

**The Relationship between Previous Concussion Experiences and Undergraduate
Faculty's Knowledge, Confidence, and Perceptions of Concussions and Concussion
Management Strategies for Student-Athletes**

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Due to the complexity and unpredictability of a concussive injury, it is difficult to formulate and provide appropriate individualized care for concussed student-athletes. Therefore, faculty in higher education play an important collaborative role in supporting student-athletes' academic recovery following a concussion. This area of concussion management is vital considering that resulting cognitive impairments from a concussion can be exacerbated by sustained academic course expectations. This study investigated the relationship between previous concussion experiences and faculty concussion knowledge, confidence in their knowledge, and the awareness and perceptions of concussion management strategies for student-athletes. An email was sent to 154 undergraduate faculty members at an NCAA Division III institution of higher education located in southwestern Pennsylvania requesting participation in a web-based survey. A total of 64 surveys were completed in their entirety (43.5% completion rate) and were used for analysis. Overall, faculty members who (1) participated in formal education, (2) encountered a concussed student-athlete who experienced a decline in academic performance after a concussion, (3) personally sustained a concussion, or (4) had an immediate family member afflicted with the injury portrayed greater concussion knowledge, confidence in their knowledge, and placed higher importance on appropriate managed care. However, regardless of the nature of previous experiences, they did not appear to affect faculty's disposition or awareness of concussion

management policies or concussion management teams to help guide proper cognitive management of concussed student-athletes. Professional development is recommended for faculty in higher education to provide them with practical and timely resources to enhance their overall knowledge and support in an effort to optimize recovery for concussed student-athletes.

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Preface

As the incidence of concussions continue to rise and this injury's short- and long-term consequences continue to become apparent, there is an even greater need to ensure proper management and resolution occurs. This project was born out of my passion as a healthcare professional and educator to have a positive impact on not only my patients' recovery, but also provide education regarding this serious injury.

In truth, I could not have achieved my current level of success without a strong support group. To my advisor Dr. Fertman, who was always available whenever I ran into trouble and allowed this project to be my own work while steering me in the correct direction when needed. His passion for his students is palpable and I could not have completed this journey without his expertise and direction. To my committee members, each of whom has provided patience, advice, and guidance throughout this entire process. Thank you all for your unwavering support.

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1.0 Introduction

In recent years, there has been growing concern regarding the health-related consequences of concussions and traumatic brain injury (TBI). Despite an expansive volume of current literature dedicated to the diagnosis and management of concussions, the injury remains complex and unpredictable. With a vast array of clinical signs and symptoms, recovery from a concussion is variable and individualized (Mccrory et al., 2013). Traditionally, concussion management has focused on minimizing the risk of more severe brain injuries and symptoms by removing the student-athlete (SA) from physical activity until recovery is complete. However, removing SAs from cognitive activities is variable or often completely omitted despite recent trends in medical management illustrating the impact concussions have on cognitive abilities in the classroom and, therefore, the need for cognitive rest (Broglio et al., 2014; Brown et al., 2014; Harmon et al., 2013; Majerske et al., 2008).

Equally, colleges and universities with athletic programs strive to ensure that their SAs are making progress each year toward earning their degree. In addition to institutional academic criteria, there are National Collegiate Athletic Association (NCAA) standards outlining further accountability for institutions, athletic departments, and coaches to ensure that their SA population is maintaining academic progress. If progress is not met consistently, repercussions could range from a loss or ban of team post-season play or even a loss of NCAA revenue sharing at the Division I level, where institutions with higher graduation rates and academic success qualify for more funding from the NCAA (Brutlag-Hosick, 2016). Often, this accountability translates to pressure on SAs. If a SA falls behind in his or her studies, there can be individual consequences depending on the level of NCAA participation (Division I, II, or III), such as a loss of athletic eligibility,

athletic and academic scholarships, or even financial aid assistance (NCAA, 2017). In comparison to their non-athlete counterparts on campus, SAs must attempt to balance their academic workload with up to 40 hours per week of athletically related events (Ridpath, 2016). With missed classes, lectures, notes, and exams due to athletic related travel and events, involvement in collegiate athletics is demanding and compounds the challenges SAs face in maintaining academic coursework. Therefore, when a SA sustains a concussion that affects cognitive ability, the capacity to balance and maintain a rigorous and demanding pace in the classroom with athletics is impacted even further (McGrath, 2010; Ransom et al., 2015).

1.1 Problem of Practice

Both physical and cognitive repercussions are associated with concussive injuries and with no clearly defined management guidelines, many inconsistencies exist in knowledge and implementation of concussion rehabilitation protocols. Previously, concussion management has focused on a return to physical activity; however, recent research and literature reveals the increased importance of cognitive rest and rehabilitation to support concussed (SAs) in the classroom as well. Unfortunately, even with a heightened public awareness of concussions, best practices to manage cognitive deficits that can affect various areas of a SA's life have been scrutinized or misrepresented among many who are uniquely positioned to implement them.

Due to the complexity and unpredictability of a concussive injury, it is extremely difficult to provide appropriate individualized plans of action without collaboration from faculty who play an important role in the overall care of a concussed SA. This area of concussion management is vital considering that the cognitive impairments that result from a concussion can be exacerbated

by sustained academic course expectations (Harmon et al., 2013; Langlois, Rutland-Brown, & Wald, 2006; Majerske et al., 2008). Yet, no studies have been identified that investigate concussion knowledge of faculty in post-secondary settings and their perceptions of how concussions can affect cognitive activity resulting in academic accommodations for concussed SAs. With such ambiguity, it is beneficial that faculty members in higher education are mindful of concussed SAs' needs while also considering the impact that their classroom management may have to either hinder or promote proper recovery from a concussion. The aim of this study is to fill a perceived gap in the literature by exploring the awareness and experiences of these professionals when presented with concussed SAs in their classrooms. Therefore, the purpose of this study was to investigate and identify faculty knowledge and confidence in their knowledge regarding concussions and their awareness and perceptions of associated academic management strategies for concussed SAs.

1.2 Problem Area

Students with documented health-related disabilities are becoming increasingly prevalent in higher education (Baker, Boland, & Nowik, 2012). Therefore, the role that faculty in higher education play to facilitate the overall success of students with disabilities cannot be ignored. Although research has suggested that faculty members are supportive of students with disabilities, there is much to understand in terms of the overall climate at the college level (Baker et al., 2012). If a faculty member in higher education lacks knowledge of or sensitivity to the needs of a student's disability or does not portray a willingness to provide accommodations, barriers to a student's academic success are eminent. Regarding concussion management for a SA, this overall disregard

will exacerbate recovery from a concussion that can affect one or several areas of cognitive function (Dreer, Crowley, Cash, O'Neill, & Cox, 2016; McGrath, 2010).

Furthermore, SAs can become stressed, frustrated, and emotional while completing academic coursework and participating in school-sanctioned extra-curricular activities. Couple this with the effects from a diagnosed concussion and academia becomes even more complex (Brown et al., 2014; Halstead et al., 2013). Educators must be familiar with potential cognitive and emotional effects of such injuries that can affect attentiveness, concentration, memory recall, the learning of new information, the time to complete tasks or assignments, demeanor, and the tolerance for stressors (Gioia, 2016). Due to such regular cognitive interactions, faculty must have a firm knowledge and understanding of concussions to deploy appropriate classroom management strategies in an effort to provide academic support enabling a concussed SA to maintain pace in the classroom.

In many ways, college and university faculty are the primary conduits through which students gain knowledge in university environments, and faculty are directly responsible for determining how competent students are in their acquisition of that knowledge. Therefore, with educators possessing singular authority and influence over cognitive loading in a classroom setting, they are responsible for executing prescribed accommodations. Yet, in spite of this important role, most educators feel unprepared to carry out these interventions (Gioia, 2016). For example, a lack of training and understanding of concussion policies and practices has been previously identified as one reason that K-12 educators are reluctant to provide cognitive accommodations pertaining to concussed SAs (Dreer et al., 2016; Graff & Caperell, 2016; Kasamatsu, Cleary, Bennett, Howard, & McLeod, 2016; Mohr & Bullock, 2005; Weber, Welch, Parsons, & Mcleod, 2015). Moreover, Dreer et al. (2016) found that only half of K-12 educators

indicate that a cognitive disability might cause difficulty returning to school. Likewise, Mohr and Bullock (2005) found that this lack of knowledge stemmed from inadequate formal preparation and training on how to support individuals with a brain injury. These studies show an overall deficiency in appropriate knowledge for K-12 educators to comprehend and meet the individual needs of SAs with such a disability. Therefore, it can be suggested that a similar absence of knowledge is probable in higher education among faculty members.

