DETERMINING THE NECESSITY OF RETURN-TO-LEARN PROTOCOLS FOR
STUDENT-ATHLETES POSSIBLY SUFFERING FROM CONCUSSIONS IN AN EAST
TENNESSEE SCHOOL DISTRICT

A DISSERTATION

Presented to

The Faculty of the Education Department

Carson-Newman University

In Partial Fulfillment

Of the

Requirements for the Degree

Doctor of Education

By

Marshall Andrew (Andy) Rines

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July 5, 2016
Abstract
Determining the Necessity of Return-to-Learn Protocols for Student-Athletes Possibly Suffering From Concussions in an East Tennessee School District
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July 2016
Although much emphasis is placed on determining when student-athletes may safely return to competition after suffering from concussions, the effects of concussions on the academic performances of student-athletes is under-researched, as is the necessity of developing formal academic accommodations when student-athletes return to their academic environments. This study scrutinized educator beliefs regarding the necessity of developing these protocols, as well as the importance of educators being able to identify concussion symptoms in student-athletes and the need for formal concussion training for high school teachers. This was a mixed methods study, utilizing convenience sampling, which used both quantitative and qualitative data. Quantitative data were collected via Likert-type surveys, and Chi-Square analysis was conducted to validate the data. Qualitative data were obtained via follow-up interviews with some educators who also completed Likert-type surveys.
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Dedication

This dissertation is dedicated to my family.
Leslie Rines, my wife – thank you for always standing by me.
Rachel Rines, my daughter – you are my inspiration every day. Words cannot express how much I love you.
Marshall Rines, my father – I hope I make you proud, and although you have been gone for 16 years, I think of you every day.
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CHAPTER 1: PURPOSE AND ORGANIZATION

Introduction and Background of the Study

A 2015 report issued by the Centers for Disease Control and Prevention (CDC) stated that hundreds of thousands student-athletes in grades K-12 sustain concussion-related injuries each year, yet according to McGrath (2010), numerous concussions are undiagnosed, partially due to the propensity of most student-athletes to fail to report these injuries, and partially due to the inability of coaches to recognize concussive symptoms. However, school personnel, other than athletic trainers and coaches, are frequently unaware that student-athletes have suffered from concussions and may face academic difficulties as a result. Accordingly, it is essential that teachers, school counselors, school medical personnel, parents, and the student-athlete’s personal physician work together to curtail the academic repercussions of the injury. Williams et al. (2015) maintained that athletic trainers, on average, treat 20 concussions per year in youth athletics, and approximately 40% of those student-athletes need academic accommodations.

Sady, Vaughan, and Gioia (2011) stipulated that the physical symptoms of concussions, such as headaches, loss of vision, sensitivity to noise and light, and lethargy, often impact learning. Additionally, disturbances in sleep patterns, which often occur as a result of concussions, can impede students’ ability to learn.

According to Halstead et al. (2013), cognitive impairments following a concussion inhibit a student’s ability to learn, and returning too soon following a concussion may both lengthen the time it takes to recover from a concussion and exacerbate concussion symptoms. Ransom et al. (2015) contended that there are no standard practices or medically established procedures for students returning to school after concussions, although numerous return-to-learn policies have been implemented. Nevertheless, many of the recommendations in these policies are not clearly
defined, nor are they communicated effectively. Thus, it is crucial that return-to-learn protocols are centered on sound medical knowledge of the effects of concussions on learning. Consequently, it is important that research should consider the incidence of learning problems that concussions exacerbate so that effective, evidence-based protocols can be instituted. Future research is also needed so that parent and student worries can be mitigated and concussion recovery can be accelerated. Faure, Moffitt, and Scheiss (2015) stated that one of the most challenging issues for leaders in youth sports and athletics is the enduring impact of concussions. Due to the absence of uniform concussion-management protocols, numerous athletic governing bodies, including the National Football League (NFL), National Collegiate Athletic Association (NCAA), and several high schools and high school athletic associations have faced concussion-related lawsuits.

**Statement of the Problem**

This study sought to determine if educators in an East Tennessee school district believe that academic accommodation protocols are needed for student-athletes returning to class after suffering concussions. As the research in Chapter 2 indicates, the impact of concussions on learning is significant, and many concussions are not reported. In like manner, concussions are difficult to diagnose, and in numerous instances, student-athletes first become symptomatic at school. While cognitive rest is recommended as part of concussion recovery, most concussion research and legislation emphasizes the safe return of student-athletes to athletic competition as opposed to the necessity of academic accommodations for concussed student-athletes. Accordingly, this study sought to ascertain if educators in the research county were able to identify concussion symptoms in student-athletes, if these educators have received training to help them identify concussion symptoms in student-athletes, if these educators believe a return-
to-learn policy is necessary, and if these educators have noticed the effects of concussions on the academic work of student-athletes.

**Purpose of the Study**

The purpose of the study was to determine the necessity of implementing a formal return-to-learn protocol for each of the five high schools in the research county. While coaches in the research county are mandated, per state policy, to complete an annual online course on concussion education, this course is not required for teachers who do not coach. Thus, it is necessary to ascertain if teachers are able to identify concussion symptoms in student-athletes, if school athletic trainers are actively helping educate faculty members on concussions, and if educators are aware of the effects, both short-term and long-term, of concussions on learning. This research should be applicable numerous other school districts, both state-wide and nation-wide, for certainly concussions and their impact on student-athletes are not limited to the research county.

**Significance of the Study**

Teachers and administrators should be able to recognize concussions and should be familiar with how concussions influence academic performance (Brown et al., 2014). Davies (2011) expressed that while some concussion symptoms are recognizable immediately, others may not be evident until days or weeks after the injury. Thus, the possibility exists that teachers may be the first stakeholders to recognize concussion symptoms in student-athletes. The CDC (2015) reported that teachers and other education professionals are often the first to notice cognitive abnormalities that are indicators of concussion, mainly because numerous concussion symptoms first become evident when advanced cognitive activities, such as concentrating, are required. According to Halstead et al. (2013), many student-athletes seem physically fine after a
concussion, so it is difficult for educators to comprehend the cognitive difficulties associated with concussion recovery and to appreciate the necessity of academic accommodations. Faure, Moffitt, and Scheiss (2015) cautioned that it will be difficult for educational leaders to continue to prioritize the importance of concussion education. Although concussions are currently a contentious issue, it is likely that apathy toward concussions and concussion management will intensify. However, it is essential that concussion education remain ongoing because of continuing advances in concussion research.

Hossler et al. (2014) noted the difficulties associated with developing and implementing a standardized return to academic work protocol, primarily because limited research has been conducted in this regard. Edwards and Bodle (2014) recounted that research into sports-related concussions and management of concussive injuries is just beginning. However, the notoriety associated with several identified instances of Traumatic Brain Injury (TBI) in the autopsies of numerous prominent former athletes has amplified the belief that concussions are serious health risks. Accordingly, funding for research is increasing and legislative and rule changes overseeing concussion diagnosis and management at all levels of sports are escalating. According to Halstead et al. (2013), the majority of attention regarding youth concussions has been focused on assessing the injuries, educating stakeholders about concussions, and determining when student-athletes may safely return to athletic competition. Conversely, there has been a lack of emphasis on how concussions affect academics and student-athletes, and it has been difficult to develop appropriate return-to-learn protocols because of a lack of research into how to best manage and treat concussions. Scorza, Raleigh, and O’Connor (2012) conveyed that the majority of concussion research prioritized adult studies, whereas there has been little research into youth
concussions. Williams et al. (2015) said that research into return-to-learn protocols has been minimal. As a result, most concussion management plans omit return-to-learn guidelines.

Brown et al. (2014) argued that while cognitive rest is frequently suggested as a component of concussion recovery, there is minimal data to augment this suggestion. Thus, additional research into several aspects of cognitive rest, including types of cognitive rest and the amount of cognitive rest that is required, is recommended. McDaniel and McIntire (2010) expressed that there are few parameters for healthcare professionals to follow when diagnosing and treating concussions. Green (2014) indicated that future legislation is likely to emphasize concussion prevention, which will necessitate continuing education and professional development relative to concussions. Kreck (2014) suggested that future research will emphasize baseline testing, which can later be compared to post-concussion test results in order to assess if a concussion happened and when the injured brain has recovered enough to determine when the injured student-athlete may safely return to competition. It is also conceivable that a blood test can be developed that will allow health-care providers to accurately diagnose concussions.

Faure, Moffitt, and Scheiss (2015) recommended additional research into return-to-academic work policies. It is vital that educational stakeholders remain informed on the effects of concussions on learning, especially in the current educational climate that is increasingly cognizant of the intellectual consequences of sports-related concussions. Halstead et al. (2013) conveyed that there is little research into both the necessity of cognitive rest and the role of cognitive rest in concussion recovery, thus additional research is necessary. More research is also needed in other related disciplines, such as determining the best procedures for developing and implementing return-to-learn policies, the effect of existing return-to-learn procedures and the importance of ongoing education programs for concussion recognition and management.
Harmon et al. (2013) opined that future research is necessary in order to better diagnose concussions and identify student-athletes who are more likely to suffer from lasting symptoms or complications as a result of sports-related concussions. McCrory et al. (2013) asserted that research into the benefits of rest as part of concussion recovery is minimal. Thus, further research is needed in order to determine both how much rest is needed and which types of rest better facilitate recovery.

According to Williams et al. (2015), additional research is necessary into the vital academic accommodations for student-athletes who are returning to class after concussions, as well as the role of athletic trainers in the development of return to learn protocols. Covassin, Elbin, and Sarmiento (2012) contended that future research should address the effectiveness of concussion protocols and the necessity of educating coaches on concussion recognition, prevention, and treatment. Additionally, more medical research into the causes and effects of concussions is warranted. Phillips (2015) reported that research into the health effects of concussions is ongoing, which has facilitated greater recognition of concussions and how to better manage them. Faure, Moffitt, and Scheiss (2015) acknowledged that while coaches have received adequate training in concussion education, parents and student-athletes have not received such training. This is mainly due to school and parental noncompliance with concussion education programs, the absence of the appropriate educational materials, and the lack of access to the necessary sports-medicine care. Thus, while most schools have educated coaches properly on the identification and effects of concussions, parents and student-athletes have not been educated accordingly.
Theoretical Framework

Becker’s Health Belief Model was utilized as the theoretical framework for this study. Rosentstock’s (1966) seminal development of the Health Belief Model (HBM) stipulated that the initial focus of the model was to develop an understanding of why people neglected to espouse and implement protective or precautionary health measures. The model denoted that individuals were more likely to engage in activities that prevent negative health behaviors if they were susceptible to the negative effects of that behavior. Conversely, individuals were unlikely to take steps to prevent a negative health outcome if they were unlikely to be affected by the behavior. Subsequently, if people believed the negative outcome of the health behavior was extremely severe, they were more likely to avoid the behavior. According to Janz and Becker (1984), the HBM has been primarily utilized to justify and calculate various health behaviors with an emphasis on perspectives and attitudes toward good health practices. The HBM postulated that good health is valued and the belief in favorable outcomes as a result of proactive approaches to good health was strong. Rosenstock, Strecher, and Becker (1988) suggested that the HBM is a model for people to avoid undesirable health behaviors and an ideal framework for preventative acts in health management. Accordingly, the HBM is predicated on the following three beliefs:

1. Some harmful health conditions can be avoided or prevented.
2. Individual action can allay some negative health concerns.
3. Individuals can successfully follow a recommended course of action that promotes good health.

Subsequently, Janz and Becker (1984) asserted that the HBM has been utilized on numerous occasions to elucidate and forecast the actions related to the results of positive health. Ross, Thompson-Ross, Rahman, and Cataldo (2010) noted that the HBM has been employed to
study numerous health behaviors. According to Glanz, Lewis, and Rimer (1997), the HBM is the most frequently utilized theory in health education and promotion. Jang (2013) reported that the HBM has been employed in recent studies to determine the likelihood of sports injuries and parental acuity of the susceptibility of their children to injuries that occur as a result of competing in youth sports.

In a 2014 study, Cao, Chen, and Wang utilized the HBM to ascertain that community-initiated health programs appreciably improve the health attitudes of high school students. The effectiveness of these programs was enhanced when meaningful collaboration occurred between student, parents, educators, and the community. Giang, Koester, Vondy-Beaver, Clay, and McLaughlin (2010) used the HBM to determine that online learning was an effective method of instruction that better educated high school coaches, athletes, parents, teachers, and administrators on the severity of concussions and concussion management. This was significant for several reasons, primarily because this training was likely to reduce the hazards linked to concussions that occur in youth athletics.

**Research Questions**

1. To what extent are educators able to recognize concussion symptoms in student-athletes?
2. How frequently are educators provided with information from school athletic trainers to help them identify concussion symptoms in student-athletes?
3. To what degree do educators acknowledge a need for return-to-learn protocols in schools?
4. To what extent are educators able to discern the effects of concussions on academic performances of student-athletes?
Null Hypothesis & Hypothesis

The null hypothesis is that there is no relationship between educators’ athletic and coaching backgrounds and their acknowledgement of the necessity of return-to-learn protocols for student-athletes possibly suffering from concussions. The hypothesis is that educators with athletic and coaching backgrounds are more likely to acknowledge the necessity of return-to-learn protocols for student-athletes possibly suffering from concussions.

Limitations

The results of the study were limited to the population of high school educators (teachers, coaches, athletic trainers, administrators) in one East Tennessee school system. Elementary grades and middle grades educators did not participate in this study. Additionally, the study did not address specific return-to-learn policies and academic modifications for concussed student-athletes. The study focused specifically on educators’ beliefs in determining the necessity of developing these policies and modifications.

Delimitations

The target population for this research was high school teachers and other educational professionals from five different high schools in one East Tennessee school district. This population was chosen due to the accessibility of the participants. High-school student-athletes were not considered for participation in this research because the majority of these student-athletes were still minors. While this research may be applicable and relevant in other school districts, the researcher did not have accessibility to these educators. Similarly, lack of accessibility to college professors precluded this research from being conducted at the collegiate level.
Assumptions

It was assumed that all the research participants would answer questions in a truthful manner. Additionally, it was assumed that research participants understood the questions they were asked. However, errors in participant comprehension of questions and participant bias could not be controlled.

Scope

The scope of this study was limited to one school district in East Tennessee. Although the findings were limited to this one school district, they may be pertinent to other school districts – locally, regionally, and nationally. Conducting research outside of this school district was not practicable, but that does not preclude the findings from being applicable to other school systems because concussed student-athletes are not unique to the district in which the research occurred.

Definition of Terms

For clarification purposes, the researcher chose to define the following terms. Other terms are defined in the literature review, and in those instances, sources are cited.

Chronic Traumatic Encephalopathy (CTE) is a degenerative neurological disease that is believed to be caused by recurrent head injuries. CTE was first diagnosed in 1973 and was frequently associated with boxing. However, recent medical research indicates that CTE may also result from sports in which frequent head trauma occurs, such as football (Gavett, Stern, and McKee, 2011). It is currently unknown if youth concussions are factors in the development of CTE (Kreck, 2014).

Post-Concussion Syndrome (PCS) occurs when multiple concussion symptoms, such as dizziness and headaches, linger for an extended period of time after the initial injury. PCS
symptoms typically dissipate within three months, but sometimes last up to one year. The seriousness of the initial concussion injury does not appear to be a predictor of PCS (Mayo Clinic, 2015a). According to Kapadia (2013), high school athletes who do not recover from concussions within three weeks may suffer from PCS, which can last for years. PCS sufferers typically are forced to endure frequent headaches, personality changes, academic difficulties, and loss of balance.

