyond what you may experience in your course. No identifiable data will be provided to instructors.

Are there any benefits to yourself or others? No personal benefits are expected as a part of participating in this study. In your course, you will experience different pedagogical approaches in physical education so that you can identify the ones that are effective in keeping you motivated and actively engaged in physical activity. Likewise, the instructors will be able to identify the pedagogical approaches that are effective in keeping students actively engaged and encouraged to participate in physical activity. The study will also serve as an evaluative resource for the School of Kinesiology as it relates to improving PAWP and enhancing the services they provide to the student population here at Auburn University. We/I cannot promise you that you will receive any or all of the benefits described.

Will you receive compensation for participating? Although no compensation is provided for participating in this study, we thank you for your time.

Are there any costs? You will not incur any cost as a participant in this study.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the School of Kinesiology or your outcome in this course.

Participant's initials _____

Your privacy will be protected. Any information obtained in connection with this study will remain confidential. Information collected through your participation will be used to fulfill an educational requirement for a dissertation and for the furtherance of the field of Kinesiology through published research articles in professional journals and presentation at professional meetings and conferences.

If you have questions about this study, please ask them now or contact Michelle Vaughn at 334-844-7481 vaughma@auburn.edu or Dr. Jared Russell, at russej3@auburn.edu. A copy of this document will be given to you to keep.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

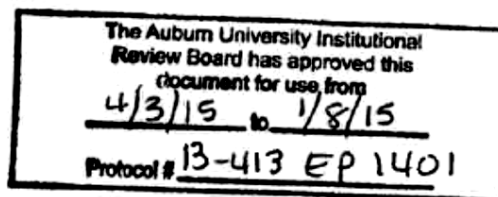
HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

Participant's signature Date Investigator obtaining consent Date

Printed Name Printed Name

Co-Investigator Date

Printed Name





AUBURN UNIVERSITY

SCHOOL OF KINESIOLOGY

(NOTE: DO NOT SIGN THIS DOCUMENT UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMED CONSENT

for a Research Study entitled

“The Exploration of Pedagogical Approaches Effectiveness to Engage Students in Collegiate Physical Education Courses”

You are invited to participate in a research study to assist in the identification of effective pedagogical approaches that the instructors of the School of Kinesiology Physical Activity and Wellness Program (PAWP) courses and physical educators in general could use to engage, encourage, and enhance active participation of student in physical education courses. The study is being conducted by Michelle Vaughn, Doctoral student, under the direction of Dr. Jared Russell, Associate Professor in the Auburn University School of Kinesiology. You were selected as a possible participant because you are currently an instructor on record of one or more of the Physical Activity and Wellness Program courses and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete one-on-one interviews at the beginning, middle, and end of the study that will be recorded using audio and videotape. The one-on-one interviews will be approximately 30-45 minutes long. You will also be asked to implement and practice different pedagogical approaches in your courses that are relatively new to the field of physical education. You will be observed during each class session. Some of the classroom sessions will be videotaped to observe how you are implementing the pedagogical approaches. Your total time commitment will be 50 minutes each day, that is, the entire class time assigned for each lesson throughout the duration of the study.

Are there any risks or discomforts? There are minimal risks associated with participating in this study beyond what you may experience in your course.

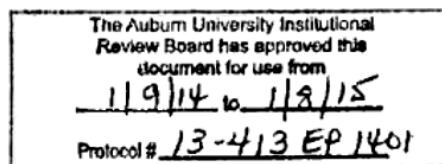
Are there any benefits to yourself or others? No personal benefits are expected as a part of participating in this study. If you participate in this study, you may identify the pedagogical approaches that are effective in keeping students actively engaged and encouraged to participate in physical activity. The study will also serve as an evaluative resource for the School of Kinesiology as it relates to improving PAWP and enhancing the services they provide to the student population here at Auburn University. We/I cannot promise you that you will receive any or all of the benefits described.

Will you receive compensation for participating? Although no compensation is provided for participating in this study, we thank you for your time.

Are there any costs? You will not incur any cost as a participant in this study.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the School of Kinesiology or your outcome in this course.

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HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

Participant's signature Date Investigator obtaining consent Date

Printed Name

Printed Name

Co-Investigator Date

Printed Name

The Auburn University Institutional
Review Board has approved this
document for use from
1/9/14 to 1/8/15
Protocol # 13-413 EP 1401

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