Although faculty beliefs can foster constructive changes and reform in classroom management for concussed SAs, misinformed or misguided beliefs and opinions may also lead to damaging negative stereotypes towards them. There is ample research dedicated to these negative assumptions surrounding SAs' academic skills, as well as the stigma attached to the label of "student-athlete" (Baucom & Lantz, 2001; Engstrom, Sedlacek, & McEwen, 1995; Lawrence, 2009; Umbach & Wawrzynski, 2005). This label often influences faculty perceptions about this population's intellectual capability, causing them to question the commitment these particular students have to their educational pursuits. If SAs in general are often distinguished as inferior to other students, how are SAs with an invisible concussive injury that disrupts cognitive ability perceived? A deficiency in awareness of the effects of a concussion combined with negative views of SAs by faculty members may marginalize a concussed SAs' academic success.

Although there are similar rules and procedures that govern implementation of academic accommodations for a student in all educational settings, there are minor differences that can be damaging to academic success if not understood by both the student and educator. In K-12 settings, the Individuals with Disabilities Education Improvement Act (IDEA 2004) and Section 504 of the Rehabilitation Act (1973) mandate the delivery of accommodations for students with diagnosed disabilities. Both laws are enacted to protect individuals with disabilities to ensure

equal access to educational opportunity. Essentially, if a student has a diagnosed disability, these laws require that the school must formulate and provide appropriate educational accommodating services via an Individualized Education Program (IEP) team.

Similarly, in post-secondary settings, a student's need to use accommodations is also protected by Section 504 of the Rehabilitation Act (1973) and the Americans with Disabilities Act (ADA, 1990). Under these laws, post-secondary institutions are required to provide appropriate academic adjustments, just like secondary school settings, to ensure that they do not discriminate based on disability. However, initiating accommodations can prove challenging and oversight from a formal IEP team is not required. Due to legal ramifications prohibiting institutions from seeking disability status, a student must divulge their documented disability before accommodations can be rendered (Bolt, 2011). Once the disability has been disclosed and verified, the post-secondary institution is only then required to provide reasonable accommodations via any means the institution sees fit. This may prove difficult due to varying disability referral and management procedures among institutions.

Moreover, in addition to Section 504 and the ADA at the collegiate level, there are various protocols prescribed by the National Collegiate Athletic Association (NCAA) to address concussion management that are only specific to SAs engaged in NCAA-sanctioned activities. Although not intended for comprehensive institutional governance of concussions, many NCAA concussion mandates permeate into institutional policies and practices for general student populations. Regardless, few mandates and protocols expand beyond initially recognizing signs and symptoms of a concussion and the immediate post-care of the physical event (NCAA Sport Science Institute, 2016). Specifically, this post-care only supports the aspects of physical rest through limitation of physical activity and contact sports. However, many authors point out that

the key to recovery from a concussion includes not only physical rest but also cognitive rest followed by a gradual progression back to normal activities (Kasamatsu et al., 2016; Williams, Welch, Parsons, & Valovich McLeod, 2015). Consequently, there is an emphasis by the NCAA and consensus statements to incorporate return-to-learn (RTL) policies within these protocols and affirm the importance of incorporating strategies to accommodate academic challenges perceived by a concussed SA (Broglio et al., 2014; Harmon et al., 2013; NCAA, 2014). However, these protocols are not currently required and the content within such policies often vary significantly among NCAA-affiliated institutions.

Additionally, due to the complexity of concussions and in lieu of a mandated IEP team, management for one individual to oversee all components of concussion recovery is difficult. Thus, formulation and subsequent collaboration among members of a concussion management team (CMT) is necessary during recovery (Weber et al., 2015; Williams et al., 2015). The NCAA identifies one member of this strategic team as faculty members. Thus, familiarity with concussions and associated signs and symptoms is imperative. McGrath (2010) points out that educators are uniquely positioned to help identify and facilitate proper management and accommodations in the classroom to allow SAs to continue progressing academically but with accommodations implemented. Unfortunately, poorly specified or inconsistent recommendations across providers and a lack of standardized communication channels between medical teams and school personnel may contribute to adverse or prolonged post-injury academic effects.

It is vital that any standardized protocols pertaining to post-injury academic recommendations be predicated on an empirically based understanding of the cognitive effects of concussion and not just speculation. As a result, one of the major underpinnings to aid in a SA's recovery is an improvement in the organizational procedures and infrastructure beyond the

physical event to prevent further disability from the concussion as well as permanent damage to the SA's academic record (Centers for Disease Control and Prevention, n.d.; Halstead et al., 2013; Kasamatsu et al., 2016; McGrath, 2010). Thus, to affirm prescribed accommodations to ensure proper academic reintegration and optimal coordinated care for concussed SAs occurs, faculty concussion knowledge and perceptions as well as awareness of concussion management strategies must be identified and examined.

2.0 Literature Review

2.1 Definition of Concussion

Over 38 million adolescents and 170 million adults participate in physical activities in the United States annually (Daneshvar, Nowinski, McKee, & Cantu, 2011). Alarmingly, of those it is estimated that 1.6 to 3.8 million individuals will encounter a Traumatic Brain Injury (TBI) or concussion during sport and recreational activities each year (Langlois et al., 2006). However, this estimate may still be low because many of these injuries go unrecognized or undisclosed and thus uncounted. Broglio et al. (2017) reports in many instances clinical diagnosis is based on “self-report, sometimes hours or days after the initial event, which can be difficult to identify” (p. 1449). This exposes the possibility that, on one hand, concussions are missed due to student-athlete (SA) underreporting, while on the other hand, some over-diagnosis occurs in the existence of non-specific symptoms. With such ambiguous statistical information and the current heightened awareness of these types of injuries in both the media and scientific community, these figures indicate the importance and need for increased awareness regarding concussions and their management.

Although the terms TBI and concussion are often used interchangeably, a concussion is defined as a subset of a mild TBI and at the less severe end of the brain injury spectrum (Harmon et al., 2013; Mccrory et al., 2013, 2017). Harmon et al. (2013) defined concussion as a “traumatically induced transient disturbance of brain function and involves a complex pathophysiologic process” (p. 1). The latest consensus statement by McCrory et al. (2017) defines a concussion as a mild TBI without structural abnormalities on conventional neuroimaging

modalities that usually impairs neurological function for a short duration, although symptoms could persist longer in some cases. According to the National Collegiate Athletic Association (NCAA) Sport Science Institute (SSI) (2016), a leader in the development of consensus documents and educational resources to assist NCAA member institutions in the effort to provide optimal SA health and safety, there are more than 42 consensus-based definitions of a concussion. The most widely accepted evidence-based definition of concussion is “any change in brain function following a force to the head, which may be accompanied by temporary loss of consciousness, but is identified in awake individuals, with measures of neurologic and cognitive dysfunction” (Carney et al., 2014, p. S4).

The primary group charged with reviewing current research and formulating up-to-date concussion guidelines is the International Conference on Concussion in Sport Group (CISG). This group has met five times (2001, 2004, 2008, 2012, and 2016) and has noted the increasing incidence of potentially dangerous head injuries in sports. During these periodic conferences, leading medical experts from all over the world meet to discuss and debate new and relevant information in an effort to provide recommendations for the improvement of safety and health of all athletes in all sporting fields who suffer concussive injuries. The group’s objective is to understand, as completely as possible, what actually takes place when severe blows to the head occur. Their most recent definition of concussion is that of “a traumatic brain injury induced by biomechanical forces” caused by “either a direct blow to the head, face, neck or elsewhere on the body with impulsive force transmitted to the head” with several common features such as “the rapid onset of short-lived impairment of neurological function that resolves spontaneously” that “may or may not involve loss of consciousness” with “no abnormality seen on standard neuroimaging studies” (McCrory et al., 2017, p. 2). This can occur in both males and females of

all ages and all types of athletic and recreational activities, but most often sustained during contact or collision sports (Broglio et al., 2014).