**Second Impact Syndrome** (SIS) is a two-tiered injury in which an athlete first suffers a concussion, then suffers a second concussion within weeks after the first concussion. SIS is identifiable by extreme brain swelling and/or bleeding in the brain. Although rare, SIS may cause sudden death. Youth and adolescents are believed to be most susceptible to SIS (Bey and Ostick, 2009). SIS, which occurs when athletes incur repeated concussions without sufficient time to heal after the occurrence of the first concussion, is the most significant short-term effect of concussions. Although SIS is not common, the health risks associated with SIS mandate that athletes be removed from competition immediately if a concussion is suspected (Edwards and Bodle, 2014). According to Piebes et al. (2009), SIS is most prevalent among teenagers, and occurs when an individual sustains subsequent injury to the brain before the first brain injury has healed. McAvoy (2012) asserted that SIS can result in lasting brain damage or death. McGrath (2010) stated that high-school athletes are more susceptible to SIS.

The Mayo Clinic (2015b) defines **Traumatic Brain Injury** (TBI) as disruption of normal or typical brain function resulting from violent impact to the head or an extreme whiplash motion. Mild TBI symptoms include loss of consciousness, altered sleep patterns, nausea, fatigue, dizziness, headache, mood swings, and difficulty concentrating or remembering. Severe TBI symptoms include loss of coordination, repeated vomiting and continuous nausea,
convulsions, seizures, loss of feeling or weakness in fingers and toes, inability to wake up, slurred speech, and coma.

A **504 Plan** is a provision of Section 504 of the Rehabilitation Act of 1973 that disallows discrimination based on disability. The law stipulates the needs of students with disabilities are to be met in the same manner as the needs of students who do not have disabilities. Increasingly, students with physical disabilities may qualify for 504 accommodations (Madaus and Shaw, 2006). According to the United States Department of Education (2007), Section 504 “protects the rights of individuals with disabilities in programs and activities that receive federal funds,” and the law mandates that schools should provide a “free appropriate public education to each qualified person with a disability who is in the school district’s jurisdiction, regardless of the nature or severity of the person’s disability.”

**Response to Intervention (RTI)** programs are designed to improve student learning by incorporating appropriate assessment and intervention procedures. At-risk students are monitored accordingly and assessed regularly. Subsequently, practices that best fit the individual student’s learning needs are implemented and evaluated (National Center on Response to Intervention, 2010).

An **Individual Education Plan (IEP)** is a plan designed to meet the individual learning needs of a student who has an identified disability. The IEP notates services and modifications the student is to receive (Sutton, 2014).

A **veteran teacher** is a teacher with five or more years teaching experience.

A **beginning teacher** is a teacher with less than five years of teaching experience.

A teacher with an **athletic background** is a teacher who competed in high school or college athletics and/or has coached or currently coaches a high school sport.
A teacher with **no athletic background** is a teacher who did not compete in either high school or college athletics and has never coached a high school sport.

**Organization of the Document**

This study was organized into five chapters. The first chapter detailed the background of the study, the problem statement, and the significance of the research. The theoretical framework was also described, and research questions were listed. Limitations and delimitations of the study were indicated, and a definition of terms was incorporated. The second chapter consisted entirely of a comprehensive literature review related to the topic. The literature review integrated information on the following concussion issues: concussion diagnosis, difficulties in diagnosing concussions, concussion statistics, cognitive rest, effects of concussions on learning, physical and emotional effects of concussion, return-to-competition policies and procedures, return-to-learn protocols, how concussions affect adults and adolescents differently, and concussion legislation. The third chapter was solely dedicated to the methodology that detailed the proposed research. The fourth chapter reported the results of obtained data, and the fifth chapter detailed conclusions, implications, and recommendations of the study.
CHAPTER 2: REVIEW OF LITERATURE

Concussions Defined

The CDC (2015) defined concussions as brain injuries, typically caused by falls or impact to the head or body, that alter the normal functions of the brain. The American College of Sports Medicine (2011) classified concussions as brain injuries caused by rapid acceleration or deceleration that commonly result from hits to the head and contact with the ground. According to Harmon et al. (2013), concussions are mild traumatic brain injuries that can be branded as less acute than other identified brain injuries. Edwards and Bodle (2014) reported that concussions occur most often as the result of a direct blow to the head, but in some instances they can occur as a result of a blow to the body that results in a whiplash effect. The whiplash effect, in turn, transfers the force of the impact to the brain. Brady and Brady (2011) stated that concussions most often result from head trauma that occurs during falls, collisions, or whiplash force. Edwards and Bodle (2014) noted that definitions of concussions differ somewhat between various professional medical organizations, but in general, concussions can be described as trauma that affects the head and are manifested in the form of altered neurological symptoms. In a 2014 report issued by the NCAA, concussions were defined as changes in brain function, which result from force to the head that can be identified when individuals demonstrate altered cognitive and neurological functions. McAvoy (2012) defined a concussion as a brain injury that impacts physical, mental, and emotional wellness. Roetert and Richardson (2014) asserted that the brain is susceptible to external damage because the skull does not mitigate the forces of impact or extreme rotation. The Network for Public Health Law (2015) catalogued concussions as a form of TBI. According to Cantu and Hyman (2011), concussions can be characterized as a jostling of the brain within the skull that alters the awareness of the sufferer. Frequently,
Concussions occur as a result of the whiplash effect, contrary to the common perception that they only result from contact to the head.

**Symptoms of Concussions**

Some symptoms of concussions may not manifest themselves until hours or days after the injury. These symptoms include difficulty remembering or concentrating, feeling sluggish, irritability, unexplained sadness or emotion, headache, nausea, vomiting, problems with balance, blurry or double vision, increased inability to tolerate light or noise, fatigue, and changes in sleep patterns (Centers for Disease Control and Prevention, 2015). According to Edwards and Bodle (2014), concussion symptoms vary greatly from case-to-case and are manifested at different times during the recovery process. McGrath (2010) reported that student-athletes who suffer from concussions typically display a variety of physical and cognitive symptoms, including irregular sleep patterns and emotional instability. Also, student-athletes who do not lose consciousness as a result of concussions but have memory loss are slower to recover than student-athletes who lose consciousness but do not have memory loss.

Some symptoms of concussions linger for days, and these symptoms include increased fatigue, irritability, sleep disruption and sensitivity to light and noise. Symptoms that may persist for longer periods of time include difficulty concentrating and paying attention, delayed processing, loss of memory, loss of balance, difficulty in tracking objects visibly, increased occurrences of being distracted, and higher rates of anxiety and depression (Coppel, 2014). According to The American College of Sports Medicine (2011), common concussion symptoms include nausea, headaches, dizziness, difficulty concentrating and remembering information, change in sleep patterns, increased irritability, and increased emotional instability.
M. Van Bruggen (personal communication, June 3, 2015) said that student-athletes often appear normal in the hours and days following a concussion, but their analytical processing skills are often severely diminished. According to Edwards and Bodle (2014), typical early concussion symptoms, which occur within a few hours after the injury, include delays in motor and verbal responses, confusion, incoherent or slurred speech, loss of coordination, loss of memory, nausea, vomiting, dizziness, and loss of consciousness. Later symptoms, which develop in the days and weeks following a concussion, include lingering headaches, changes in sleep patterns, inability to pay attention or concentrate, loss of memory, change in personality, and increased irritability.

Sady, Vaughan, and Gioia (2011) asserted that while some concussion symptoms, such as forgetfulness and memory loss, may resolve themselves in a short period of time, they are typically followed by changes in sleep patterns and other cognitive, physical, and emotional disorders.

Concussions are identifiable by neck pain, blurry vision, vacant stares, and numbness or tingling in extremities (McAvoy, 2009). Concussion symptoms include vertigo, inability to concentrate, amnesia, and difficulty retrieving words (Lynch, Anderson, Benton, and Green, 2015). Loss of consciousness was once considered a primary indicator of concussions, but this is no longer the case. In fact, less than 10% of concussed athletes suffer loss of consciousness (Scorza, Raleigh, and O’Connor, 2012).

**Diagnosis of Concussions**

Diagnosis of concussions is primarily predicated on the identification of symptoms (Halstead et al., 2013). While it is clear that student-athletes who lose consciousness as a result of concussions should receive prompt medical attention, most sports-related concussions do not involve a loss of consciousness (McGrath, 2010). According to a 2015 report issued by the
Centers for Disease Control and Prevention, students with concussions often exhibit the following behaviors – confusion, inability to answer questions quickly, repeating of questions, inability to recall events prior to and following the injury, brief loss of consciousness, behavior or personality changes, and forgetting assignments and school schedules. M. Van Bruggen (personal communication, June 3, 2015) said that only 0.3% of athletes lose consciousness as a result of concussions. According to Scorza, Raleigh, and O’Connor (2012), concussions cannot be effectively diagnosed until cervical spine injuries and more severe traumatic brain injuries are first ruled out. Kerasidis (2015) argued that athlete self-assessment is an ineffective method of concussion diagnosis, and coaches are similarly ill-equipped to effectively diagnose concussions. Instead, the determination should be made by the school’s athletic trainer or team physician.

Difficulties in Diagnosis

Diagnosing concussions is often difficult because most student-athletes who have concussions do not lose consciousness or demonstrate symptoms, and the effect on cognitive functioning is frequently insignificant and brief (Coppel, 2014). Concussions cannot be diagnosed as easily as other common sports injuries, and concussion diagnosis is a developing practice (Kerasidis, 2015). Concussions are difficult to diagnose because most do not result in a loss of consciousness (Davies, 2011). Many concussions are not diagnosed because of the lack of medical personnel at youth sporting events, which means coaches are often responsible for determining if an athlete has suffered a concussion. Thus, it is essential that all involved with youth athletics be able to ascertain concussion symptoms (Covassin, Elbin, and Sarmiento, 2012). According to the American College of Sports Medicine (2011), there is no current medical procedure that can precisely diagnose concussions, and since student-athletes who suffer concussions typically look and act normally, it is challenging for teachers and coaches to
accurately determine if concussions have occurred. M. Van Bruggen (personal communication, June 3, 2015) said that there is no definitive way to diagnose a concussion.

Although CT scans or MRI exams can be utilized to determine if there is bleeding or bruising in the brain, they are not effective diagnostic tools for concussions, and negative test results do not indicate the absence of a concussion. Concussion diagnosis is predicated on recognition of various symptoms, some of which do not manifest until hours or days after the injury (McAvoy, 2009). There are 27 indicators on the standard concussion checklist, and just because an athlete demonstrates one of those indicators, that does not mean he or she has a concussion. It is feasible that an athlete could demonstrate only one of the 27 indicators and have a concussion, and it is also possible that an athlete could demonstrate as many as 15 of the 27 indicators and not have a concussion. In like manner, some symptoms of concussions are also symptoms of sleep deprivation and heat exhaustion, which often makes concussions difficult to diagnose. (M. Van Bruggen, personal communication, June 3, 2015). Diagnosing concussions is problematic because neurological changes are often minor and difficult to identify. Additionally, many of the symptoms associated with concussions are also indicators of other disorders, such as heat exhaustion and migraine headaches (Scorza, Raleigh, and O’Connor, 2012). Concussions are often hard to detect for several reasons, including the tendency of athletes, coaches, and athletic trainers to dismiss mild symptoms as minor injuries associated with contact sports, the lack of a baseline test to correctly gauge neurological function and injury, and the unwillingness of some athletes to report concussive symptoms due to fear of being removed from competition. (Edwards and Bodle, 2014). According to Faure, Moffitt, and Scheiss (2015), athletic trainers are adept at diagnosing and managing concussions, yet the majority of schools in the United States, notably those in rural areas, are not staffed with athletic trainers. Covassin, Elbin, and
Sarmiento (2012) asserted that concussions are more difficult to diagnose in younger athletes because there is minimal medical coverage at youth sports events. As a result, coaches are often responsible for detecting concussion symptoms, so it is necessary that coaches are able to identify concussion symptoms.

Magnetic Resonance Imaging (MRI) exams and Computed Tomography (CT) scans are usually unable to detect concussions. Additionally, medical professionals often disagree on what constitutes an accurate diagnosis of a sports-related concussion, medical school students receive only nominal training in sports medicine, and 68% of physicians reported being uncomfortable when managing sports-related concussions (Brady and Brady, 2011). According to Edwards and Bodle (2014), 53% of concussions that occur in football are not reported, and it is not uncommon for concussed athletes to be unaware that they have sustained concussions. M. Van Bruggen (personal communication, June 5, 2015) said that there are over 40 working definitions of concussions, and there is no medical consensus on what actually constitutes a concussion. Scorza, Baugh, Kroshus, Daneshvar, and Stern (2014) stated that there are no universal concussion-diagnosis protocols, and diagnosis of concussions is primarily predicated on athletes reporting concussion-like symptoms. However, approximately 50% of concussions that occur go undiagnosed, mainly because student-athletes do not report symptoms. Kerasidis (2015) reported that numerous concussion symptoms do not manifest immediately, and some symptoms may not be palpable until hours or days after the injury. Additionally, some revealing symptoms, such as the inability to walk or loss of consciousness, are not always evident. McDaniel and McIntire (2010) said that diagnosis is problematic in approximately 90% of concussions because symptoms are relatively negligible. According to McCrory et al. (2013), CT scans and MRI exams are ineffective when utilized to diagnose concussions, but may be necessary in order to
rule out more severe traumatic brain injuries. Murray, Salvatore, Powell, and Reed-Jones (2014) suggested that diagnosis of concussions is challenging in many instances because symptoms are inconsistent and causes may be multifaceted. Lynch et al. (2015) asserted that the diagnosis of concussions is problematic because numerous elements of the brain may be affected differently depending on the nature of the injury.

According to the NCAA (2014) concussions are difficult to diagnose for numerous reasons. They are:

- Often, the initial physical and cognitive exams performed by athletic trainers are normal, and advanced medical tests such as CT scans and brain MRI scans are often normal.
- Medical effects of concussions are usually subtle and challenging to detect.
- Symptoms of athletic concussions are not unique to concussions only, and may be related to other medical issues, such as migraine headaches, learning disabilities, and mood disorders.
- Not all symptoms occur immediately after concussions. Some symptoms may present immediately, whereas others may be delayed. This varies greatly between individual student-athletes. In some instances, it varies between the same individual who has suffered multiple concussions.
- Student-athletes often want to return to competition as quickly as possible, so they tend to minimize or not report their symptoms and overstate their level of recovery.

**Failure to Report**

Many athletes do not recognize some or all concussion symptoms, thus many concussions go undiagnosed or unreported (Brady and Brady, 2011). Coaches should be aware, particularly if student-athletes on their teams seldom report concussion symptoms, that many
concussions go undetected (McGrath, 2010). High school football players lack the necessary knowledge about both the symptoms and consequences of concussions, and high school athletes may not report concussive injuries (Cournoyer and Tripp, 2014). Many student-athletes are either reluctant to report concussion symptoms or are likely to understate the severity of their symptoms because of their desire to return to athletic competition (Coppel, 2014). Athletes are often unable to self-diagnose concussions because they are unaware of symptoms or are unaccustomed to them. In many instances, there are no overt signs of injuries, which often causes family members, coaches, and teachers to question the validity of the injury (Meehan, 2011). Numerous concussions are never reported because sufferers often are unaware that they have been concussed and never report symptoms. Additionally, many student-athletes are reluctant to report symptoms due to fear of removal from competition (Kapadia, 2013). Diagnosing and managing concussions is problematic, and it is estimated that over 50% of concussions that occur among high school student-athletes go unreported (Register-Mihalik et al., 2013).

**Concussion Statistics**

According to Harmon et al. (2013), approximately 3.8 million concussions occur each year in the United States during competitive athletics and recreational activities. However, nearly 50% of these concussions are not reported or diagnosed. Baugh et al. (2014) reported that between 1.6 million and 3.8 million concussions occur each year in sports-related activities. Murray, et al. (2014) estimated that approximately 300,000 concussions occur each year as a result of athletics, and the occurrence of concussions is expected to increase in accordance with participation in high school and college athletics. According to Lowrey and Morain (2014), sports-related head injury visits to emergency rooms for individuals under age 19 rose from 153,375 in 2001 to 248,414 in 2009, an increase of 62%, and it was estimated that 30.8% of
athletes who suffered concussions eventually returned to athletic competition. Edwards and Bodle (2014) stated that emergency room visits for athletic-related concussions have risen to approximately 175,000 per year, which accounts for a 60% gain over the past decade. According to McGrath (2010), less than 10% of injuries assessed by athletic trainers are concussion-related, but there is a typical gain of 5% to 10% of concussion reports when contact sports are in-season. Moore, Broglio, and Hillman (2014) approximated that 15% to 20% of concussions occur during sports-related activities, and as a result, there is growing concern from both the public and medical domains regarding athletic-related concussions.

Most concussions result from participation in athletics, with more concussions occurring during competitive events as opposed to practice or training (Scorza, Raleigh, and O’Connor, 2012). Kreck (2014) stated that of the approximately 1.7 million traumatic brain injuries that occur each year, 75% of those are concussions. Edwards and Bodle (2014) opined that the increase in concussion reporting is likely due to enhanced recognition and awareness of concussions, as opposed to an increase in the occurrence of concussions. According to Sady, Vaughan, and Gioia (2011), over 100,000 adolescents seek emergency treatment each year as a result of concussions. Others are treated by private physicians and some adolescents do not seek treatment for concussion symptoms. Broglio et al. (2014) stated that concussions occur in both male and female athletes in all sports, but are more prevalent in collision and contact sports.

A 2015 report issued by the Network for Public Health Law stipulated that athletics are the second leading cause of traumatic brain injuries for individual between ages of 15 and 24, behind only motor vehicle accidents. Thus, the effect of concussions on adolescent wellness is nationally substantial because participation numbers in youth and school-sanctioned sports annually exceeds 7 million members. In like manner, recreational athletics participation typically
approaches 25 million members. According to Phillips (2015), there are over 100,000 concussions that occur each year in high school athletics, although this number would likely increase dramatically if all athletes reported concussion symptoms. Additionally, college athletes who have previously suffered concussions are three times more likely to suffer subsequent concussions. Piebes, Gourley, and Valovich-McLeod (2009) reported that 9% of all high school sports injuries are a result of concussions, and females are slightly more likely than males to suffer concussions. A 2013 report issued by the Institute of Medicine of the National Academies stated that the highest rates of occurrence for concussions among male high school and college athletes are in football, ice hockey, lacrosse, wrestling, and soccer. For female high school and college athletes, the highest rates of occurrence for concussions are in soccer, lacrosse, basketball and ice hockey. According to Williams, Welch, Parsons and McLeod (2015), concussions account for 8.9% of all injuries suffered by high school athletes.

**Effects of Concussions on Learning**

The effects of concussions on learning vary for each student, but a premature return to learning activities that require significant cognitive function may cause concussion symptoms to linger, reappear, or get worse (CDC, 2015). Symptoms associated with sports-related concussions make the transition back into academic work difficult for student-athletes. Some symptoms, such as the inability to sleep or excessive fatigue, preclude student-athletes from being able to concentrate and focus, and other cognitive effects may impact learning even when student-athletes appear to be fully recovered (McGrath, 2010). Negative effects of concussions on learning are primarily due to inability to concentrate, loss of short-term memory, and lack of energy (Sady, Vaughan, and Gioia, 2011). A 2015 report issued by the Network for Public Health Law stated that student-athletes recovering from concussions are more likely to perform
poorly on attention, concentration, and processing assessments than student-athletes who have not suffered concussions. Physical symptoms associated with concussions, such as trouble concentrating or remembering, depression, lethargy, and intolerance for noise and light, inhibit student-athletes’ capacity to perform in the classroom. Similarly, an increase in cognitive activities before concussion symptoms have dissipated frequently causes symptoms to linger or worsen, and multiple concussions can lead to lasting learning disabilities.

Concussions make it difficult for student-athletes to concentrate and remember (Cantu and Hyman, 2011). The negative effects on learning are significant for student-athletes recovering from concussions. These effects include the inability to organize assignments, problems comprehending new information, the incapability of completing work in a timely manner, increased petulance and impulsiveness, and a reduced ability to manage stress. Students recovering from concussions are also likely to face difficulties multitasking and concentrating (Davies, 2011). Student-athletes recovering from concussions typically become confused easily, have trouble remembering and concentrating, and slur their speech. Additionally, sleep disorders and disruptions in the student-athlete’s normal sleep pattern are not uncommon (McAvoy, 2009). According to Halstead et al. (2013), concussions are likely to inhibit students’ ability to learn because many concussion symptoms prevent students from concentrating, focusing, and learning and retaining new information. In like manner, the effects of concussions on sleep habits may increase student non-attendance, tardiness, and falling asleep in class. Lowrey and Morain (2014) reported that concussions in individuals under age 19 may lead to diminished cognitive function, higher depression rates, loss of memory, and mild cognitive deficiency. According to Harmon et al. (2013), if cognitive or physical activity occurs before student-athletes have completely recovered from concussions, extended neurological difficulties are likely. A 2015
study of Ransom et al., which consisted of 349 students under age 18 who were recovering from concussions, determined that the impact of concussions on learning were significant. The study found that the majority of students returning to class while recovering from concussions have difficulty paying attention, taking notes, studying, and understanding material.

**Physical and Emotional Effects of Concussions**

Concussions increase the risk of relationship difficulties, suicide, long-term stress and substance abuse (Brady and Brady, 2011), and concussions may intensify feelings of melancholy and thoughts of suicide (Cantu and Hyman, 2011). The risk of long-term implications as a result of concussions is greater than the risks of other sports-related injuries (McDaniel and McIntire, 2010). According to the Network for Public Health Law (2015), concussions increase the risk of diminished or altered cognitive functioning, which may lead to learning difficulties, memory problems, and inability to focus or concentrate for extended periods of time. Halstead et al. (2013) reported that concussions may exacerbate stress, which can aggravate or prolong symptoms. Williams et al. (2015) said that concussions are likely to impact both the athletic and personal well-being of the student-athlete. Coppel (2014) stated that most student-athletes recover from concussions quickly and return to athletic competition and academic work in a timely manner. However, student-athletes who display persistent symptoms or delayed symptoms often must endure a much more difficult transition into their normal academic, athletic, and social norms. Additionally, when student-athletes are unable to resume physical activities and/or are aware of meaningful changes to their cognitive and emotional well-being, they often struggle with a loss of identity that may impact their self-worth, career plans, and future goals. According to DeNisco (2014), student-athletes who return to competition
prematurely and suffer additional head injuries are more likely to suffer from extended neurological difficulties, such as Parkinson’s and various forms of dementia, as they age.

**How Concussions Affect Adolescents and Adults Differently**

Unrecognized or unreported concussions among teenagers are especially troubling because adolescents are more likely than adults to suffer the negative effects of concussions due to differences in brain physiology (Cournoyer and Tripp, 2014). Concussions are more problematic for adolescents because the brain is not yet fully developed, so adults typically recover from concussions quicker than adolescents. Also, college athletes usually recover quicker from concussions than high school athletes (Kapadia, 2013). Teenagers are more likely to suffer long-term effects from concussions than adults. In some instances, symptoms may persist for as long as six months. Additionally, teenagers are more likely to suffer concussions because some parts of their brains are still developing (Kreck, 2014). College athletes recover quicker from concussions than do high school athletes. (Lynch, Anderson, Benton, and Stanley, 2015), and the whiplash effect impacts adolescents more severely than it does adults because adolescents have weaker necks that cannot effectively withstand hits and collisions (Cantu and Hyman, 2011).

**Concussion Recovery**

Recovery from concussions varies for each individual. Typical recovery occurs within a week or so, but some student-athletes continue to suffer from concussion symptoms and effects for much longer (Sady, Vaughan, and Gioia, 2011). While some concussion symptoms may be immediately evident, many are not manifested until hours after the injury. Symptoms typically last for a minimum of three days and most often dissipate within 7-10 days, although recovery may take longer for student-athletes who have suffered prior concussions. Additionally,
concussion recovery is longer in duration for both adolescents and others who have previously suffered concussions (Scorza, Raleigh, and O’Connor, 2012). According to the American College of Sports Medicine (2011), typical recovery time from concussions takes up to 14 days. Baugh et al. (2014) reported that recovery from concussion symptoms can take days or weeks, and in some instances, several months. Brown et al. (2014) concluded that student-athletes are deemed to be recovered from concussions if they demonstrate no symptoms while both at rest and during physical activity after any post-concussion medications have been halted, and if post-concussion neurological testing returns to pre-concussion baseline norms, if applicable. Halstead et al. (2013) stated that most student-athletes recover from concussions within three weeks. According to McCrory, et al. (2013), concussions symptoms typically do not last for longer than 10 days, although recovery time may be longer for children and adolescents.

Most concussed student-athletes recover with three weeks, but some develop unforeseen complications and take much longer to heal (Cantu and Hyman, 2011). The majority of concussion sufferers recover completely in two weeks or less, but recovery takes longer for adolescents. Accordingly, it is imperative that concussions be allowed to heal in order that adolescents do not suffer unnecessary scholastic, cerebral, behavioral, and emotional difficulties. (Davies, 2011). Approximately 80% of concussion sufferers recover completely within three weeks, although adolescents typically recover at a slightly slower rate. Conversely, some student-athletes may continue to manifest symptoms months after the initial injury (McAvoy, 2009). According to Coppel (2014), 80-90% of concussion symptoms abate in seven to 10 days, but the recovery time may be longer for adolescents. Lynch et al. (2015) reported that concussion symptoms typically subside within 21 days, and in most instances, within 7-10 days. However, as many as 20% of concussion patients have symptoms that linger for more than two weeks, and
2% of concussion patients endure symptoms that last up to several months. Kapadia (2013) stated that 83% of high school athletes recuperate from concussions in three weeks or less if symptoms are properly managed. According to Brown et al. (2014), concussions are difficult to treat. However, they usually heal on their own after a period of time, primarily as a result of cognitive and physical rest. Roetert and Richardson (2014) said that student-athletes who are allowed to lessen homework and minimize online use recover from concussions in 20-50 days, whereas student-athletes who do not have time allocated for cognitive rest may take as many as 150 days to completely recover. Broglio et al. (2014) stated that student-athletes who are young or who have suffered multiple concussions tend to recover more slowly.

Cognitive Rest

Brown et al. (2014) conveyed that the theory of cognitive rest was first presented in 2004 at the Second International Conference on Concussion in Sport. The theory is predicated on the belief that intensified cognitive activity prolongs the abatement of concussion symptoms. Williams et al. (2015) emphasized that cognitive rest is an essential element of the healing phase because it affords the brain the requisite recovery time while symptoms subside. Typical academic activities are the primary impediments to the cognitive rest needed for student-athletes who have suffered concussions. However, other actions, such as watching television, playing video games, listening to music, and reading are also likely to prolong or worsen concussion symptoms. McCrory et al. (2013) opined that both cognitive and physical rest are the foundations of successful concussion recovery. According to McGrath (2010), student-athletes will recover quicker from concussions if both physical and cognitive activities are minimized.

Cognitive rest typically requires concussion sufferers to avoid any activity that requires mental strain, such as text messaging, playing video games, using a computer, viewing
television, or listening to music. However, it is often difficult for student-athletes to avoid these behaviors because they are habitual activities that occur each day. While the crucial component of concussion treatment has historically been physical rest, the emphasis on physical rest is exclusive from mental effort and cognitive exertion, which are critical factors in each student’s ability to perform academically (Sady, Vaughan, and Gioia, 2011). When student-athletes recovering from concussions engage in pursuits that mandate concentration, they are more likely to prolong or exaggerate symptoms (Davies, 2011). Both physical rest and cognitive rest are essential components of concussion recovery. (Brady and Brady, 2011; Scorza, Raleigh, and O’Connor, 2012).

Cognitive rest is imperative in allowing the concussed brain to fully recover. Although a premature return to cognitive activities has not been linked to severe long-term consequences, such a return often prolongs concussion symptoms and impedes recovery (McAvoy, 2012). Student-athletes who do not get sufficient cognitive rest after a concussion take as many five months to recover, whereas student-athletes who minimize cognitive activities accordingly recover in two months or less (Roetert and Richardson, 2014). Premature returns to cognitive activities before the brain has had sufficient cognitive rest may either prolong or exacerbate concussion symptoms. Thus, it is essential that those recovering from concussions avoid cognitive activities that require perceptual and intellectual tasks during the time period immediately following the occurrence of the injury. Otherwise symptoms may reappear or worsen. However, it is difficult to determine how much mental activity is permissible because each individual recovers at a different rate (Sady, Vaughan, and Gioia, 2011). According to Halstead et al. (2013), the cognitive testing protocols that have been used to assess whether student-athletes have a concussion have not been used to help determine how much cognitive
rest is needed before resuming academic work. Students recovering from concussions should return to school as quickly as possible with the provision that the cognitive rest may be needed in order that symptoms do not worsen. Thus, the primary focus of concussion recovery should be determining how much cognitive rest is needed so that symptoms do not return or worsen. Brown et al. (2014) reported that a reduction in cognitive activity correlates to a decreased period of concussion symptoms. According to Williams et al. (2015), recommendations for cognitive rest as part of concussion management protocols are increasing.

Safeguarding the mental utilities of concussion sufferers is essential because the long-term impact of a premature return to cognitive activities is yet to be determined, thus cognitive rest is an essential component of concussion recovery (Valentine and Logan, 2012). In order to maximize the benefits of cognitive rest, athletes should refrain from or limit activities that mandate concentration and attentiveness, including reading, texting, playing video games, and board games that require critical thinking (Meehan, 2011). Cognitive rest is a critical component of concussion recovery and is likely to reduce the possibility of lasting effects of any sort of TBI. (Kapadia, 2013). Gibson, Nigrovic, O’Brien, and Meehan (2013) cautioned that recommending extended absences from school in order to facilitate cognitive rest is not advisable because there is minimal evidence that cognitive rest aids concussion recovery. The NCAA (2014) recommended cognitive rest as part of a student-athlete’s recovery from a concussion, which would preclude student-athletes from texting, playing video games, reading, watching television, and school work.

**Return-To-Play**

The premature return to athletic competition following a concussion may prolong or exacerbate symptoms (McGrath, 2010), but many athletes downplay concussions symptoms in
order to return to play quicker (McDaniel and McIntire, 2010). Although it is not debatable that student-athletes should receive significant medical evaluation before returning-to-play, there is substantial disagreement on who is competent to make these determinations. In like manner, there is much dispute regarding the competency of caregivers to determine when student-athletes may return to competition. Accordingly, any medical provider making return-to-play decisions should undergo specialized concussion training (Lowrey and Morain, 2014). According to M. Van Bruggen (personal communication, June 3, 2015), athletic trainers must err on the side of caution when removing athletes from competition, and return-to-play decisions should be predicate on ensuring that the brain is healed well enough to prevent SIS and protecting the student-athlete from further injury.