Due to such an idiopathic nature and ambiguous clinical indicators, concussions are one of the most difficult injuries to diagnose and manage because medical providers often base detection on clinical judgment. Further complicating the matter, the severity of a concussion frequently goes unrecognized because signs and symptoms may not be immediately apparent due to their delayed onset that can manifest multiple hours after the initial injury (Guskiewicz et al., 2003). Symptoms of a concussion consist of a wide scope of symptoms with several common features including both cognitive and physical effects that largely reflect a functional disturbance rather than a structural injury. Clinically observable physical indicators may include dizziness, balance and coordination deficits, and even a loss of consciousness (Broglio et al., 2014; Broglio, Collins, Williams, Mucha, & Kontos, 2015; Harmon et al., 2013; McCrory et al., 2017). Other patient reported physical symptoms include possible photophobia, tinnitus, nausea, dizziness, and even amnesia with the most common symptom being that of a headache (Daneshvar et al., 2011; Harmon et al., 2013; Mccrory et al., 2017). Compounding physical ailments, concussions may also comprise of cognitive deficits such as sleep disturbances, general malaise, depression, anxiety, impaired memory and concentration, irritability, and slowed reaction times (Broglio et al., 2015; Mccrory et al., 2013; Williams et al., 2015). Typically, these clinical syndromes follow a sequential course in resolution; however, a small percentage of symptoms may be prolonged. With few objective measurements, and often-vague patient-reported sequelae these signs and symptoms, individually or in conjunction with one another, can have substantial adverse implications on tasks that are essential to activities of daily living.

2.2 Management of Concussion

The presentation of concussions varies considerably both between individuals and between multiple or subsequent injuries in one individual (Broglio et al., 2014). Due to this broad spectrum of potential dysfunction, the complexity and unpredictability of a concussive injury can lead to ambiguity in management practices. Although an individualized approach to concussion management has been proposed, most position and consensus statements regarding management provide recommendations for both physical and cognitive rest (Broglio et al., 2014; Harmon et al., 2013; Mccrory et al., 2013, 2017). With the risk of prolonged recovery, limitations of physical and/or mental activities is the cornerstone of concussion management, particularly in the acute phase (Mccrory et al., 2013). The rationale for recommending such restrictions after a concussion is to reduce the potential for repeat concussive injuries while the brain is still vulnerable from the initial concussion (Guskiewicz et al., 2003). This rationale is further supported by Broglio et al. (2017), who showed that there “is a window of vulnerability that may extend beyond the point of clinical recovery, leaving the brain physiologically compromised” (p. 1438). Therefore, failure to follow a comprehensive, stepwise management plan following initial injury may hinder restoration of normal neurological function, prolonging recovery time by weeks or even months (Majerske et al., 2008). Furthermore, allowing premature return-to-play (RTP) while the individual is still symptomatic can result in a heightened risk of re-injury, a compounding neurologic injury, or even possible death (Broglio et al., 2017; McGrath, 2010).

It has been accepted practice for treating physicians and medical personnel to prescribe restrictions from physical activity to protect SAs with concussions from subsequent injuries and life-long consequences. Thus, typical management begins with a stepwise RTP progression that is individualized, gradual, and should consider factors used to assess the SA’s readiness for the

physicality of their sport while monitoring for re-occurrence of concussion symptoms (Harmon et al., 2013; Mccrory et al., 2013). A typical progression begins with symptom-limited actions where only daily activities that do not exacerbate symptoms may occur. The 5th International Conference on CISG dictates that once concussion related symptoms have resolved, the individual may begin light aerobic exercise, such as walking or stationary cycling, to increase the heart rate in an attempt to provoke a return of symptoms (Mccrory et al., 2017). If symptoms do not re-emerge, the individual may progress to sport-specific exercise, then non-contact training drills, then full contact practice, finishing with unrestricted return to sport or activity (Mccrory et al., 2017). It is recommended that an individual progresses only one-step within a 24 hour (or longer) period, consequently taking a concussed individual a minimum of 1 week to proceed through the full re-integration protocol once they are asymptomatic at rest (Mccrory et al., 2017). If any symptoms return during this stepwise progression, it is advised that the individual restart at the first step once the individual is again asymptomatic. It is worth noting, that the period for RTP may vary with the injured individual's age, concussion history, level of sport, etc., creating a need for an individualistic management approach (Mccrory et al., 2017).

Equally important, experts have recommended following a similar progression for return to cognitive activity (Broglio et al., 2014; Halstead et al., 2013). Often called return-to-learn (RTL), the 5th International Conference on CISG outlines that an individual should gradually return to typical daily cognitive activities at home that do not aggravate symptoms, then progress towards school activities as an increase in cognitive workload becomes tolerable (Mccrory et al., 2017). This gradual RTL may include part-time reintroduction that steadily progresses towards full reintegration into academic activities. Gioia (2016) states that a typical progression may include the concussed individual staying at home if the symptoms are severe and they cannot

concentrate for more than 30-45 minutes. If symptoms are less severe, rest breaks during academia can help recovery and, as symptoms decrease, any imposed accommodations can be removed slowly until normal cognitive function is restored and full recovery is attained.

Although essential for complete recovery from a concussion, this progressive protocol to address cognitive stressors and their subsequent impact on academics in the life of a student is often overlooked (Majerske et al., 2008). Multiple concussion symptoms (e.g., headaches, sensitivity to light and noise, fatigue, and difficulty concentrating or remembering) have a direct impact on a student's ability to be successful academically (Broglio et al., 2015; Mccrory et al., 2017). Thus, recognition and proper management techniques must be understood and deployed effectively.

2.3 Importance of Cognitive Rest

Multiple research teams have identified that a concussion causes a degree of neurocognitive impairment, specifically impacting basic cognitive abilities like memory and information processing speed, which can have a detrimental effect on a student for days, weeks, or even months after their injury (Halstead et al., 2013; Harmon et al., 2013; McGrath, 2010; Valovich McLeod, Lewis, Whelihan, & Welch Bacon, 2017). With such a common occurrence, it is suggested that management plans consist of some form of cognitive rest to enhance recovery from a concussion (Broglio et al., 2015; Valovich McLeod et al., 2017). Although it has been identified that between 80% and 90% of concussed individuals will return to pre-injury levels of functioning within 1-2 weeks without intervention, there is potential that a percentage will remain symptomatic for substantially longer (Broglio et al., 2015; Harmon et al., 2013). Thus, even with

a possible quick resolution of the injury, concussed SAs falling within and outside the range of normal recovery will still require individualized cognitive management approaches.

In addition to these effects on learning, academic engagement after a sustained concussion has an impact on the length of overall concussion symptom resolution as well. It is believed that increasing cognitive activities following a concussion will escalate symptoms and prolong recovery (Brown et al., 2014). Therefore, cognitive rest is based upon the theory that the strain experienced by a concussed SA as they attempt to maintain their academic responsibilities can worsen symptoms and, in turn, worsen or prolong overall symptoms and the ultimate resolution of the injury (Broglio et al., 2015; Kasamatsu et al., 2016; Williams et al., 2015). Williams et al. (2015) states that these symptoms can be “exacerbated by any activity requiring cognitive demand” (p. 263). Thus, actions to incorporate cognitive rest by reducing brain-stimulating activities (e.g., watching television, engaging in video games, school work, reading, and writing) is widely recommended in consensus statements and concussion guidelines (Broglio et al., 2014; Harmon et al., 2013; Mccrory et al., 2017; NCAA Sport Science Institute, 2016). Furthermore, collegiate SAs may endure significantly greater post-injury academic difficulties due to the increased demand for balancing the breadth and depth of rigorous academic curriculums alongside time consuming NCAA sanctioned extracurricular activities in comparison with the general student population.