Concussed student-athletes should not return to academic courses involving physical activity, such as physical education, if any concussion symptoms are evident. Accordingly, student-athletes should not resume physical activity of any sort until they are able to return to normal academic activity without recurrence of concussion symptoms (Sady, Vaughan, and Gioia, 2011). There is little data available to assist health-care professionals in determining when concussed athletes can return to competition. (Scorza, Raleigh, and O’Connor, 2012). Teacher input should be valued in determining when student-athletes may be cleared to return to athletic participation (McAvoy, 2009). Halstead et al. (2013) suggested that student-athletes should not return to athletic competition or other extracurricular activities until they are able to function at their previously established cognitive levels. According to Harmon et al. (2013), student-athletes should not return to competition until concussion symptoms are no longer evident, and if symptoms linger once physical activity resumes, the student-athlete should immediately refrain from further competition or activities.
Return-To-Class

Academic success for student-athletes is predicated on the ability to concentrate and process information. However, concussions diminish these capabilities, so it is likely that academic modifications will be necessary when student-athletes are recovering from concussions in order that their grades will not suffer as a result of concussions (Meehan, 2011). Much of the attention on concussion management has focused on when student-athletes may safely return to competition, whereas there has been little focus on when student-athletes should return to class and what, if any, academic accommodations should be made when they do (Master, Gioia, Leddy, and Grady, 2012). According to McAvoy (2012), there are no universally accepted protocols for returning to learning, primarily because of the discrepancies associated with the severity of each concussion, the learning habits of the student-athlete, and the severity of concussion symptoms. In each instance, however, early intercession and proactive, collaborative management of the student-athlete are essential in order to ensure the most effective return to academic work.

The role of educational leaders in promoting concussion recovery in student-athletes is paramount. Schools that are proactive in developing and implementing return-to-learn protocols are better equipped to help students navigate a successful return to academic work. Accordingly, while effective return-to-learn programs should institute protocols for the safe return of the student-athlete to the classroom, these programs should first develop strategies designed to foster student success upon returning to class. Subsequently, it is critical that school faculty and staff undergo concussion training that emphasizes the symptoms and consequences of concussions and the role of each school employee in the concussion-management protocol (Sady, Vaughan, and Gioia, 2011). Academic accommodations are essential components of concussion recovery
plans, but the necessity of return-to-learn procedures is often ignored. In many instances, student-athletes are mandated to refrain from athletic activities but are cleared to fully participate in school activities (Valentine and Logan, 2012). Fox, Barr-Anderson, Neumark-Sztainer, and Wall (2010) stated that because student-athletes commonly perform better academically than non-athletes, they are rarely viewed by administrators or other school support staff as academically at-risk. However, student-athletes are more likely to suffer concussions or other injuries that could negatively impact their academic performance, social interactions, and emotional behavior.

Brady and Brady (2011) recommended individualized return-to-learn programs for student-athletes returning to the classroom, and asserted that academic and physical adjustments should be contemplated. Master et al. (2012) reported that the necessity of excusing student-athletes from school due to concussions has often been overlooked, mainly because of the erroneous belief that mild concussions do not preclude students from functioning at normal cognitive levels. M. Van Bruggen (personal communication, June 3, 2015) suggested that there is some resistance to return-to-academic work policies because student athletes are often viewed as a very small sample of the overall student population, and while returning to class too soon will not cause re-injury, it will delay healing and will most likely have a negative impact on the student-athlete’s grades. McAvoy (2009) contended that academic accommodations should be determined by educational leaders, not health care professional or athletic trainers. In most cases, classroom teachers should adjust academic assignments accordingly. When student-athletes continue to manifest symptoms for an extended period of time after the initial injury, it is advisable to consider 504 or RTI protocols.
Although athletic trainers’ primary concern should be the assessment for when student-athletes may safely return to competition, it is also important to acknowledge that student-athletes recovering from concussions encounter academic challenges as well during the recovery phase (McGrath, 2010). Student-athletes may need to be excused from school if concussion symptoms are still evident, and it is essential that mental demands on student-athletes recovering from concussions be scrutinized closely in a manner that allows cognitive recovery (Sady, Vaughan, and Gioia, 2011). Academic work may sometimes exacerbate concussion symptoms. Accordingly, academic accommodations, such as delays in testing and other assignments, shorter school days, and longer time in between classes may need to be considered until concussion symptoms are absent (Valentine and Logan, 2012). Brown et al. (2014) suggested that 504 accommodations may be necessary if concussion symptoms do not abate within three weeks after occurrence of the injury. If a student-athlete is suffering from long-term concussion effects, an IEP may be mandated in order to appropriately modify academic participation.

It is important to note that return-to-learn plans may be individualized to fit the needs of both the school and the injured-student athlete, predominantly because all concussions differ somewhat. Similarly, recovery from concussions varies among individual athletes, and not all teachers’ beliefs regarding student nonattendance are the same. Accordingly, it is recommended that student-athletes recovering from concussions return to academic work on a gradual basis. The primary determination should be if the student-athlete should return to school, and this should not occur as long as symptoms are evident. Subsequently, a personalized, measured return plan should be implemented once the student-athlete is symptom-free, and should prioritize the reduction of apprehension associated with returning to school that most students suffer after illness or injury (Sady, Vaughn, and Gioa, 2011). According to the CDC (2015), most students
will not need formal academic accommodations upon returning to school after concussions. In some instances, however, formal support will be required, and will typically involve utilization and implementation of 504 accommodations, IEPs, and RTI protocols that may include curriculum, environmental, and behavioral modifications. Master, et al. (2012) related that there is cumulative evidence that suggests that measured return to academic work protocols are more beneficial for student-athletes as opposed to immediate return-to-class procedures once a prescribed amount of cognitive rest has occurred. In like manner, student-athletes who are permitted to self-determine when they return to academic work often return too soon, which delays recovery and often causes symptoms to recur or worsen.

Academic accommodations, which can be formal or informal, are essential components of concussion management protocols. Informal accommodations, which are utilized on a temporary basis and are designed to help facilitate recovery, include modifications to testing, homework assignments, and abbreviated school days. Formal accommodations, which are more long-lasting, should be incorporated as part of a student’s IEP or 504 plan (Williams et al., 2015). According to Harmon et al. (2013), student-athletes who have suffered concussions should undergo cognitive evaluations before returning to academic work and may require academic modifications, such as additional time to complete school assignments and a limited workload. Coppel (2014) noted that cognitive rest for student-athletes recovering from concussions typically involves a reduction in class time and modification of assignments. However, due to the stress of falling behind in school, making up assignments, and maintaining satisfactory academic progress upon full recovery, the anxiety associated with missed class time often fosters the development of stress in the student-athlete later in the recovery process.
Master et al. (2012) argued that an effective return to academic work policy for student-athletes who have suffered concussions should be individualized to the needs of each student athlete, and should incorporate the following three components: a prescribed time for cognitive and physical rest; a gradual inclusion into returning to academic work; and the effective communication of necessary academic accommodations that will eventually lead to a full return to normal academic activities.

Due to the variety of concussion symptoms, which vary between physical, cognitive, and emotional, and the variety of factors that affect concussion recovery, multiple stakeholders, including coaches, athletic trainers, physicians, and academic advisers, should play important roles in identifying concussion symptoms and overseeing social, academic, and medical support (Coppel, 2014). The NCAA (2014) recommended that return-to-learn protocols should be individualized to meet the needs of each student-athlete. Return to academic work should be gradual, and should proceed accordingly as concussion symptoms abate. For instance, when student-athletes can endure cognitive activities minus the recurrence of symptoms, a gradual, incremental return to academic work is recommended. Halstead et al. (2013) suggested that schools form multidisciplinary teams, which should include family members, independent medical personnel, teachers and other education professionals, and school athletic trainers and school nurses, to oversee return-to-learn procedures. According to the American College of Sports Medicine (2011), student-athletes who are recovering from concussions should refrain from any activities that require mental exertion and concentration, such as schoolwork, video games, and texting. Accordingly, student-athletes recovering from concussions should only gradually increase cognitive activities.
Coppel (2014) recommended that athletic trainers should prioritize and facilitate return-to-learn protocols for student-athletes recovering from concussions. If existing protocols for academic accommodations are already in place for student-athletes returning from concussions, the athletic trainer should ensure that the student-athlete and all appropriate stakeholders are aware of the policy and that all parties actively support the student-athlete during recovery. If no such policy is in place, the athletic trainer should work with all appropriate stakeholders to develop and implement a return-to-learn policy. The NCAA (2014) asserted that student-athletes are much more likely to successfully return to academic work following concussions if a reasonable return-to-learn protocol is in place. To date, the primary emphasis on student-athletes recovering from concussions has focused on returning to competition, whereas there has been little inquiry into return-to-learn protocols. Thus, it is difficult to implement a standard return-to-learn program because student-athletes often appear physically normal but are unable to perform accordingly in the classroom due to various concussion symptoms and effects. The Network for Public Health Law (2015) stated that the key tenet of any return-to-learn policy should be the wellness of the student-athlete. Accordingly, protocols should be developed by well-informed, interested parties and conceivable hindrances to implementation should be considered. Additionally, various factors should be deliberated prior to development and implementation, including available resources and the political and social disposition of the community. Davies (2011) suggested that numerous allowances may be necessary for concussed student-athletes who are returning to school. They include a reduction in cognitive activities that require higher-order thinking, additional time for testing and to finish assignments, periods of rest throughout the day or an abbreviated school day, and the curtailment of the student’s participation in extracurricular activities during recovery. Similarly, physical accommodations may be necessary,
such as allowing the student to work in isolation or wear sunglasses to minimize the effect of light. If symptoms linger, a 504 plan may be necessary.

**Importance of Collaboration**

Concussions often impact a student’s academic performance and the ability to succeed in school. Accordingly, collaboration among educators, health care providers, and family members is essential because academic modifications may be necessary during the recovery phase (CDC, 2015). Utilizing a collaborative approach that calls upon the various areas of expertise exhibited by school nurses, school psychologists, and school athletic trainers is the best possibility of developing a return-to-class protocol for student-athletes recovering from concussions. Thus, school medical professionals, such as athletic trainers, nurses, and psychologists, are critical components in determining when student-athletes should return to school and what academic accommodations should be made (Hossler, McAvoy, Rossen, Schoessler, and Thompson, 2014).

According to DeNisco (2014), student-athletes recovering from concussions are faced with academic challenges upon returning to the classroom, thus it is important that educational leaders ensure that appropriate concussion management protocols are in place. Accordingly, it was recommended that school administrators assign a faculty liaison to oversee return-to-learn protocols, and emphasized that collaboration among parents, school health professionals, and teachers is critical if students’ academics needs are to be met. McGrath (2010) recommended that student-athletes, parents, coaches, teachers, and all other relevant school personnel should undergo concussion-education training for the purpose of assisting student-athletes who are recovering from concussions. McAvoy (2009) stated that it is essential that communication between parents and school officials be both proactive and frequent when student-athletes are returning to school during the concussion recovery phase. Return-to-learn protocols for each
student should be individualized depending on the frequency of symptoms that are evident, as well as their seriousness and type. Subsequently, students should be able to increase their academic activity each day as symptoms abate. Accordingly, teachers can reasonably expect to gradually return students to their normal academic work loads. However, if symptoms persist or worsen, teachers should continue to modify accordingly. It is also essential that a communication model be implemented that allows teachers to provide feedback to other stakeholders, including parents, administrators, and school health care professionals. Davies (2011) suggested that educational leaders should facilitate concussion-education programs in their schools in order to guarantee that educators are able to identify signs of concussions, and concussion-management protocols should subsequently be implemented. Accordingly, collaboration among teachers, parents, school medical personnel, administrators, and coaches is vital when determining how to manage student-athletes who are returning to class after suffering concussions. It is recommended that the principal designate an individual to oversee return-to-learn protocols for individual students, but all school personnel can observe the student to determine if symptoms are lingering or exacerbating.

Concussion Legislation

The Lystedt Law was passed in Washington State in 2009. The first concussion law of its kind, the Lystedt Law mandates concussion education programs for parents, coaches, and athletes, and also requires an immediate removal from athletic competition if a concussion cannot be ruled out. Additionally, a student-athlete cannot return to competition unless he or she is cleared by a licensed health care professional (Scorza, Raleigh, and O’Connor, 2012). Since the passage of the Lystedt Law, each state in the country passed similar laws with minor variations. Each state law emphasizes return-to-play policies, parent, coach, and player education.
regarding concussions, and removal from competition if an athlete is assumed to have suffered a concussion (Kreck, 2014). Since 2009, each state and the District of Columbia have passed laws that mandate that student-athletes in high school or younger be removed immediately from competition or practices if a concussion is suspected, and the laws also dictate return-to-play procedures (Ollove, 2014). However, the Associated Press (2015) reported that less than half the states that have passed concussion laws since the Lystedt Law was adopted have incorporated each of the critical tenets of the Lystedt Law, and only 21 states have passed laws that include each of the four major provisions of the Lystedt Law. State concussion laws vary greatly, and most do not include repercussions for schools or athletic associations that do not conform. Also, 20 states do not mandate that athletes and parents sign a concussion information form, and 26 states do not require written clearance from a trained health care provider in order to return to athletic competition. The Network for Public Health Law (2015) stated that all 50 states and the District of Columbia have passed concussion-related youth athletics laws that detail return-to-competition protocols. However, return-to-academics policies are rarely addressed in these laws. Seven states – Hawaii, Maryland, Massachusetts, Nebraska, New York, Vermont, and Virginia, have included return-to-learn stipulations as part of their legislation, and it is expected that more states will add return-to-academics protocols in the near future. Green (2014) noted that there are numerous, meaningful dissimilarities between the concussions laws in each state. Faure, Moffitt, and Scheiss (2015) asserted that all 50 states passed youth concussions laws, primarily in response to the numerous media commentaries and research initiatives focused on sports-related concussions. Each of the laws emphasized the dissemination of educational materials pertaining to concussions to coaches, parents, and student-athletes, the removal of student-athletes from competition if a concussion is suspected, and the necessity of appropriate assessment by a health-
care professional prior to a return to competition. However, various educational and political leaders have indicated that compliance with state concussion laws may be problematic minus the necessary resources, particularly in rural or economically disadvantaged areas. Additionally, most state concussions laws do not include enforcement provisions for noncompliance. M. Van Bruggen (personal communication, June 3, 2015) said that numerous non-medical organizations, such as professional sports leagues and high school association governing bodies, are developing and implementing medical policies that govern the diagnosis and management of concussions.

Current awareness and concern regarding sports-related concussions is unprecedented, primarily due to the increase in litigation that has resulted from allegations that concussions cause both short-term and long-term health problems. Numerous associations, as well as state and federal legislative bodies, are enacting practices to facilitate better concussion management in order to ensure the wellness of concussion sufferers (Phillips, 2015). Due to the differences in state concussion laws, student-athletes in some states may not have access to school medical personnel that can assist with the return to athletic and academic activities (Halstead et al., 2013).

Although youth concussion laws may increase the awareness of concussion implications for young athletes (Lowrey and Morain, 2014), schools need to be more cognizant of how to better recognize and manage concussions. While there has been an increase in both legislation and guidelines that mandate return-to-competition protocols, this same increase is not evident when developing plans for how to regulate student-athletes’ return to the classroom (Sady, Vaughan, and Gioia, 2011). Nevertheless legislative measures at both the local and national levels are on the increase due to the perceived risks associated with a premature return to athletic competition and the increasing proof that concussions have lasting consequences (Scorza, Raleigh, and O’Connor, 2012).
Approximately half of the state laws in existence mandate that coaches complete some sort of concussion education program, and approximately 80% of these state laws require coaches to undergo concussion-recognition training. In 13 states, concussion laws also encompass private organizations, such as private schools and various youth leagues. Twelve state laws provide immunity from civil litigation to school districts, school personnel, athletic volunteers, and medical providers, and some states allow individuals who are unqualified in traumatic brain injuries to clear concussed student-athletes for return to athletic competition (Kreck. 2014). Concussions constitute an escalating health concern. As such, medical research has prompted gains into pinpointing the probability of concussions and their effects. However, this has stimulated numerous legal trepidations concerning the consequences of sports-related head injuries. Although all 50 states have adopted concussion legislation since 2009, the legal standard for concussion diagnosis, in most cases, is insufficient. Student-athletes are often required to self-report injuries, and many student-athletes fail to do so because they are afraid of being removed from competition. In like manner, some student-athletes do not self-report because symptoms often do not manifest themselves until hours or days after the injury. As a result, many student-athletes return to competition prematurely, which enhances the probability of re-injury (Grey, Marchant, and Tyszka, 2015). The Network for Public Health Law (2015) opined that some state athletic concussion laws are ambiguous enough to allow for the inclusion of return-to-learn protocols.

**Summary**

Although concussions are being diagnosed more frequently, many concussions are never diagnosed or reported. This is partially due to the failure of the student-athlete to report symptoms and partially due to the difficulties in diagnosing concussions. However, because
concussions negatively impact learning and the physical, mental, and social well-being of student athletes, the effects of concussion on the academic work of student-athletes are significant.

Cognitive rest, which precludes student-athletes from higher-order thinking and analysis, is often a key component of concussion recovery. Although each state has passed concussion legislation since 2009, much of the legislation focuses on the safe return of student-athletes to athletic competition and does not address protocols for when student-athletes may return to class and what academic accommodations should be made when they do. Concussion education is generally limited to coaches and not the general teaching population. Accordingly, it is important to determine if teachers are able to recognize concussion symptoms and if they acknowledge the need for developing and implementing return-to-learn protocols.
CHAPTER 3: METHODOLOGY

This study focused on the necessity of determining if academic protocols should be in place when student-athletes return to school after suffering concussions. A mixed-methods study was utilized with the primary research instrument being a Likert-type survey. Post-questionnaire interviews were conducted with some survey participants in order to gain greater insight into survey opinions. This study was conducted in an East Tennessee school district, and teachers from each of the five high schools in the district served as the sample population for this study. Convenience sampling was utilized, and participation was entirely voluntary.

Mixed-methods research purposely combines qualitative and quantitative data. Its worth in educational research is being acknowledged with increasing frequency, primarily because education is a multifaceted field of study with complex problems to solve (Ponce and Pagan-Maldonado, 2015). When researchers are able to acquire both quantitative and qualitative data, this enhances both the reliability of the data and the interpretation of the data (Zohrabi, 2013). Combining quantitative and qualitative data augments the complexity of a study (Roberts, 2010). Explanatory design was chosen as the form of mixed-methods research for this study. According to Creswell and Plano Clark (2011), explanatory designed is defined as a “two-phase mixed methods design in which the researcher starts with the collection and analysis of quantitative data, followed by the collection and analysis of qualitative data to help explain the initial quantitative results.”

This chapter is organized as follows – population sample, description of survey instruments, research procedures and time period of the study, and use of data.
Population and Sample

High school teachers and coaches from a school district in East Tennessee served as the population for this study. Convenience sampling was utilized for this study, and participation in the study was completely voluntary. According to Cooksey and McDonald (2011), convenience sampling is beneficial because the researcher has easy access to the research participants and the participants are agreeable to contributing to the study.

The researcher approached individual teachers at various high schools in the research district. The purpose of the research was explained, and individual teachers were asked if they wished to participate in the survey. If the individual teacher agreed to participate, the researcher explained the consent form and answered various questions from individual teachers. After reading and signing the consent form, individual teachers were provided with the surveys and subsequently completed the surveys. If individual teachers wished to participate in follow-up interviews, times were scheduled to conduct these interviews. If teachers did not consent to interviews, then their participation in this study was considered to be complete. Surveys were completed over a one-week period in April 2016. Interviews were scheduled within a two-week period following the collection of all the quantitative data.

There are five high schools in the school district, and each high school offers multiple sports. All schools offer the following sports – football, boys and girls basketball, baseball, softball, volleyball, and boys and girls soccer. Each high school is a member of the Tennessee Secondary Schools Athletic Association (TSSAA). According to the TSSAA’s concussion policy (2015), student-athletes, parents, and coaches are required to sign forms granting that they are familiar with concussion symptoms and risks. Additionally, coaches must complete an annual online education course and student-athletes must be removed from competition if they show any
signs of a concussion. Similarly, student-athletes may not return to competition unless the TSSAA return-to-play form is signed by a doctor and provided to officials. It is important to note, however, that the concussion policy does not offer any guidelines, accommodations, or recommendations for student-athletes returning to class while recovering from concussions. In like manner, there are no established return-to-class protocols for student-athletes recovering from concussions in the county, although the county does adhere to the TSAAA concussion policy.

**Description of Instruments**

A Likert-type survey was utilized, and data were subsequently analyzed using both the chi-squared test and t-test. In order to determine that the survey was not biased and the questions were easily understood, the surveys were disseminated to 10 teachers from another school district. Open-ended questions were listed at the end of the survey, which allowed survey participants to provide feedback on each of the questions found on the survey. Surveys were subsequently analyzed to determine if the overall consensus was that questions were easily understood. If any question(s) did not earn consensus approval from the pilot study participants, it would have been deleted and the survey would have been modified accordingly.

Follow-up interviews were constructed based on the results of the initial survey. Opinion-based questions were created in order to develop a better understanding of educator beliefs. A statistical analysis of the Likert-type questions of the survey determined the wording of the interview questions.

**Research Procedures/Informed Consent**

Per district protocol, the research proposal and a sample survey were submitted to the appropriate district-level supervisor, who subsequently granted permission for research to be
conducted. The candidate requested and received permission to conduct research from the appropriate school district supervisor in March 2016, and IRB approval was granted from Carson-Newman University in April 2016. Research was conducted over a three-week period in April 2016. Participation in this study was completely voluntary. Accordingly, a consent form was provided to each participant in order to notify him/her of the purpose of the study. Additionally, the consent form notified each participant that he/she had the option of participating or not participating in the study. Participants were not required to provide any type of identifying information, such as name, contact information, or social security number.

**Time Period of the Study**

The prospectus for this research began at the beginning of the 2015 summer term and was completed at the end of the term. The prospectus was subsequently submitted in January 2016. Additional literature review was conducted beginning in January 2016.

Random surveys of teachers were conducted during a three-week time period in April 2016. Follow-up interviews of teachers were conducted in April 2016.

**Use of Data**

Statistical analysis was utilized to compare the responses of each of the Likert-type questions in order to determine the responses that were statistically similar. A chi-squared test was used to determine if there was statistical significance between any of the categorical variables. For instance, did survey answers vary significantly between teachers with coaching experience as opposed to teachers without coaching experience? A t-test was also utilized.

According to Best and Kahn (2006), the Chi Square test is a credible research method because it allows the researcher to determine if two groups have statistically different opinions.
Chi Square compares expected outcomes to actual results, and is utilized to show discrepancies between expected results and actual results.

Similarly, a t-test was utilized to determine if statistical responses could be attributed to chance or errors in sampling. Best and Kahn (2006) stated that it in order to determine if there is a statistical significance, a t-test can determine if the difference is greater than any rational sampling error. A t-test examines the differences between the means of the two variables, and determines the ratio between the observed difference between the means of two samples and the error divergence associated with sampling.

Upon completion and analysis of the surveys, interview questions were developed. These questions were designed to provide greater depth and insight into the answers on the original surveys. Grounded theory was utilized to analyze the qualitative data.
CHAPTER IV: FINDINGS

Research Process

The goal of this research was to survey, via convenience sampling, a minimum of 60 high school teachers from various high schools within one East Tennessee school district. The researcher requested permission from each of the school principals to conduct on-site surveys. Three principals granted permission to conduct surveys at each of their respective schools. The researcher visited each of these schools one time for the purpose of distributing and collecting the surveys with a goal of 60 survey participants. Due to time limitations, the researcher visited each school only once. Thus, teachers who were absent or not available on that given day did not have the opportunity to accept or decline the opportunity to participate in the study. Additionally, some principals did not respond to requests to conduct on-site surveys.

Data

The data collected are divided into three different categories. The first category relates specifically to the coaching and athletic background of research participants. Specifically, these data were used to ascertain whether research participants currently or have previously coached a high school sport and whether they participated in high school or college athletics. The second category of data are the Likert-type questions, in which research participants responded to statements on their opinions of concussions and return-to-learn procedures. The third category of data are the follow-up interviews, which were conducted after an initial analysis of the first two data categories. Each category of data, as well as how the data is coded and the results of the data, is explained on the following pages of this chapter.
Concussion Statistics from the Research County

According to figures provided by the supervisor of sports medicine in the research district, 75 concussions were diagnosed during the 2015-2016 school year as a result of participation in high school athletics. The largest school in the district reported 23 concussions during this time period, and the smallest school in the district reported eight concussions during this time period.

Category 1 – Demographic Information

A total of 68 high school teachers were surveyed. As indicated in Figure 4.1, 45 survey participants, or 66% of the survey population, reported having athletic backgrounds, which means they have coached or currently coach a high school sport, and/or participated in high school and/or college athletics. Conversely, 23 survey participants, or 34% of the survey population, reported no athletic background.

Figure 4.1. Teacher Background
Category 2 – Likert Surveys

These surveys were designed to determine teacher opinion and perception regarding concussion education, concussion identification, concussion reporting, the effects of concussions on learning, and the necessity of academic modifications for student-athletes returning to class after suffering or possibly suffering from concussions.

Eight of the 16 statements in the survey were formed to determine the following opinions – strongly disagree, disagree, neither agree nor disagree, agree, or strongly agree. The coding assigned to each of these responses is either a -2 for strongly disagree, -1 for strongly disagree, 0 for neither agree nor disagree, 1 for agree, or 2 for strongly agree.

Eight of the 16 statements in the surveys were formed to determine the following occurrences – never, rarely, occasionally, a moderate amount, or frequently. The coding assigned to each of these responses is either a -2 for never, -1 for rarely, 0 for occasionally, 1 for a moderate amount, and 2 for frequently. Four of these eight statements included the not applicable response option. These responses were treated as missing responses and were not coded.
**Likert Survey Results**

As shown in Figure 4.2, 42 of the 45 teachers with athletic backgrounds (93%) indicated that they either agreed or strongly agreed that concussions affect classroom learning. Three teachers (7%) selected the neither agree nor disagree option. In like manner, 19 of the 23 teachers with no athletic backgrounds (83%) specified that they agreed or strongly agreed that concussions affect classroom learning. Three of the teachers in this category (13%) checked that they neither agreed nor disagreed, and one teacher with no athletic background strongly disagreed.

*Figure 4.2. Concussions Affect Classroom Learning*

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<tr>
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<td>0</td>
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</tr>
<tr>
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</table>

Figure 4.2 displays teacher beliefs on whether concussions affect classroom learning.
As shown in Figure 4.3, 37 of 45 teachers with athletic backgrounds (82%) either agreed or strongly agreed that academic modifications are necessary for student-athletes who are returning to class while recovering from concussions. Eight teachers with athletic backgrounds (18%) neither agreed nor disagreed. Fifteen of 23 teachers with no athletic backgrounds (65%) agreed or strongly agreed that academic modifications are necessary for student-athletes who are returning to class while recovering from concussions, and six teachers with no athletic backgrounds (26%) neither agreed nor disagreed. Two teachers with no athletic backgrounds (9%) either disagreed or strongly disagreed.

**Figure 4.3. Necessity of Academic Modifications**

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<tr>
<td>Neither Agree Nor Disagree</td>
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<td>Agree</td>
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<tr>
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</tr>
</tbody>
</table>

Figure 4.3 shows teacher opinion regarding the necessity of academic modifications for student-athletes returning to class while recovering from concussions.
As shown in Figure 4.4, 39 of 45 teachers with athletic backgrounds (87%) either agreed or strongly agreed that formal academic protocols should be in place for student-athletes returning to class after possibly suffering concussions. Six teachers with athletic backgrounds (13%) neither agreed nor disagreed. Fourteen teachers with no athletic backgrounds (61%) either agreed or strongly agreed that formal academic protocols should be in place for student-athletes returning to class after possibly suffering concussions. Seven teachers with no athletic backgrounds (30%) neither agreed nor disagreed, and two teachers with no athletic backgrounds (9%) strongly disagreed.

*Figure 4.4. Necessity of Formal Academic Protocols*

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<td>0 0</td>
</tr>
<tr>
<td>Disagree</td>
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<td>9 10</td>
</tr>
<tr>
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</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td>10</td>
<td>5</td>
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</tbody>
</table>

Figure 4.4 indicates teacher opinion on whether formal academic protocols should be in place for student-athletes returning to class after possibly suffering concussions.
As shown in figure 4.5, 23 of 45 teachers with athletic backgrounds (51%) agreed or strongly agreed that teachers should determine, on an individual basis, if academic accommodations are necessary for student-athletes with concussions. Seven teachers with athletic backgrounds (16%) neither agreed nor disagreed. Conversely, 15 teachers with athletic backgrounds (33%) either disagreed or strongly disagreed. Twelve teachers with no athletic background (52%) agreed or strongly agreed that teachers should determine, on an individual basis, if academic accommodations are necessary for student-athletes with concussions. Five teachers with no athletic background (22%) neither agreed nor disagreed, and six teachers with no athletic background (26%) either disagreed or strongly disagreed.

**Figure 4.5. Individual Teacher Determination of Academic Accommodations**

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<tr>
<td>Disagree</td>
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<td>5</td>
</tr>
<tr>
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<td>5</td>
</tr>
<tr>
<td>Agree</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>6</td>
<td>3</td>
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</tbody>
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Figure 4.5 elucidates teacher opinion on whether teachers should individually determine if academic accommodations are necessary for student-athletes with concussions.
Figure 4.6 shows that 31 of 45 teachers with athletic backgrounds (69%) agreed or strongly agreed that student-athletes hide or attempt to hide concussion symptoms, and 10 teachers with athletic backgrounds (22%) neither agreed nor disagreed. Four teachers with athletic backgrounds (9%) disagreed or strongly disagreed. Of the 23 teachers surveyed with no athletic backgrounds, 18 (83%) agreed or strongly agreed that student-athletes hide or attempt to hide concussion symptoms, while four of these teachers (17%) neither agreed nor disagreed. One teacher with no athletic background strongly disagreed.

Figure 4.6. Hiding Concussion Symptoms

![Bar chart showing teacher beliefs on whether student-athletes hide or attempt to hide concussion symptoms.]