Ransom et al. (2015) sought to study the nature and extent of adverse academic effects faced by students recovering from a concussion by exploring the level of academic concern of concussed students and their parents, the specific types of academic problems experienced by the injured student, and the relationship of concussion symptom severity to academic outcomes. As a result of surveying a sample of 349 students, ages 5 to 18 years, who sustained a concussion and

their parents reported academic concerns and problems, the authors concluded there was greater anxiety for sustaining academic performance by actively symptomatic students and their parents compared to their non-concussed peers and their parents (Ransom et al., 2015). Furthermore, students who had not yet completely recovered from a concussion reported a significant increase in adverse academic effects and greater severity of concussion symptoms, which were attributed to more school-related problems and worse academic effects than their non-concussed peers (Ransom et al., 2015). This study implies that it is vital and necessary to provide actively symptomatic students with targeted supports during the recovery period after sustaining a concussion. Potential negative outcomes will likely be mitigated by constructing a symptom-relevant set of accommodations in the acute stage of recovery, with appropriate personnel implementing, monitoring, and adjusting enacted supports through recovery to reduce concussion co-morbidities and the delay of complete injury resolution.

2.4 Return-to-Learn Strategies

School is a major component of a student's life, requiring the attainment of new knowledge, development of academic skills, and diligence to complete assignments and prepare for examinations. To be successful in academic endeavors, students must engage in classroom learning which requires attention, material memory recall, critical thinking, and problem-solving (Broglio et al., 2015). With concussed SAs experiencing a multitude of physical, emotional, and societal changes that impact daily life and their ability to succeed academically, limiting school activity is one mechanism that affords the injured SA time to mitigate concussion-related symptoms. To combat this cognitive disability and to aid in the SA's recovery following a

concussion, temporary academic support strategies or the incorporation of RTL policies are imperative (Halstead et al., 2013; Lyons et al., 2017; McGrath, 2010; O'Neill et al., 2017; Valovich McLeod et al., 2017).

RTL policies are grounded in the process of transitioning and subsequently returning to full reintegration into the classroom following a concussion. This process of academic rehabilitation is variable and individualistic in nature (Broglio et al., 2014; Mccrory et al., 2017). However, it has been suggested that RTL processes incorporate a form of cognitive rest, such as recommended absence from school, as well as additional plans that emphasize mental rest from activities that require a focused attention (Kasamatsu et al., 2016). Additional recommendations suggest specific adjustments, such as shortened school days, tutoring, reductions in academic workloads (e.g., no homework), as well as extended time for completion of assignments and tests (O'Neill et al., 2017).

At the core of RTL policies is the philosophy of a gradual, sensible approach to school so that concussion symptoms are not exacerbated, however, despite this rationale critics do exist. Evidence supporting activity restriction versus cognitive rest is mixed, with some research showing negative consequences of prescribing complete cognitive rest altogether (Broglio et al., 2015; Eastman & Chang, 2015). For example, Broglio et al. (2015) notes that prolonged complete cognitive rest and reduction of school events has the possibility to exacerbate symptoms or cause negative mental health issues such as depression, behavioral concerns, and/or social issues. They defend this notion by concluding that a decrease in school attendance and other social activities can negatively affect some concussed individuals by preventing them from going through proper injury-coping mechanisms while also adding an increased burden and sense of anxiety for fear of falling behind academically (Broglio et al., 2015).

These contradictory viewpoints may be due to the conflicting evidence on the topic. Optimal cognitive load for individuals after a concussion has not yet been established despite efforts to identify appropriate capacities to implement and improve guidelines for concussed individuals (Eastman & Chang, 2015). This inability to define appropriate cognitive rehabilitation leads to difficulty creating evidence-based protocols and continues to create disparity among RTL policies and procedures (Kasamatsu et al., 2016). To follow a uniform process of care in the development of RTL policies, many outlines and guidelines have been proposed. Government, state programs, and various association guidelines, such as the Centers for Disease Control and Prevention's (CDC) "Heads Up" initiative, the state of Colorado's "Reduce, Educate, Adjust, Pace (REAP) Plan", and the NCAA's "Interassociation Consensus Statement on Concussions", have spearheaded the need for framework to guide the creation and implementation of RTL policies (Centers for Disease Control and Prevention, n.d.; Mcavoy, 2011; NCAA Sport Science Institute, 2016). Similarly, the American Medical Society for Sports Medicine (AMSSM) recommends "academic accommodations such as a reduced workload, extended test-taking time, days off, or a shortened work day" (Harmon et al., 2013, p. 23) and encourages their implementation as part of a RTL policy. Until evidence-based guidelines emerge, efforts to identify and implement appropriate cognitive rehabilitation strategies should remain an individualized approach based on the signs and symptoms that the concussed individual is experiencing (Halstead et al., 2013).

2.5 Return-to-Learn in K-12 Settings

Although academic accommodations are governed similarly between secondary and post-secondary educational settings, procedures to initiate and procure accommodations vary

considerably (Bolt, 2011). In K-12 settings, the Individuals with Disabilities Education Improvement Act (IDEA 2004) and Section 504 of the Rehabilitation Act (1973) mandate the delivery of accommodations for students with disabilities. Essentially, these laws require that schools provide an appropriate education if a student is determined to have a disability and in need of special accommodating services. Under IDEA (2004), students with disabilities must be provided with accommodations that are deemed appropriate by the Individualized Education Plan (IEP) team. This formulation of an IEP sets up the opportunity for a multidisciplinary team to convene and assemble an appropriate educational plan of care.

To aid a SA's recovery after disability incurred from a concussion, temporary academic support strategies may be necessary. In K-12 settings, a Section 504 plan outlines academic accommodations related to documented health conditions, which may be appropriate for SAs who experience prolonged concussion symptoms (Halstead et al., 2013). Because most concussions resolve within a matter of weeks, SAs will not likely qualify for an IEP or a Section 504 plan (Halstead et al., 2013). However, a need for proper educational care is still needed. Therefore, informal academic support strategies are necessary to balance recovery and prevent cognitive overload throughout the RTL progression outside these formal policies.

Although concussion laws exist across the United States in all 50 states and the District of Columbia, few discuss or require implementation of educational protocols that optimize student learning and RTL strategies after a concussion at the K-12 level (Heyer, Weber, Rose, Perkins, & Schmittauer, 2015; Kasamatsu et al., 2016; Wing, Amanullah, Jacobs, Clark, & Merritt, 2016). To this date, only eight states have RTL legislation (Halstead, McAvoy, & Brown, 2016). Thompson et al. (2016) identified that only 75% of these RTL regulations held schools responsible for RTL management. Moreover, mandated RTL education for school personnel was not common, present

in roughly one-quarter of the laws, with no laws providing guidance on support of students with persistent concussion symptoms, and with only one law based on any evidence-based standards for RTL protocols (Thompson et al., 2016). Because laws, regulations, policies, and practices vary among states, districts, and schools, it is important that support systems be familiar with the level of flexibility and creativity that a school can provide or permit to aid concussed individuals in their recovery.

2.6 Return-to-Learn in Higher Education

In post-secondary settings, a students' need to utilize accommodations is also protected by Section 504 of the Rehabilitation Act (1973) and the Americans with Disabilities Act (ADA, 1990). These acts are intended to protect individuals with disabilities and ensure equal access to educational opportunity. Like K-12 settings, post-secondary institutions under these laws are required to provide appropriate academic adjustments, as necessary, to ensure that they do not discriminate based on disability. However, evidence exists that there is considerable variability across post-secondary institutions in the disability service model as well as the components needed to document a disability (Bolt, 2011).

Moreover, there is no legislation at the post-secondary level that entitles a student to the same level of academic support that can be received in high school (Bolt, 2011). IDEA, the law that provides students with IEPs, no longer applies once a student graduates from high school. Although Section 504 of the Rehabilitation Act of 1973 still protects students from discrimination when they attend an institution of higher learning, many do not refer to accommodations as “504

plans”. Ultimately, an IEP, Section 504 plan, or any other accommodation or modification that a student had in high school, may not necessarily transfer into the college setting.

Additionally, the process of requesting and receiving accommodations in higher education is not the same as in high school. Due to legal ramifications prohibiting institutions from seeking disability status, a student must seek out support and then disclose their disability to the appropriate offices before accommodations can be rendered (Bolt, 2011). Adding to the struggle of attaining appropriate accommodations, post-secondary institutions may significantly vary in their requirements for documentation from diagnosing medical professionals or therapists regarding the student’s disability. However, once the disability has been verified, the post-secondary institution is required to provide reasonable accommodations under Section 504 through a collaborative process whereby appropriate personnel from the institution and the student engage with one another to identify appropriate needs and efforts to navigate the documented disability.