Figure 4.6 illustrates teacher beliefs on whether student-athletes hide, or attempt to hide, concussion symptoms.
As shown in Figure 4.7, 15 teachers with athletic backgrounds (33%) designated that students have never reported concussion symptoms to them, and nine teachers with athletic backgrounds (20%) specified that students have rarely reported concussion symptoms to them. Sixteen teachers with athletic backgrounds (36%) related that students occasionally report concussion symptoms to them, four teachers with athletic backgrounds (9%) conveyed that students report concussions symptoms to them a moderate amount, and one teacher with an athletic background stated that students reported concussion symptoms frequently. Of the 23 teachers with no athletic backgrounds that were surveyed, 14 (61%) specified that students have never reported concussion symptoms to them, five (22%) designated that students rarely reported concussion symptoms to them and four (17%) indicated that students reported concussion symptoms to them either occasionally or a moderate amount.

![Figure 4.7. Student Reporting of Concussion Symptoms](image)

Figure 4.7 exhibits the frequency of student-athletes reporting concussion symptoms to classroom teachers.
Figure 4.8 shows that of the 45 teachers with athletic backgrounds that were surveyed, 15 (33%) have never undergone concussion training, five (11%) have rarely undergone concussion training, five (11%) have occasionally undergone concussion training, 12 (27%) have undergone concussion training a moderate amount, and eight (18%) have frequently undergone concussion training. This figure also shows that of the 23 teachers with no athletic backgrounds that were surveyed, 18 (78%) have never undergone concussion training, two (9%) have rarely undergone concussion training, one (4%) has occasionally undergone concussion training, and two (9%) have undergone concussion training a moderate amount.

![Figure 4.8. Teacher Concussion Training](image)

Figure 4.8 reveals the extent to which teachers have undergone concussion training.
As shown in Figure 4.9, of the 45 teachers with athletic backgrounds that were surveyed, 16 (36%) reported that they have never suspected a student-athlete of having a concussion when teachers were not directly informed that the student-athlete may have one, and 14 of these teachers (31%) conveyed that this rarely occurs. Twelve of these teachers (27%) indicated this occurred occasionally, and three (6%) of these teachers conveyed that this occurred a moderate amount. Of the 23 teachers surveyed with no athletic backgrounds, 19 (83%) reported that they have never suspected a student-athlete of having a concussion when the teacher was not directly informed that the student-athlete may have one. Four of these teachers (17%) stipulated that this occurred rarely or occasionally.

**Figure 4.9. Teacher Suspicion of Concussions in Student-Athletes**

<table>
<thead>
<tr>
<th>Frequency</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>19</td>
</tr>
<tr>
<td>Rarely</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Occasionally</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>A Moderate Amount</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Frequently</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

Figure 4.9 indicates the degree to which teachers have suspected student-athletes of having concussions when the teachers were not directly notified of the concussions.
In Figure 4.10, 12 teachers with athletic backgrounds (27%) reported that they have never been provided with educational materials on concussions from school athletic trainers or other medical professionals, and seven of these teachers (15%) related that this rarely occurred. Thirteen of these teachers (29%) conveyed that this occurred either occasionally or a moderate amount, whereas 13 of these teachers (29%) stipulated that this occurred frequently. Conversely, 18 teachers with no athletic backgrounds (78%) reported that they have never been provided with educational materials on concussions from school athletic trainers or other medical professionals, and five of these teachers (22%) stated that this has occurred either rarely or occasionally.

**Figure 4.10. Teachers Provided With Educational Materials on Concussions**

<table>
<thead>
<tr>
<th></th>
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</thead>
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<td>18</td>
</tr>
<tr>
<td>Rarely</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Occasionally</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>A Moderate Amount</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Frequently</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 4.10 displays how often teachers have been provided with educational materials on concussions from school athletic trainers or other medical professionals.
Figure 4.11 shows that five teachers with athletic backgrounds (11%) have never noticed an effect on student learning when a student-athlete is suspected of having a concussion. Three of these teachers (7%) have rarely noticed, whereas 20 (44%) have occasionally noticed and 13 (29%) have noticed a moderate amount. One of these teachers has frequently noticed, and three of these teachers (7%) indicated that this scenario is not applicable. Of the 23 teachers with no athletic backgrounds that were surveyed, five (22%) reported that they have rarely or never noticed an effect on student learning when a student-athlete is suspected of having a concussion. Six (26%) of these teachers have occasionally noticed and two (9%) have noticed a moderate amount. Four of these teachers (17%) have noticed frequently, and six of these teachers (26%) reported that this scenario is not applicable.

**Figure 4.11. Effects of Concussions on Student Learning**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
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<td>4</td>
</tr>
<tr>
<td>Rarely</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Occasionally</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>A Moderate Amount</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Frequently</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 4.11 shows how often teachers have noticed an effect on student learning when a student-athlete is suspected of having a concussion.
As shown in Figure 4.12, 33 of 45 teachers with athletic backgrounds (73%) indicated that they have never been provided with a 504 Plan or IEP for a student-athlete returning to class after being diagnosed with a concussion, and eight of these teachers (18%) reported that this has occurred either rarely or occasionally. One teacher conveyed that this has transpired a moderate amount, two stipulated it has occurred frequently, and one of these teachers related that this situation is not applicable. Of the 23 teachers surveyed with no athletic backgrounds, 15 (65%) related that they have never been provided with a 504 Plan or IEP for a student-athlete returning to class after being diagnosed with a concussion, and six of these teachers (26%) reported that this has occurred either rarely or occasionally. Two of these teachers (9%) indicated this scenario is not applicable.

Figure 4.12. Formal Modifications for Concussed Student-Athletes Returning to Class

![Bar chart showing the frequency of formal modifications for concussed student-athletes returning to class based on athletic background.]

Figure 4.12 exhibits how often classroom teachers have been provided with 504 Plans or IEPs when student-athletes are returning to class after being diagnosed with concussions.
As shown in Figure 4.13, 33 of 45 teachers with athletic backgrounds (73%) have never or rarely suspected student-athletes of having concussions that have not been diagnosed. Eleven of these teachers (24%) have suspected this either occasionally or a moderate amount, and one of these teachers indicated that this is not applicable. In like manner, 15 of 23 teachers with non-athletic backgrounds (65%) have never suspected student-athletes of having undiagnosed concussions, and six (26%) of these teachers have suspected such either rarely or occasionally. Two of these teachers stipulated that this is not applicable.

Figure 4.13. Teacher Suspicion of Non-Diagnosed Concussions

<table>
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</thead>
<tbody>
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<td>15</td>
</tr>
<tr>
<td>Rarely</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Occasionally</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>A Moderate</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Amount</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Frequently</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 4.13 reveals how often classroom teachers have suspected student-athletes of having concussions that have not been diagnosed.
Figure 4.14 displays that of the 45 teachers with athletic backgrounds that were surveyed, 14 (31%) have never been informed when a student-athlete is returning to class after being diagnosed with a concussion, nine (20%) have rarely been informed, 11 (24%) have been informed occasionally, seven (16%) have been informed a moderate amount, and three (7%) have been informed frequently. One of these teachers indicated this scenario is not applicable. Of the 23 teachers with non-athletic backgrounds that were surveyed, 13 (57%) have never been informed when a student-athlete is returning to class after being diagnosed with a concussion, five (22%) have either been rarely or occasionally informed, three (14%) have either been informed a moderate amount or frequently, and two indicated this situation is not applicable.

![Figure 4.14. Informing Teachers About Concussed Student-Athletes](chart.png)

Figure 4.14 illustrates how often teachers have been informed when student-athletes are returning to class after being diagnosed with concussions.
As shown in Figure 4.15, 20 of the 45 teachers with athletic backgrounds (44%) that were surveyed either strongly disagreed or disagreed that they feel comfortable identifying concussion symptoms in student-athletes, whereas nine (20%) neither agreed nor disagreed and 16 (36%) either agreed or strongly agreed. Of the 23 teachers with non-athletic backgrounds that were surveyed, 20 (87%) either strongly disagreed or disagreed that they feel comfortable identifying concussion symptoms in student-athletes. Two of these teachers (9%) neither agreed nor disagreed, and one agreed.

![Figure 4.15. Teacher Comfort Level For Identifying Concussion Symptoms](image)

Figure 4.15 elucidates the degree to which teachers feel comfortable identifying concussion symptoms in student-athletes.
As detailed in Figure 4.16, of the 45 teachers surveyed with athletic backgrounds, 33 (73%) either agreed or strongly agreed that teachers should undergo concussion training. Eight of these teachers (18%) neither agreed nor disagreed, while four (9%) either disagreed or strongly disagreed. Of the 23 teachers with non-athletic backgrounds that were surveyed, 18 (78%) either agreed or strongly agreed that teachers should undergo concussion training. Four of these teachers (17%) either disagreed or strongly disagreed, while one neither agreed nor disagreed.

**Figure 4.16. Concussion Training For Teachers**

- Athletic Background
- No Athletic Background

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.16 indicates teacher beliefs on whether teachers should undergo concussion training.
Figure 4.17 details that 30 of the 45 teachers with athletic backgrounds (67%) that were surveyed either agreed or strongly agreed that teachers should be able to identify concussion symptoms. Eight of these teachers (18%) indicated that they neither agreed nor disagreed, while seven (15%) reported that they either disagreed or strongly disagreed. Conversely, 14 of the 23 teachers with non-athletic backgrounds that were surveyed (61%) stipulated that they either agreed or strongly agreed that teachers should be able to identify concussion symptoms. Three of these teachers (13%) neither agreed nor disagreed, and six (26%) either disagreed or strongly disagreed.

Figure 4.17. Teacher Identification of Concussion Symptoms

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
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<td>Athletic Background</td>
<td>No Athletic Background</td>
<td>Athletic Background</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

Figure 4.17 illustrates teacher opinions on whether teachers should be able to identify concussion symptoms.
Chi-Square Test for Likert-Type Questions

In order to ascertain if the responses to the surveys were statistically significant, a chi-square test was calculated for each question with Microsoft Excel. The expected value used in the calculations is 13.6 (assuming an even random distribution of 20% of the participants on each of the five possible responses). For each question, in order for the responses to be statistically significant, \( p \) must be less than 0.05. The \( p \) for each question is listed in the table below.

Table 4.1
Chi-square values for Likert-type question based on 20% distribution

<table>
<thead>
<tr>
<th>Question #</th>
<th>P-Value</th>
<th>Shows significance (( p ) is less than 0.05)</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>2</td>
<td>1.96526x10^{-10}</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>7.86904x10^{-14}</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>0.000817943</td>
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<tr>
<td>5</td>
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<td>7</td>
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<td>16</td>
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</table>
As displayed in Table 4.1, each of the responses was statistically significant, given a 20% distribution. In order to further analyze the data, the researcher scrutinized the data in the following manner: agree (a combination of strongly agree and agree), disagree (a combination of strongly disagree and disagree), or neither agree or disagree; and frequently (a combination of frequently and a moderate amount), rarely (a combination of never or rarely), or occasionally. When analyzed from this perspective, the following chi-square results are indicated (assuming an even random distribution of 33% of the participants on each of the three possible responses) in Table 4.2. All responses with the exception of question 10 were statistically significant.

**Table 4.2**

Chi-square values for Likert-type question based on 33% distribution

<table>
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<th>Shows significance (p is less than 0.05)</th>
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<tbody>
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<td>2</td>
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<td>6</td>
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<td>15</td>
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</tr>
<tr>
<td>16</td>
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</table>
In order to further examine the statistical significance of each question, a t-test was conducted utilizing Microsoft Excel. In order to be statistically significant, the t-stat must be greater than the t-critical. As indicated below (Table 4.3), questions 6, 7, 8, 9, 12, and 14 were statistically significant.

**Table 4.3**  
Two-sample t-test assuming unequal variables

<table>
<thead>
<tr>
<th>Question #</th>
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<th>T-Critical</th>
<th>Shows Significance</th>
</tr>
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Category 3 – Interview Questions

Survey participants who agreed to follow-up interviews were chosen through convenience sampling. Six survey participants (three with athletic backgrounds, three with non-athletic backgrounds) were interviewed. Interview questions were developed after analyzing the data from the Likert-type questionnaires. All interview participants also completed questionnaires.

Interview Participants

Participants A, B, and E are teachers with non-athletic backgrounds. Participants C, D, and F are teachers with athletic backgrounds. Letters were assigned in the order which the interviews were conducted to ensure participant anonymity.

Interview Questions and Responses

All questions and the responses provided by participants A, B, C, D, E, and F are listed below. The interviews were conducted orally and the responses were transcribed while the interviews were being conducted.

Interview Question 1: To what extent do you believe concussions affect learning?

A: I believe concussions greatly affect classroom learning. If you’re foggy, or your mind is in a fog, you can’t really concentrate.

B: I think concussions have a large effect on learning. I’m sure some of that depends on the severity of the concussion but there is definitely some effect.

C: If a student-athlete had one, I’m sure it would cause some disruption in the classroom. The biggest issues would be time out of school and getting behind on work.
D: Greatly. Anything that would stimulate the brain, such as reading or exposure to light, would have a negative impact on rehabilitation.

E: I think concussions highly affect learning. They affect short-term memory, and it’s hard to process information after a concussion.

F: If concussions affect their ability to play, it has to affect their ability to function in the classroom.

Interview Question 2: To what extent should teachers have input on academic modifications for student-athletes returning to class after suffering concussions?

A: Teachers should be able to modify how they see fit based on what they know about concussions or after they have consulted a reliable source.

B: This should be to a large extent. You would have to take the expectations of the class and the subject-area into account, along with any advice you have received from a medical professional.

C: I think that’s best left up to the individual teacher. I don’t think there needs to be a special rule. I think it’s best to just let the teacher handle it. If the student-athlete is not getting any cooperation from the teacher, then he/she can go to the administration.

D: I don’t think it should be up to the individual teacher. They don’t have the background they need on how concussions impact student learning. There probably should be a board policy constructed by medical personnel, teachers, and administrators.

E: If teachers understand what concussions can do, teachers should be able to modify at their discretion. Unfortunately, a lot of teachers don’t understand. To
some teachers, it’s an inconvenience to modify an assignment, so they aren’t going to do it.

F: It’s hard for a teacher to gauge the severity of a concussion. It’s hard for a teacher to determine what modifications should be made, but the teacher should be in communication with the athletic director. The teacher needs to know where student-athlete is in the concussion protocol, and the teacher may need to modify some.

Interview Question 3: Why do student-athletes seldom report concussion symptoms to teachers?

A: They still want to play. Some of them are fearful of getting behind in school and don’t want their daily lives to be affected. They believe they can still get by even if they aren’t functioning at their full capacity.

B: They don’t want to miss playing time. They are afraid that teachers will report it to the coaches. Pride comes into play because they don’t want to seem weak or admit that there is a problem. I also think that in some cases there is a lack of knowledge about symptoms.

C: In most cases, I don’t think they even know that they’ve had one. If they have actually been diagnosed, I think more of them would report the symptoms.

D: I’m not sure that the student-athletes realize that their symptoms can impact learning. I think there is a general lack of education regarding that aspect of concussions.
E: They are afraid they are going to be treated differently. I’m not sure some of them understand how serious a concussion really is. They have been taught to walk it off and toughen up. They see it as a sign of weakness.

F: It’s a lack of knowledge on the part of the student-athlete, especially when it comes to the long-term severity of a concussion. A lot of times, the athlete will just pass it off as a headache and think that everything is going to be fine in a day or two.

Interview Question 4: To what extent do student-athletes attempt to hide concussion symptoms?

A: Some would not report them at all and some would even lie about it when asked.

B: I don’t know how often this occurs, but I think they would attempt to hide it more from their coaches than they would their classroom teachers.

C: Most don’t. I think a small percentage of them enjoy the game so much or feel like their futures are on the line. If they aren’t in the game, they are not getting a scholarship, but I believe that’s just a small percentage of student-athletes.

D: I think they try to hide them to a great extent because of the stigma that goes with being an injured athlete.

E: I think they go to every extent to hide it. They don’t want to be pulled from the game and they don’t want to be seen as weak. I have never had a student tell me about a concussion. I have always learned about it from the coach. They want to play so bad and play so much. I think it should be part of the training for the
athletes. They should be taught about concussions before they are allowed to play so they can make better decisions.

F: They want to continue to play. They want to keep everything normal. They don’t want to be penalized for something they think they can overcome. In their minds, they can just push through it.

Interview Question 5: To what extent is concussion training necessary for classroom teachers?

A: It should be something similar to CPR, or something we have do once a year or so. At the least, first-year teachers should have to sit through a concussion class or a tutorial. It’s not just about athletes. A classroom teacher could have a student with a concussion that resulted from a car wreck, and if the teachers knew what to look for, they could help.

B: Something should be done regularly. Teachers should have some knowledge on how to assess and recognize the symptoms.

C: It can be done in a couple of hours, possibly online. I don’t think it would even take up an entire in-service day. We should consider that it’s a problem that could happen with non-athletes as well.

D: It’s just as necessary as it is for coaches. We have to take into account the severity of the concussion, but I think now we have to recognize that all concussions are serious.

E: I don’t think it could be more important. If teachers don’t recognize the symptoms, they don’t know what to look for.
F: Classroom teachers don’t want one more thing to have to go to, but with more concussions being identified, teachers at least need to be aware of the process and how long it could be for a student to be out. Since we already have 504 plans, teachers probably need to be aware of the symptoms of concussions as well. We need to keep the students learning as much as possible.

Interview Question 6: To what extent should teachers be able to identify concussion symptoms in student-athletes?

A: Teachers need to be educated on the basic symptoms of concussions. Through whatever means necessary, teachers should be able to identify concussion symptoms.

B: To a great extent. There should be general knowledge among educational professionals because we deal with student-athletes all the time. We should be able to pick out some of the symptoms so students can be diagnosed if there is an issue.

C: I think this should happen to the point where teachers can recognize that something is wrong and refer it to a medical professional, like a school nurse. There is no way we can expect teachers to diagnose a concussion, but teachers need to know if a student-athlete has a concussion.

D: Teachers need to be held to the same standards as coaches. We are all caregivers to adolescents and should be able to recognize the symptoms.

E: A lot of it should come from the coaches. Coaches should notify the teachers. Teachers should know what to look for. This is something that should be a part of our professional development or in-service. We go through blood-borne
pathogens every year. We learn about suicide prevention and how to identify homelessness. We learn about bullying. Why not this? This is more important because it is life-altering.

F: As a teacher, it’s hard to know unless the student-athlete informs you. There has to be communication between the athlete, the teacher, and the athletic side of it. Teachers use a lot of common sense and they can in these cases too. But how many times does a teacher really find out a student-athlete has a concussion? They probably won’t if nobody tells them. Notification has to be top priority. There has to be some kind of communication and some kind of training. There definitely needs to be a protocol for the teachers being notified and teachers need to be educated to some degree.
CHAPTER V: CONCLUSIONS, IMPLICATIONS, and RECOMMENDATIONS

Research Design

A mixed-methods design was utilized for this study, and the principal research instrument was a Likert-type survey consisting of 16 questions. Subsequently, post-questionnaire interviews were conducted with six participants in order to gain greater acumen into survey opinions. This study was conducted in an East Tennessee school district, and teachers from each of the five high schools in the district served as the sample population. Convenience sampling was utilized, and participation was entirely voluntary.

Population

High school teachers from one East Tennessee school district were asked to voluntarily to complete surveys and participate in follow-up interviews. This district was chosen for the study for several reasons, primarily because it afforded the researcher the opportunity to conduct convenience sampling. Additionally, this school district is comprised of multiple high schools that offer all state-sanctioned athletics, thus it representative of both larger and smaller school districts that also offer extracurricular athletic programs. Accordingly, it was reasonable to assume that student-athletes in this school district have had concussions resulting from competition in scholastic athletics.

Sample

The sample population was high school teachers from each of the schools in the research district. The research was conducted during a three-week timeframe, and 68 teachers volunteered to complete surveys. Some teachers at each of the schools declined to complete surveys, and some were not available on the respective days the research was conducted.
Research

Participants were asked to voluntarily complete surveys. After reading and signing a consent form (See Appendix A), participants answered questions on the survey (See Appendix B). The survey consisted of 16 Likert-type questions concerning participants’ opinions and experiences relative to concussions and the impact of concussions on student-athletes’ academic work. The survey also asked participants to designate whether they currently coach or previously coached a high school sport and whether they competed in either/or high school/college athletics. Participants were also asked if they wished to participate in follow-up interviews at a subsequent time. Six participants who agreed to participate in these interviews were selected, and the interviews were then conducted.

Discussion of Findings

Conclusions from Likert-type Questions

There were 16 Likert-type questions that addressed the effects of concussions on the learning, the necessity of academic protocols for concussed student-athletes returning to class, the need for concussion training for teachers, and student-athlete reporting of concussion symptoms. Fifteen of the 16 questions (as evidenced in Chapter IV) were statistically significant, and they are discussed in this section.

Question 1 – Concussions affect classroom learning. Of the 45 teachers with athletic backgrounds that were surveyed, 42 either agreed or strongly agreed that concussions affect classroom learning. Similarly, 19 of the 23 teachers with non-athletic backgrounds that were surveyed either agreed or strongly agreed with this statement. These figures suggest that most teachers, irrespective of their athletic backgrounds or lack thereof, are aware of the impact of concussions on learning. In sum, 90% of all teachers surveyed believe that concussions affect
learning. This is consistent with the reasonable assumption that the short-term effects of concussions, such as memory loss and difficulty processing information, are generally considered to be common knowledge.

**Question 2 – Academic modifications are necessary for student-athletes who are returning to class while recovering from concussions.** Of the 45 teachers with athletic backgrounds that were surveyed, 37 either agreed or strongly agreed that academic modifications are needed when student-athletes are recovering from concussions, and the other eight neither agreed nor disagreed. Similarly, 15 of the 23 teachers with non-athletic backgrounds that were surveyed either agree or strongly agreed, and six neither agreed nor disagreed. Only two teachers, both with non-athletic backgrounds, either disagreed or strongly disagreed. Thus, it can be concluded that most teachers believe student-athletes recovering from concussions are in need of academic accommodations during the recovery phase. However, the greater percentage of teachers with athletic backgrounds (82%) that support this statement as opposed to the percentage of teachers with non-athletic backgrounds that uphold this belief (65%) suggest that teachers with athletic backgrounds are more cognizant of the impact of concussions on learning. It is also noteworthy that only teachers with non-athletic backgrounds disagreed or strongly disagreed with this assertion.

**Question 3 – Formal academic protocols should be in place for student-athletes returning to class after possibly suffering concussions.** A greater percentage of teachers with athletic backgrounds (87%), compared to teachers with non-athletic backgrounds (65%), agreed that formal academic protocols are needed when student-athletes are coming back to class after possibly suffering concussions. These figures are similar to those found in Question 2, which indicates that while the majority of teachers from both backgrounds believe student-athletes
returning to class following concussions should have formal academic modifications in place, teachers with non-athletic backgrounds are not as convinced of the necessity of the formal academic accommodations in these instances.

**Question 4 – Teachers should determine, on an individual basis, if academic accommodations are necessary for student-athletes with concussions.** Although responses to this statement varied greatly, there was little statistical difference between the opinions of teachers with athletic backgrounds and those with non-athletic backgrounds. For instance, six of the 23 teachers surveyed (26%) with non-athletic backgrounds either disagreed or strongly disagreed that individual teachers should determine the necessity of academic accommodations for student-athletes with concussions, and 15 of the 45 teachers (33%) with athletic backgrounds that were surveyed either disagreed or strongly disagreed. Similarly, 12 of the 23 teachers (52%) with non-athletic backgrounds either agreed or strongly agreed with this statement, as did 23 of the 45 teachers (51%) with athletic backgrounds. These responses suggest that more teachers, irrespective of athletic background, would prefer autonomy in determining the necessary academic accommodations for concussed student-athletes. This does not preclude the implementation of formal return-to-learn protocols, but indicates that teacher input should be a critical component of these protocols.

**Question 5 – Student-athletes hide or attempt to hide concussion symptoms.** A lesser percentage of teachers with athletic backgrounds (69%) agreed or strongly agreed with this statement compared to their colleagues with non-athletic backgrounds (78%). This is consistent with opinions expressed in follow-up interviews, which hold that student-athletes do not want to be removed from competition and/or believe that symptoms are not severe enough to report.
**Question 6 – Students have reported concussion symptoms to me.** Only 53% of teachers with athletic backgrounds indicated that student-athletes have never or rarely reported concussion symptoms to them, which sharply contrasts with the 83% of teachers with non-athletic backgrounds who report that students never or rarely reported concussion symptoms. The discrepancy could be suggestive of the fact that student-athletes are more likely to report concussions symptoms to school athletic trainers or other medical personnel. However, 16 teachers with athletic backgrounds, or 36% of the sample population, stipulated that students have occasionally reported concussion symptoms to them. As noted above, it is likely student-athletes are more likely to report symptoms to athletic trainers upon occurrence. However, it is conceivable that coaches may be the first to learn of concussion symptoms in some instances.

**Question 7 – I have undergone concussion training.** While 20 teachers with non-athletic backgrounds (87%) stipulated that they have never or rarely undergone concussion training, only 44% of teachers with athletic backgrounds indicated that have never or rarely undergone concussion training. Conversely, 44% of teachers with athletic backgrounds reported that they have undergone concussion training either frequently or a moderate amount, compared to only 9% of teachers with non-athletic backgrounds. Therefore, it can be assumed that teachers who currently coach or have previously coached a high school sport received concussion training as required by the Tennessee Secondary Schools Athletic Association. This also indicates that teachers, irrespective of athletic background, have not received concussion training as part of in-service or professional development activities.

**Question 8 – I have suspected a student-athlete of having a concussion when I was not directly informed that he/she may have one.** Of the 45 teachers with athletic backgrounds that were surveyed, 30 (67%) reported never or rarely suspecting student-athletes of having
concussions when the teachers were not notified that the student-athlete may have concussions, and 12 of these teachers (27%) occasionally suspected. Conversely, 96% of teachers with non-athletic backgrounds never or rarely suspected student-athletes of having concussions that the teachers were not directly informed that this may have been the case. This discrepancy suggests that teachers with athletic backgrounds, who are more likely to have received concussion training as part of their participation in athletics and/or as part of their roles as high school coaches, are more prone to recognize concussion symptoms in student-athletes.

**Question 9 – I have been provided with educational materials on concussions from school athletic trainers or other medical professionals.**

Of the 45 teachers with athletic backgrounds that were surveyed, 20 (44%) indicated that they have been provided with educational materials on concussions from appropriate medical personnel either frequently or a moderate amount. Conversely, none of the 23 teachers with non-athletic backgrounds that were surveyed stipulated that they have received these materials either frequently or a moderate amount, and this implies that teachers with athletic backgrounds receive these materials as part of mandated training required for coaches. Additionally, 20 of the 23 teachers (87%) with non-athletic backgrounds stipulated that they have rarely or never been provided with educational materials pertaining to concussions, compared to only 19 of 45 teachers (42%) with athletic backgrounds. The indication is that teachers with non-athletic backgrounds receive significantly less concussion training than teachers with athletic backgrounds, which can likely be attributed to the concussion training that is mandated for high school coaches and/or a greater sense of concussion awareness resulting from participation in high school or college athletics.
Question 10 – When a student-athlete is suspected of having a concussion, I have noticed an effect on his/her learning.

This question was determined to be statistically invalid after analyzing the data utilizing the Chi-square values for Likert-type question based on 33% distribution and the two-sample t-test assuming unequal variables. All other questions were shown to be statistically valid using two of the three methods of analyzing the collected data.

Question 11 – I have been provided with a 504 Plan or IEP for a student-athlete returning to class after being diagnosed with a concussion.

A high percentage of both teachers with athletic backgrounds (76%) and non-athletic backgrounds (78%) indicated that they have never been provided with an IEP or 504 Plan when a concussed student-athlete is returning to class. This implies that formal return-to-learn protocols are not in place in the research schools, and also suggests that teachers must make individual academic accommodations for these student-athletes.

Question 12 – I have suspected student-athletes of having concussions that have not been diagnosed.

Of the 45 teachers surveyed with athletic backgrounds, 33 (73%) stipulated that they rarely or never suspected student-athletes of having concussions that have not been diagnosed. Similarly, 18 of 23 teachers with non-athletic backgrounds (78%) noted that they rarely or never suspected student-athletes of having concussions that have not been diagnosed. While it is conceivable that a lack of teacher education on concussions could account for this percentage relative to teachers with non-athletic backgrounds, it does not account for the similar percentage evidenced by teachers with athletic background because these teachers receive more concussion training and more likely to suspect concussion symptoms (see Figure 4.8 and Figure 4.10). Thus,
these percentages likely indicate that most teachers believe that concussions are frequently diagnosed appropriately.

**Question 13 – I have been informed when a student-athlete is returning to class after being diagnosed with a concussion.**

Of the 45 teachers surveyed with athletic backgrounds 34 (76%) indicated that they have occasionally, rarely, or never been informed when student-athletes are returning to class after being diagnosed with concussions. A similar percentage of teachers with non-athletic backgrounds (78%), or 18 of these 23 teachers that were surveyed, stipulated that they have occasionally, rarely, or never been informed when student-athletes are returning to class after being diagnosed with concussions. These percentages are similar to those found in Figure 4.12, which is indicative of an absence of formal return-to-learn protocols at the research schools.

**Question 14 – I feel comfortable identifying concussion symptoms in student-athletes.**

A much higher percentage of teachers with non-athletic backgrounds, (87%, 20 of 23 teachers surveyed), indicated that they either disagreed or strongly disagreed with the premise of identifying concussion symptoms in student-athletes. Conversely, only 20 of the 45 teachers with athletic backgrounds (44%) that were surveyed disagreed or strongly disagreed. Additionally, 16 of the 45 teachers (36%) with athletic backgrounds that were surveyed either agreed or strongly agreed that they were comfortable identifying concussion symptoms in student-athletes, whereas only one teacher (4%) with a non-athletic background either agreed or strongly agreed. Similar to the discrepancies detailed in Figure 4.8 and Figure 4.10, the percentages indicate that teachers with athletic backgrounds are better able to identify concussion symptoms because they have
received concussion training or have been provided with educational materials on concussions from school athletic trainers or other appropriate medical personnel.