In addition, at the collegiate level, there are various documents prescribed by the NCAA for member institutions to aid in the guidance of concussion management for SAs. For instance, on April 29, 2010, the NCAA enacted its Concussion Policy legislation (NCAA Bylaw 3.2.4.17), stating that all member institutions must have a concussion management plan on file for its student-athletes (NCAA, 2014). This legislation sets a critical precedent mandating the creation of a formal document that essentially becomes the backbone of RTL in higher education.

These inter-association legislative management directives breed the formulation of a best practice checklist for all NCAA divisional members, though only NCAA Division I institutions are held to a yearly evaluative process of their concussion management policies by the NCAA legislative body. However, universities and colleges outside the NCAA Division I level have also utilized the checklist as a guide for the development and implementation of concussion treatment

and management protocols in the form of their own institutional management policies to remain compliant with NCAA Bylaw 3.2.4.17. This plan is to include a multitude of components for overall concussion management. However, only Section D (“education about concussion, including a policy that addresses RTL”) and E (“proper and appropriate concussion management, consistent with known best practices, made available to any student-athlete who has suffered a concussion”) of the plan are relevant to cognitive rehabilitation (NCAA, 2014). The theory behind this mandate is that when caring for a concussed SA, a proper concussion management policy should outline appropriate RTL measures. With this foundational requirement, compliance in the form of prescribed procedures to protect SAs from the potential dangers of concussions on the field and in the classroom are expected.

Even with the formulation and incorporation of concussion management policies accepted as best practice, a lack of institutional compliance with these mandates has been identified in the literature. In 2015, Kerr et al. reported that 96.6% of all NCAA Division I institutions had concussion-related protocols. However, only 67.2% had RTL policies (Kerr et al., 2015). DiFabio, Baugh, and Buckley (2016) furthered this work by evaluating institutions’ concussion management policies for compliance with NCAA suggested guidelines. The research team concluded an overall compliance of 93.6% among institutions having a policy on file. Again, RTL components had the lowest compliance among overall recommended concussion management policy guidelines at 87.0%. Furthermore, the most common information lacking from the RTL section were modification of schedule/academic accommodations for up to two weeks with help from an identified point person or case-manager (80%), re-evaluation by team physician if concussion symptoms worsen with academic challenges (81.5%), and remaining at home/dorm if the SA cannot tolerate light cognitive activity (81.5%) (DiFabio et al., 2016). Likewise, a study

by Buckley et al. (2017) revealed concussion management policies varied substantially in length and level of detail among the 47 NCAA Division I Power 5 conference schools. The authors revealed that general compliance for overall recommended components of policies across sample institutions was 94.3%, with 23.6% still having the lowest level of compliance clustered in the RTL component (Buckley et al., 2017).

Although these studies conclude that overall NCAA concussion management requirements were high at the Division I level, there remains room for improvement in RTL management policies. In particular, there is a need for increased attention to appropriate academic accommodations, within institutional guidelines, to assist with successful return to the classroom and academic environment. While not mandatory, the NCAA hopes that such concussion management policy guidelines are enacted and followed across all member institutions. With no direct oversight, the underlying belief is that by creating such transparency, the development of more uniform policies among NCAA member institutions would further spur best practices.

Additionally, the NCAA concussion management policy requirements are broadly stated, thereby allowing each intercollegiate athletic department and medical staff flexibility in concussion management given the individualistic presentation and resolution of each concussion. Unfortunately, the mandate falls short in that as long as each member institution keeps a policy on file, the NCAA does not provide any oversight to determine whether its terms are enforced or are adequate in nature to meet best standards and practices. Therefore, it is imperative that there is not only a thorough understanding of the potential cognitive affects and co-morbidities imposed by a concussion, but that perceived roles and responsibilities of all stakeholders involved to create a continuum of academic support occurs. Only then will consistency and quality of implementation and care be achieved for this mandate to be effective.

Finally, many NCAA member institutions' concussion management protocols and guidelines dictate pointed care for SAs only. This is especially important to note, because not all those suffering concussions are athletes; yet all are students. Therefore, many suggested strategies outlined by the NCAA parallel the need for campus-wide concussion management policies and RTL approaches to provide oversight and care for not only SAs but the entire general student population enrolled in higher educational institutions as well.

2.7 The Concussion Management Team

A concussion management team (CMT) is a multi-disciplinary team that provides data, perspectives and observations of a concussed SA. With recovery of a concussion encompassing many facets of a SA's life, management is difficult for one individual to oversee all components of recovery (Weber et al., 2015; Williams et al., 2015). Best practice indicates that a multi-disciplinary team approach be the foundation for optimal management and positive outcomes following a concussion (Halstead et al., 2013; NCAA Sport Science Institute, 2016). This multi-disciplinary team allows for constant communication and relies on member expertise to formulate concise and appropriate decisions and rehabilitative guidelines. Furthermore, a CMT may consist of a multitude of individuals including physicians, athletic trainers, principals, educators, counselors, school psychiatrists, school nurses, parents, and the concussed individual to work collaboratively in varying capacities to facilitate optimal recovery from a concussion (Halstead et al., 2013). For each member, having an invested stake in the recovery process, appropriate, ongoing, and effective communication among members of the CMT is critical to ensure a collaborative partnership is occurring to optimize care.

Moreover, academic accommodations need to be effectively managed and mutually agreed upon, but inherent inter-professional barriers exist expressing the necessity of developing a consistent approach and unified CMT (Dreer et al., 2016; Heyer et al., 2015). Only until recently has the knowledge, perceptions, and collaborative practices of members of the CMT been studied. One study, using a constructivist approach, investigated Athletic Trainers' (ATs) perceptions of RTL policies in secondary school settings. Of the ATs surveyed, only 44% reported having a RTL policy (Kasamatsu et al., 2016). Of the ATs who did not provide RTL recommendations, rationales included a lack of school professionals' understanding and knowledge of concussions, which ultimately led to ineffective communication between ATs and school professionals that hampered overall concerted management efforts (Kasamatsu et al., 2016). Overall, the authors concluded that ATs followed best practices for cognitive rest and RTL after concussion, although school professionals may be better suited to monitor academic progress (Kasamatsu et al., 2016). They recommend increased communication between the AT and school professionals to monitor recovery and facilitate academic support for symptomatic SAs. To achieve this, Kasamatsu et al. (2016) suggests interdisciplinary training regarding individualized roles in the RTL process and reassurance that implementation of a school-based concussion management approach occurs.

Another study investigated a different member of the CMT, secondary school nurses (SNs). Weber et al. (2015) surveyed 1,246 SNs to evaluate their familiarity and perceptions regarding academic accommodations for SAs following a sport-related concussion. This study revealed that SNs who collaborate with medical personnel are more familiar with academic accommodations than SNs who did not (Weber et al., 2015). Additionally, the authors expressed that these findings demonstrate a need to continually provide education in this area, stating, “education for all medical professionals within the concussion management team on the subjects of academic

accommodations is essential for proper return-to-learn and return-to-play completion” (Weber et al., 2015, p. 152).

Similarly, Wing et al. (2016) assessed SNs’ readiness to participate in concussion rehabilitation, the presence and nature of concussion rehabilitation policies at their place of practice, and perceived barriers to RTL plans. With an 83% (151/181) response rate from surveyed SNs, the authors identified that the majority of participants were able to recognize signs and symptoms of concussion; however, nearly 20% of the sample felt that they lacked the training necessary to be a part of an academic rehabilitation team (Wing et al., 2016). Additionally, the authors identified the single largest barrier for SNs in providing academic rehabilitation was inadequate communication with the concussed individual’s other medical providers.

These studies conclude that strategies for implementation and adherence to RTL policies for a concussed SA may vary greatly. Furthermore, variable differences in members’ experiences and educational backgrounds may lead to potential roadblocks to successful care. However, the underlying theme is the collective realization by all members of the CMT of the necessity to recognize and acknowledge the importance of academic accommodations, understand the RTL implementation process, and practice effective communication skills. By doing so, a well-informed and comprehensive team approach to concussion management will facilitate enhanced outcomes for SAs with concussions, including a quicker and more successful return to academics.

2.8 Faculty Role in Disability Management

Rioux and Valentine (2005) hypothesize that those who control an environment have the capabilities to ensure the equal treatment of all participants. The authors state that “personal

abilities and limitations are the result not only of factors residing within the individual, but also the interaction between individuals and their environments” (p. 52). In other words, the environment can negatively influence any disability by failure to accommodate the inability. Thus, this damage can be lessened by a commitment to adapt the overall environment to accommodate the disability. With this belief, it is formulated that those in positions of authority, such as faculty, can control their classrooms in which they work to ensure that all the participants are supported regardless of health status. Therefore, the critical role faculty play in establishing an environment that is adaptable to the changing needs of a concussed SA cannot be overlooked.

Any student can become stressed, frustrated, and/or emotional while completing academic coursework. Combine these with the associated symptoms from a sustained concussion and academic pursuits become even more complex (Brown et al., 2014; Halstead et al., 2013). As the concussion epidemic lingers throughout society, its accompanying cognitive disability will continue to permeate the classroom. Although research has suggested that educators are supportive of individuals with disabilities, there is much to understand in terms of the overall climate at the college level (Baker et al., 2012). Therefore, faculty need to recognize how to provide an instructional climate that is both supportive and emboldens academic success when supporting a concussive injury. If a faculty member is ill-informed of the effects of a concussion, then a lack of sensitivity to the needs of an individual’s disability or an unwillingness to provide accommodations can occur. Ultimately, these barriers can lead to a concussed SA’s struggle in sustaining long-term educational goals.

Various authors have studied and evaluated the knowledge, experience, and attitudes that faculty have towards students with disabilities. In 2005, Vasek surveyed 208 faculty at 4-year institutions and found that faculty tend to report a high degree of willingness to provide a student

with appropriate accommodations; however, when probed about specific accommodations they were less willing to provide them. Additionally, Murray, Wren, & Keys (2008) identified that faculty have positive perceptions in terms of their knowledge, expectations, willingness to provide accommodations, and their actual delivery of agreed-upon arrangements. However, they are more apt to providing minor academic accommodations rather than major ones. Murray et al. (2008) concluded that this is due to faculty members perceiving that “major accommodations alter underlying academic requirements in ways that compromise overall program quality” (p. 110). Moreover, the authors identified that faculty members did not have sufficient knowledge to make appropriate accommodations, suggesting that faculty development and communication around issues pertaining to students with disabilities are important.

In addition, Hartman-Hall & Haaga (2002) studied student reactions to hypothetical scenarios in which faculty reacted positively or negatively to a request for an accommodation. Eighty-six university students with learning disabilities rated their willingness to seek campus help for their disability. The researchers found that negative reactions from faculty adversely affected a students' decision to seek support, whereas positive reactions from faculty led to a greater willingness to pursue future assistance. Similarly, the authors compared hypothetical reactions from peers and concluded that they were not significantly associated with students' willingness to seek additional support, suggesting that faculty play a particularly crucial role in influencing a students' decision to seek support for their learning disability (Hartman-Hall & Haaga, 2002).

Faculty at institutions of higher education also need to be informed about documented disabilities and the associated legal requirements of not only concussed SAs but also any student with a disability. There appears to be strong relationship portrayed in the literature between faculty members' knowledge of the laws regarding accommodations and their willingness to provide

accommodations. Recent studies indicate that faculty in higher education have little knowledge about legislative mandates regarding their obligation in serving students with disabilities (Murray et al., 2008; Rao, 2004; Vasek, 2005). Rao (2004) further stated that faculty who reported increased knowledge of legislative principles had a more positive attitude towards disabled students. Additionally, most faculty indicate that they have little to no interaction with the Office of Disability Services on their campus with one-quarter reporting little to no familiarity with the office (Vasek, 2005). Therefore, it can be surmised that there is a clear need for information pertaining to the education of disabled students for faculty members. The lack of faculty knowledge regarding the office of disability services and disability law can create additional obstacles that concussed SAs will face ultimately compromising the classroom climate.

These studies suggest that faculty at post-secondary institutions generally have positive perceptions and express a willingness to support a students' disability; however, personal knowledge, availability of resources, and interpretation of legal requirements, as well as specific factors such as academic department and faculty rank, may compound issues affecting the education and classroom management of any disability. Therefore, it is important to garner a greater understanding of faculty perceptions of SAs with concussions in these settings.

2.9 Faculty Role in Concussion Management

As an integral member of the CMT, an overall neglect of associated neurocognitive deficits or skewed perception of concussions and its management by faculty members will exacerbate recovery and continue to affect one or several areas of cognitive function impacting a concussed individual's academic endeavors or permanent record (Dreer et al., 2016; McGrath, 2010). As a

result, one of the major underpinnings to aid in a student's recovery is an improvement in knowledge communication procedures as well as infrastructure beyond the physical event (Centers for Disease Control and Prevention, n.d.; Halstead et al., 2013; Kasamatsu et al., 2016). These iterative processes will increase contribution from faculty members, which will ensure quality cognitive rehabilitation improvements for concussed SAs.

Additionally, faculty possess singular power and influence over cognitive loading in a classroom setting and play a crucial role in executing prescribed accommodations. They are uniquely positioned to help observe changes in a concussed SA, including symptoms that may be worsening, that may only manifest within the classroom, thereby providing a channel to obtain and share information regarding the concussed SA's progress and challenges. This is a critical aspect of concussion management that other members of the CMT are not afforded. With such robust and often difficult to identify cognitive and emotional signs and symptoms affecting attentiveness, concentration, increased irritability, less tolerance for stressors, memory recall, learning new information, or the completion of tasks or assignments in the classroom, it is difficult for medical professionals to provide pointed care and recommendations to meet the concussed SAs' cognitive needs without input from faculty members. Therefore, it is imperative that faculty are knowledgeable and collaborative to ensure a comprehensive picture is depicted of the SA's cognitive condition to ensure appropriate classroom management strategies are formulated and enacted to maintain pace in the classroom (McGrath, 2010).

Despite this important role, most educators feel unprepared to carry out these duties (Gioia, 2016). This lack of overall knowledge and familiarity with cognitive disability among educators has been previously identified. In 2005, Mohr & Bullock reported outcomes from two focus groups. The study's aim was two-fold: first, to ascertain professional educators' perceptions

regarding their level of preparedness for working with students with TBI and, second, to investigate how they felt about the adequacy of existing training resources for educators in general. Most of the participants (86%) felt that there is an overall lack of knowledge regarding the diverse educational needs of students with brain injuries (Mohr & Bullock, 2005). Additionally, 63% indicated that they would be intimidated, given their current level of knowledge, and lacked self-confidence in being able to handle the challenges associated with having a student in their classroom following a brain injury (Mohr & Bullock, 2005). The authors concluded that these concerns are directly related to the participants' perception that there is a lack of formal training opportunities and collaboration amongst members of the CMT for educators.

In 2016, Dreer et al. conducted a needs assessment among teachers in K-12 settings, to determine concussion knowledge, practices and preferences, and classroom management strategies. Shockingly, only half of educators indicated that a cognitive disability might cause difficulty returning to school, while slightly under a quarter (22.3%) perceived that they were "very confident" in their ability to recognize signs or symptoms of a concussion (Dreer et al., 2016). Not surprising, the majority of respondents (82%) expressed the need for more information about concussions and classroom management for students with concussions. Overall, the authors concluded that these findings indicate a need for an improvement in framework and communication protocols among members of the CMT. Even though this endeavor may be challenging, the partnership between medical professionals and educators will help maximize recovery and positive outcomes for concussed SAs.

Similarly, Graff and Caperell (2016) also identified the presence of important deficits in the knowledge of K-12 educators regarding concussions and classroom management. Interestingly, they concluded that 97% of the participants in the study were familiar with academic

classroom interventions; however, perceived comfort level was sub-standard due to little education on how to approach concussed populations in the classroom. This study, again, supports the necessity to educate those directly involved in academic oversight of a concussed SA to help improve symptoms and overall recovery by concluding that the “importance of educating the educators cannot be overemphasized” (Graff & Caparell, 2016).