**Question 15 – Teachers should undergo concussion training.** Both teachers with athletic backgrounds, 33 of 45 surveyed (73%) and teachers with non-athletic backgrounds, 18 of 23 surveyed (78%) either agreed or strongly agreed that teachers should receive concussion training. Conversely, only 9% of teachers with athletic backgrounds and 17% of teachers with non-athletic backgrounds either disagreed or strongly disagreed with this assertion. The slightly higher percentage of teachers with non-athletic backgrounds who disagreed is likely attributable to concussion training that teachers with athletic backgrounds have already received. As a result of this training, these teachers are more cognizant of the effects of concussions on student-athletes.

**Question 16 – Teachers should be able to identify concussion symptoms.** Although opinions varied somewhat regarding this question, a greater percentage of teachers with athletic backgrounds (67%) and a greater percentage of teachers with non-athletic backgrounds (61%) either agreed or strongly agreed than those who disagreed or strongly disagreed. In sum, 16% of teachers with athletic backgrounds either disagreed or strongly disagreed and 30% of teachers with non-athletic backgrounds either disagreed or strongly disagreed. It is also interesting to note that 11 teachers (eight with athletic backgrounds, three with non-athletic backgrounds), or 17% of the total teacher population surveyed, neither agreed nor disagreed. As detailed in both follow-up interviews and previous interviews with a school athletic trainer (See Chapter 2), many symptoms of concussions may also be symptoms of other medical problems. As also indicated in follow-up interviews, while many teachers may be able to detect some concussion symptoms,
they do not have the medical training or enough context to determine if various symptoms are concussion-related or due to other causes.

**Conclusions From Interviews**

Each teacher interviewed, irrespective of athletic background, agreed that concussions significantly affect classroom learning. Notable concerns included the inability to concentrate, student nonattendance and the stress associated with makeup work, the negative rehabilitation effects of reading and exposure to light, loss of short-term memory, and difficulty processing information. One teacher with an athletic background indicated that if concussions affect a student-athlete’s ability to compete, it is reasonable to assume concussions also affect their ability to learn.

Opinions varied regarding the extent of teacher input into determining academic modification for student-athletes returning to class after concussions. All teachers agreed that teacher input is necessary. However, three teachers suggested that teachers should have sole discretion on determining necessary modifications, whereas three teachers indicated that modifications should be developed as part of a collaborative process with appropriate medical personnel and school administrators. The primary trepidation associated with teacher discretion is lack of concussion training.

All teachers interviewed acknowledged that student-athletes fail to report concussion symptoms for two reasons – they are afraid of being removed from competition or they lack the necessary training to acknowledge that their symptoms may be indicative of concussions. Additionally, the stigma of missing athletic competition due to injury is one that many student-athletes try to avoid at all costs.
Similarly, to ensure a sense of normalcy and to ensure their participation in athletics, student-athletes hide or attempt to hide concussions symptoms, especially when the symptoms seem mild. Accordingly, one teacher interviewed suggested that student-athletes should also undergo concussion training prior to athletic participation.

All teachers interviewed agreed that regular concussion training is necessary for classroom teachers, especially considering the annual training that teachers undergo for CPR, bullying, homelessness, and blood-borne pathogens. In like manner, while it is unreasonable to assume that teachers should be tasked with diagnosing concussions, it is imperative that teachers be able to identify at least some concussion symptoms.

In sum, the effects of concussions on learning cannot be discounted. Due to a lack of knowledge regarding concussion symptoms and an unwillingness to report symptoms for fear of begin removed from competition or being stigmatized as weak, student-athletes often hide, attempt to hide, or neglect to report symptoms. Similarly, because of both the academic and health implications associated with concussions, teachers should be able to identify concussion symptoms. Thus, some form of concussion training is necessary for all classroom teachers, even those who do not coach. Additionally, academic modifications are necessary for concussed student-athletes, and their development is contingent upon several factors, including the severity of the concussion, teacher input, subject material and difficult of the course, and communication with appropriate administrators and medical personnel.

Research Questions Answers

1. To what extent are educators able to recognize concussion symptoms in student-athletes?

Teachers with athletic backgrounds have received more concussion training than those with non-athletic backgrounds, thus teachers with non-athletic backgrounds are less
likely to recognize concussion symptoms. Similarly, teachers with non-athletic backgrounds are much less comfortable identifying concussion symptoms than teachers with athletic backgrounds.

2. How frequently are educators provided with information from school athletic trainers to help them identify concussion symptoms in student-athletes? Teachers with athletic backgrounds have been provided with educational materials on concussions much more frequently than teachers with non-athletic backgrounds, although some teachers with athletic backgrounds have rarely, if ever, been provided with educational materials on concussions from school athletic trainers.

3. To what degree do educators acknowledge a need for return-to-learn protocols in schools? A high percentage of teachers acknowledge that academic modifications are needed for student-athletes returning to class after suffering concussions. In like manner, a high percentage of teachers believe that formal return-to-learn protocols should be implemented when student-athletes are returning to class during concussion recovery. However, while some individual teachers believe teachers should have autonomy in determining needed academic accommodations for concussed student-athletes, others do not support this contention. Additionally, teachers are usually not provided with 504 Plans or IEPs for concussed student-athletes, and are usually not informed when concussed student-athletes are returning to class.

4. To what extent are educators able to discern the effects of concussions on academic performance of student-athletes? A high percentage of teachers with both athletic and non-athletic backgrounds acknowledge that concussions generally affect classroom
learning, although the data for this study is inconclusive relative to specific instances of effects on student learning.

**Null Hypothesis and Hypothesis**

The null hypothesis stated that there is no relationship between educators’ athletic and coaching backgrounds and their acknowledgement of the necessity of return-to-learn protocols for student-athletes possibly suffering from concussions. The hypothesis stated that educators with athletic and coaching backgrounds are more likely to acknowledge the necessity of return-to-learn protocols for student-athletes possibly suffering from concussions.

As evidenced by the research conducted in this study, the null hypothesis is true. Teachers from both athletic and non-athletic backgrounds acknowledge the necessity of return-to-learn protocols for student-athletes returning to class after suffering concussions.

**Strengths and Weaknesses of Research**

The research was limited to high school educators in one East Tennessee School district. The researcher considered surveying educators from various school districts in the same East Tennessee area in order to develop a large sample size, but the time allotted for research was not conducive to conducting such a survey. In like manner, it was not feasible for the researcher to make repeated visits to the research schools, thus teachers who were not present or available on the days the research was conducted did not participate in the survey. If more teachers were available to participate in the research or the researcher had additional opportunities to visit district schools, the sample size would have been greater.

Time constraints also precluded the researcher from surveying and interviewing school athletic trainers, which likely would have added insight and perspective to the study. Additionally, school athletic trainers are not school-system employees and they are usually only
present at schools immediately prior to or during athletic competition, thus it would have been
difficult to include them in the study given the time period allotted.

The researcher attempted to contact neighboring districts in an effort to obtain concussion
statistics for the purposes of comparing those to concussion statistics from the research district.
However, one district provided only a partial list of statistics that did not include each school in
the district, and multiple officials from the other district did not return numerous e-mails and
phone calls.

It is also noteworthy that many student-athlete compete in athletic events that are not
school-sanctioned, such as AAU Basketball and travel soccer. Diagnosis of concussions that
occur during these events does not fall under the purview of school athletic trainers, so reporting
concussion symptoms to educators may not occur.

**Future Research**

It is likely that student-athletes will need both cognitive rest and some form of academic
assistance when returning to class while recovering from concussions. However, there is limited
knowledge on how to best develop and implement return-to-learn policies in high schools.

Nevertheless, it is believed that effective communication between school athletic trainers and
classroom teachers is the most essential component of effective return-to-learn protocols.
Additionally, while school athletic trainers are critical in management of student-athletes’
physical wellness, teachers and other education professionals are uniquely qualified to supervise
academic progress and expedite any academic support protocols that may be needed (Kasamatsu,
Cleary, Bennett, Howard, and McLeod, 2016). Due to the national pervasiveness of youth
concussions, educators find themselves in positions that mandate the support of student-athletes
who are recovering from concussions. Accordingly, academic support is often necessary.
Additionally, concussions are increasingly considered to be a public health crisis that requires more research. While concussion symptoms negatively impact school attendance and cognitive function, there is minimal research on the effects of concussions on student learning. This is of increasing concern to educators because even minimal student nonattendance can be harmful to student academic progress. Additionally, a student’s ability to learn, retain information, and think critically may be limited for an extended period of time during concussion recovery. The persistence of concussion symptoms as fostered by the necessary cognitive activities associated with learning is increasingly troublesome to educators. While research into the effects of concussions on learning is minimal, it is evident that concussions impact student academic performance in some capacity. Accordingly, further research that examines the outcomes of youth concussions is warranted. In like manner, research into the occurrence and effects of youth concussions is increasing, primarily for the purposes of minimizing concussion occurrence and improving concussion treatment and management protocols (Bradley-Klug, Garofano, Lynn, Jeffries DeLoach, and Yu Hin Lam, 2015).

Certainly, further medical research into concussion diagnosis, concussion recovery, and concussion management is needed, which could conceivably impact concussion legislation and both return-to-play and return-to-learn policies. Additional research is also needed into the effectiveness of any existing return-to-learn protocols in order to determine their impact and if any modifications to these protocols should be made.

Although IRB restrictions largely preclude the participation of minors, this study could be further developed by surveying and interviewing high school student-athletes in order to quantify their opinions and experience with concussions, the unwillingness to report concussion
symptoms, the inability to self-diagnose concussion symptoms, and their experiences in managing the effects of concussions upon returning to academic settings.

Research into the effectiveness of various return-to-learn protocols as established by the NCAA, individual collegiate athletic conferences, and various colleges and universities may add insight and context into the effectiveness of return-to-learn protocols. Additionally, college student-athletes are above the age of consent necessary for research, so there would likely be no IRB complications if they were to be surveyed. Accordingly, research in this regard may provide insight into the frequency of the non-reporting of concussion symptoms and the perceived effects of concussions on academic work. Subsequently, this research would likely be applicable to high school settings.

Recommendations

Although the diagnosis of concussions in student-athletes should be the responsibility of school athletic trainers or other medical professionals, it is not unreasonable for educators to be able to identify concussion symptoms. Accordingly, it is recommended that the research district incorporate a concussion education and recognition program as part of regular professional development activities. The research district already requires online professional development for various wellness concerns, such as blood-borne pathogens, homelessness, suicide prevention, and bullying. Additionally, schools in the research district offer annual CPR training, which is administered by a school athletic trainer. Thus, it is reasonable to add concussion training, especially given research participant acknowledgment that concussions affect learning and that some form of academic intervention should be implemented when student-athletes are returning to class after suffering concussions.
References


Appendix A

Consent Form
Appendix A – Consent Form

Consent Form – Participants of Doctoral Dissertation Research

in partial fulfillment for the Doctorate of Education Degree at Carson-Newman University

Marshall Andrew (Andy) Rines – Candidate for Ed.D.

Topic – Return-To-Learn Protocols For Student-Athletes Returning to School After Concussions

Purpose of Research

To determine if educators believe there is a need for return-to-learn protocols for student-athletes returning to academic work after suffering concussions.

Consent

I, the undersigned, have read and understood the ensuing information regarding my participation in the research noted above:

1. Participation in this research is entirely voluntary. Any participant in this research may choose, at any point during the research, to withdraw from the research and request that his/her answers be excluded from the study at any time.
2. All information will be kept confidential in order not to intrude on the privacy of the participant, and all local, state, and federal laws will be followed.
3. No personal identifying information (name, address, social security number) will be collected. All other identifying information (years of experience, gender, coaching background) will be kept confidential to ensure no invasion of privacy for research participants.
4. I am of legal age (18 or older) to participate in this study.
5. Although I will not personally benefit from this study, the information I provide will be helpful in determining the necessity of developing return-to-learn protocols for student-athletes returning to school after a concussion.

Participant Name_________________________Participant Signature__________________________

Date____________________________
Appendix B

Statistical Survey
Appendix B – Statistical Survey

Return-To-Learn Questionnaire

1. Years of Teaching Experience (Including current year)________________

2. Did you compete in high school or collegiate athletics? (yes/no)

3. Do you currently coach or have you previously coached a high school sport? (yes/no)

For the following statements, please check the most appropriate answer.

1. Concussions affect classroom learning.
   _____Strongly Disagree
   _____Disagree
   _____Neither Agree Nor Disagree
   _____Agree
   _____Strongly Agree

2. Academic modifications are necessary for student-athletes who are returning to class while recovering from concussions.
   _____Strongly Disagree
   _____Disagree
   _____Neither Agree Nor Disagree
   _____Agree
   _____Strongly Agree

3. Formal academic protocols should be in place for student-athletes returning to class after possibly suffering concussions.
   _____Strongly Disagree
   _____Disagree
   _____Neither Agree Nor Disagree
   _____Agree
   _____Strongly Agree
4. Teachers should determine, on an individual basis, if academic accommodations are necessary for student-athletes with concussions.

_____ Strongly Disagree
_____ Disagree
_____ Neither Agree Nor Disagree
_____ Agree
_____ Strongly Agree

5. Student-athletes hide, or attempt to hide, concussion symptoms.

_____ Strongly Disagree
_____ Disagree
_____ Neither Agree Nor Disagree
_____ Agree
_____ Strongly Agree

6. I have been provided with educational materials on concussions from school athletic trainers or other medical professionals.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently

7. Students have reported concussion symptoms to me.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently

8. I have undergone concussion training.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently
9. I have suspected a student-athlete of having a concussion when I was not directly informed that he/she may have one.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently

10. When a student-athlete is suspected of having a concussion, I have noticed an effect on his/her learning.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently
_____ Not applicable

11. I have been provided with a 504 plan or IEP for a student-athlete returning to class after being diagnosed with a concussion.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently
_____ Not applicable

12. I have suspected student-athletes of having concussions that have not been diagnosed.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently
_____ Not applicable

13. I have been informed when a student-athlete is returning to class after being diagnosed with a concussion.

_____ Never
_____ Rarely
_____ Occasionally
_____ A moderate amount
_____ Frequently
_____ Not applicable
   _____Strongly Disagree
   _____Disagree
   _____Neither Agree Nor Disagree
   _____Agree
   _____Strongly Agree

15. Teachers should undergo concussion training.
   _____Strongly Disagree
   _____Disagree
   _____Neither Agree Nor Disagree
   _____Agree
   _____Strongly Agree

16. Teachers should be able to identify concussion symptoms
   _____Strongly Disagree
   _____Disagree
   _____Neither Agree Nor Disagree
   _____Agree
   _____Strongly Agree
Appendix C

Proposal Defense Form
I. Permission Request for Dissertation Proposal Defense

Through this action, I hereby request that my Dissertation Chair approve my request for my Dissertation Proposal Defense for the doctoral degree. I understand that it is my responsibility to schedule the Proposal Defense on a date that is convenient for all Dissertation Committee members. In addition, I must determine the format, electronic or in person, which is best suited to the needs of the committee.

I certify that I am registered for at least three dissertation credit hours during the semester in which the examination will be given. I certify that I have properly disclosed all intellectual property (e.g., patentable inventions or copyrightable work) to the dissertation committee.

I further certify that Chapters 1 – 3 of the Proposal have been approved by my Committee for Defense purposes.

Student/ CN ID: Marshall Andrew (Andy) Rines/20126

II. Approval by Dissertation Committee (This section to be completed by faculty upon completion of the Proposal presentation):

[ ] Approved

[ ] Not Approved at this Time

Comments:

[Signature]
Dissertation Chair
Date 3/16/16

[Signature]
Methodologist
Date 3/16/16

[Signature]
Content Specialist
Date 3/16/16