Most recently, Kasamatsu, Mcleod, Register-Mihalik, and Welch Bacon (2017) administered the Beliefs, Attitudes, and Knowledge Following Pediatric Athlete Concussions (BAKPAC-TEACH) survey to K-12 educators to examine their beliefs and practices regarding concussion and academic support strategies for concussed SAs. By utilizing several question structures to explore perceptions of management, perceived roles, knowledge, and implementation practices associated with concussions and academic accommodations, Kasamatsu et al. (2017) was able to depict that most teachers (99.1%) agreed or strongly agreed that concussions affect school performance, and many (71.6%) have worked with a SA who received academic accommodations after a sustained concussion. In addition, educators who participated in concussion education and observed a decline in a SA’s academic performance after concussion were more familiar with and recommended accommodations more often. In conclusion, Kasamatsu et al. (2017) identified teachers as “key stakeholders throughout the concussion management process” (p. 182) and recommend practical and well-timed resources to enhance support for SAs after a concussive injury.

It is clear that educators see the importance and are eager in obtaining concussion education that is relevant to their field in order to offer the best support possible to concussed SAs. It is likely that if these professionals are not appropriately skilled in recognition and classroom management of concussions, education services are likely to be dis-jointed and inadequate at best.

However, these findings also allude to a systemic lack of appropriate training and collaborative efforts for educators to comprehend and meet the individualized academic needs of SAs with a concussion. Although the summative available research regarding concussion management in the classroom is growing and has produced many valuable resources for educators, whether that information is reaching adequate numbers of school personnel or is being translated to higher educational settings remains uncertain.

2.10 Faculty and Student-Athlete Interactions

Ideally, faculty-student interactions arise from a variety of forms and are commonly believed to help facilitate positive resolution of several student issues, both personal and societal, through various interactions, both formal and informal (Comeaux, 2011). However, despite these positive contributions to student development, they are not without flaws. In fact, faculty misconceptions can impede student engagement as well as overall academic experiences and outcomes (Umbach & Wawrzynski, 2005). In the context of faculty and SA interactions, this may be due to some faculty perceiving intercollegiate athletics as disconnected from the academic mission of their institutions, therefore being typcast as a specialized population within the university community (Lawrence, 2009). Even though a SA might have attended a form of higher education to study first and engage in athletics second, the reality shows that they are devoting much of their time to their individual sport. By doing so, they often become absorbed solely with that sport, intentionally or not, and are perceived by others as not being a productive member of the academic community. Consequently, faculty and their non-athlete peers may rebuke SAs for an alleged lack of productivity.

Research exploring the negative assumptions surrounding SAs' academic skills support the notion that there is, in fact, a stigma attached to the label of "student-athlete." It has been well documented that faculty harbor more prejudicial attitudes and typecasts towards NCAA SAs than their non-athlete peers. For instance, Engstrom, Sedlacek, & McEwen (1995) surveyed a sample of 201 faculty members and examined the degree to which they held stereotypical negative attitudes toward male revenue and non-revenue SAs. They found that university faculty at a NCAA Division I institution held more prejudicial attitudes toward male revenue and non-revenue SAs than non-student-athletes. Baucom and Lantz (2001) reported similar findings at smaller NCAA Division II institutions, citing negative attitudes held by faculty towards SAs regarding the academic admissions process, financial support, the provision of academic services, and coverage by the campus newspaper. Lawrence (2009) expressed that these negative perceptions may be due to ill-defined faculty roles in athletics and that administrators are not forthcoming with information that governance committees need to ensure quality SA educational experiences (Lawrence, 2009). Given such findings, it can be concluded that, regardless of NCAA divisional affiliation, faculty tend to be displeased with collegiate athletics and possess similar SA stereotypes.

Distorted perceptions by faculty members are also palpable by the SAs themselves. In a study by Simons, Bosworth, Fujita, & Jensen (2007), 538 collegiate SAs were asked how they were perceived and treated by faculty with 33% reporting feeling perceived negatively by professors and 61.5% disclosing that they were given a hard time or were refused accommodations for athletic endeavors. These negative views and prejudices can also lead to poor interactions between a SA and a faculty member. Supporting this notion, research performed by Hartman-Hall & Haaga (2002) revealed that "the response a student receives to a request for assistance or accommodation for a learning disability, particularly from a professor, likely affects the student's

willingness to seek help in the future” (p. 271). Additionally, Umbach and Wawrzynski (2005) revealed that the level of importance faculty place on co-curricular activities positively relates to student educational, personal, and social development. Thus, curtailing stereotypes will lead to improvements in a SA’s overall classroom climate, as they will view faculty as more accessible to helping them both in and outside of the classroom to improve their academic achievement and degree completion.

In terms of a concussive injury, these negative stereotypes and opinions can have a profound effect on a SA’s academic career and medical care. If a general student is met with a negative reaction to a request for help, that individual will be less likely to seek further assistance, impeding opportunities to provide needed services to that student. Compounding the situation, if that student is an athlete, who in general are often distinguished as inferior to other students due to their supposed lack of commitment to academics or lack of motivation in the classroom, how is a concussed SA portraying cognitive deficits perceived? It is the fundamental job duty of faculty to help students succeed in their higher educational careers regardless of need and it is troubling that some educational members outside of the medical community may attach certain stigmas to SAs that have sustained a concussion. Some may feel that the athlete is faking symptoms to gain an unfair advantage in the classroom or some other negative alternative motives are at play due to the invisible or hidden presentation of a concussion injury (Baker et al., 2012; Langlois et al., 2006). Others may simply not understand the severity and complexity of a concussion leading to questioning of the recovery process. Moreover, some may feel that athletic obligations, such as away athletic trips, take away from a SA’s devotion to academic and scholarly pursuits such as meeting with their professors during office hours or attending class (Engstrom et al., 1995). These factors collectively manifest into negative stereotypes of collegiate SAs and can create

misunderstandings towards concussions and their management. Even worse, these biases can be detrimental to a SAs' overall academic identity rather than an accurate depiction of his or her academic capabilities. Therefore, faculty must obtain an overarching vision that includes an unbiased understanding and awareness of not only concussions but also any disability regardless of student classification so that any pre-conceived notions are abated.

2.11 Conclusion

Faculty play a vital role in the CMT and, indirectly, the overall care of concussed SAs. Unfortunately, various issues arise that may hinder this important responsibility such as a lack of concussion knowledge and overall treatment best practices. Research has already begun to investigate the knowledge and perceptions of educators in K-12 settings; however, effectiveness of a faculty in post-secondary settings is lacking. In fact, it has already been shown that K-12 educators are often unprepared to sustain RTL transitions and unaware of RTL best practices. Previously surveyed K-12 educators expressed a lack of training in concussions and requested greater availability of best practices to support concussion management protocols (Lyons et al., 2017). It has also been shown that K-12 school personnel who had been exposed to some form of concussion education within the past year were more likely to recommend or support similar educational tools for faculty (Heyer et al., 2015). Thus, unfamiliarity of concussion effects and management create a palpable need for concussion education among post-secondary faculty in the classroom. Therefore, in addition to the absence of relatable research, a faculty member's overall concussion and concussion management knowledge, perceived roles, and collaborative efforts when supporting a concussed SA in higher educational settings need to be investigated and

identified. Through pointed inquiry, an understanding of how faculty in higher education approach concussions and concussed SAs in the classroom can be identified. Only then can efforts be formulated to institute explicit and effective faculty training and instructional practices to empower these professionals to assist with a concussed SA's academic reintegration process and overall concussion recovery.

The overall issues facing concussed SAs are vast and complex; therefore, the response and approach to support them need to be comprehensive, sustained, and collaborative. Ultimately, the more equipped faculty members are in terms of academic concussion management, the more likely cognitive recovery will be facilitated and academic performance sustained for a SA following a concussion.

3.0 Methodology

3.1 Research Questions

The study is guided by the following research questions:

1. What is the relationship of undergraduate faculty members' previous experiences and their level of knowledge of concussions and confidence in their knowledge regarding concussions in student-athletes?
2. What is the relationship of undergraduate faculty members' previous experiences and their level of awareness and perception of concussion management strategies?

3.2 Inquiry Design

The inquiry design was a needs assessment of undergraduate faculty to improve practice regarding student-athlete concussion management in higher education. The impact that previous personal history of concussive injuries (both self and immediate family members), previous formal concussion education, and classroom experiences with concussed SAs have on faculty dispositions regarding overall concussion knowledge, confidence in that knowledge, and the awareness and perceptions of concussion management practices were also identified through this inquiry. Capturing this population's current views at a specific moment in time yielded honest and truthful responses equating to an accurate quantitative depiction of the problem. Previous authors have shown an evaluative inquiry design to be useful when attempting to isolate and understand the

dynamics of academic concussion management and evoke recommendations where necessary to improve overall knowledge and management practices (Dreer et al., 2016; Graff & Caperell. 2016; Kasamatsu et al., 2016; Kasamatsu et al., 2017; Mohr & Bullock, 2005; Weber et al., 2015; Williams et al., 2015, 2014).

3.3 Setting

Waynesburg University (WU) is a private liberal arts institution located in Waynesburg, Pennsylvania. The university offers graduate and undergraduate programs in more than 70 academic concentrations and enrolls over 1,800 students. Additionally, WU offers National Collegiate Athletic Association (NCAA) Division III affiliated athletic programs. These athletics programs comprise the largest extracurricular enterprise on campus with the institution's medical staff responsible for the oversight of the health and well-being of approximately 450 NCAA Division III SAs. There is an array of further extracurricular activities offered to students at WU, but athletics is by far the most populated. In fact, according to NCAA data during the 2017-2018 academic year, WU student-athletes comprise 32% of its entire student body, compared to an average of 26% of all other Division III institutions (NCAA, 2018).

3.4 Population

To maximize recovery, it is recommended that a SA's return to academia following a concussion be formulated by a multi-disciplinary team approach (Halstead et al., 2013). To aid in

this collaborative effort, faculty are identified as essential members of this team. Thus, a convenience sample of WU faculty members were the focus of this investigation. Although WU employs 233 full- and part-time faculty and boasts a 12:1 faculty to student ratio, there are currently no SAs registered at the graduate level. Therefore, at the time of this study, only 154 faculty members that teach at the undergraduate level had the potential to interact with a concussed SA and the ability to collaborate with a multi-disciplinary concussion management team (CMT) to balance cognitive needs through prescribed academic adjustments and classroom agendas at any given time. (Table 1).

Table 1 Waynesburg University Faculty Breakdown

	<i>Full-time</i>	<i>Part-time</i>	Total
<i>Undergraduate</i>	70	84	154
<i>Graduate</i>	8	71	79
Total	78	155	233

3.5 Instrument

The Beliefs, Attitudes, and Knowledge following Pediatric Athlete Concussions (BAKPAC) survey was initially developed and utilized to investigate Athletic Trainers' (ATs) familiarity with, attitudes toward, and incorporation of academic accommodations in the secondary school clinical setting (Williams et al., 2015, 2014). Due to a perceived lack of pre-existing instruments to assess these constructs, authors of the BAKPAC survey conducted a literature review to locate previously developed instruments that specifically addressed participant's beliefs

about, attitudes towards, and perceived familiarity with academic accommodations. Thus, by incorporating content from the National Sports Safety in Secondary School study, as well as questions based on information from content experts, the BAKPAC-AT survey was created (Williams et al., 2015). This survey consisted of three sections: (1) concussion management and care, (2) concussion referral, and (3) academic accommodations. In addition to these sections, which included a variety of structured questions (e.g., binary, multiple choice, open-ended, Likert-scale, and multistep answers), a brief demographic questionnaire regarding participants' personal and professional information was also included.

Since its creation, numerous authors have adapted the BAKPAC survey into various versions to investigate several stakeholders in concussion management including school nurses (SNs), principals, physicians, coaches, K-12 teachers, and other secondary school personnel (Johnson et al., 2017; Kasamatsu et al., 2017; Ritter et al., 2017; Welch Bacon et al., 2017; Williams et al., 2015, 2014). However, only the BAKPAC-TEACH version developed to investigate K-12 educators was utilized as the design model for this study's instrument.

Grounded in the original BAKPAC survey and molded after the BAKPAC-TEACH, this study's instrument was adjusted to investigate faculty members in post-secondary educational settings and named the FAC-CON survey (Appendix A). The survey was generated using the online system, Qualtrics Online Survey Software (Qualtrics LLC, Provo, UT) and contains a variety of multiple choice, four-point Likert-scales, binary, and multi-step items. The questions incorporated in this survey comprised of three sections: 1) faculty knowledge and confidence in their knowledge regarding concussions and associated accommodations for SAs; 2) faculty level of knowledge and collaboration with the CMT; and 3) a brief demographic questionnaire regarding

participants' personal and professional information, personal and family concussion history, level of formal concussion education, and previous encounters with concussed SAs in the classroom.

Section 1 contained eight questions of various formats inquiring about faculty knowledge of concussions and its effects on physical and cognitive actions. Included in this section are three questions with different verbiage to represent a Likert-type response of "not at all" as a negative to "extremely" as a positive. Next, section 2 consisted of eight primary "yes/no/I don't know" questions about faculty communication, if any, with the athletic trainer, school nurse, and/or Office of Disability at the institution where the faculty member primarily teaches. Additionally, questions exploring faculty awareness, perceptions, and experiences with concussion policies, the CMT, and classroom interactions with concussed SAs were invoked. Depending upon participant answer selections, an additional 10 questions of multiple-choice format were automatically populated to follow-up on specific communication and institutional policy practice questions. Lastly, section 3 comprised of seven questions probing for responses pertaining to a faculty member's previous experiences. These experiences include previous personal and family concussion history, previous formal concussion education, employment status, student demographic taught, years' experience teaching in higher education, and gender. Again, depending upon participant answer selections in this section, one additional question was automatically populated to further define faculty concussion educational experiences.

3.6 Validity and Reliability

The original BAKPAC instrument was validated by a panel of three concussion experts to assess the survey for content validity and comprehensiveness (Williams et al., 2015). During each

review, a validity rubric regarding the importance of each question was utilized, which required each panelist to assess each survey item using a 3-point scale. A rating of “3” indicated the panelist perceived the question was good and should remain in the survey as written, a “2” indicated the question would be acceptable once revised, and a “1” was for a question that was poor and needed to be removed (Williams et al., 2015). Once the validity rubrics were completed, the authors made any necessary changes. The final BAKPAC survey was deemed a valid and comprehensive instrument and used to assess secondary school ATs’ concussion management practices, concussion referral patterns, and their role and perceptions of academic accommodations after a sport-related concussion (Williams et al., 2015). Due to the type of questioning aimed at capturing clinicians’ current clinical practice patterns, the authors concluded that a reliability analysis to determine the internal consistency of the instrument was not warranted (Williams et al., 2015, 2014). Numerous subsequent surveys have also been created based off the previously validated BAKPAC survey instrument. In one instance, it was modified to investigate teachers in K-12 settings. This version was named the BAKPAC-TEACH survey and was piloted by three teachers for comprehensiveness (Kasamatsu et al., 2017). Based on pilot feedback, survey items were modified prior to dissemination and the final BAKPAC-TEACH survey was deemed valid.

Building upon the BAKPAC-TEACH and its previous validations, the FAC-CON survey was created and was utilized as the sole instrument for this study. Creation of this instrument consisted of reviewing the BAKPAC-TEACH for comprehensiveness by the primary investigator. It was determined that alterations to structure, question wording, and clarity were required in order to properly assess faculty in higher educational settings. Following modification, the FAC-CON survey was piloted by three higher educational faculty members, who were also Certified ATs, for

content validity and completeness. Suggested edits from the pilot process were reviewed by the primary investigator and incorporated into the final FAC-CON survey.

Lastly, due to the nature and style of questioning aimed at capturing faculty members' current concussion knowledge, confidence in their knowledge, and awareness and perception of concussion management strategies, a reliability analysis to determine the internal consistency of the instrument was not warranted.

3.7 Data Collection

The institutional review boards for both the University of Pittsburgh and WU approved this study as exempt research prior to dissemination. Email addresses were obtained for all full- and part-time WU faculty who taught at the undergraduate level by means of the Director of Human Resources. Identified subjects were invited via email to participate in a web-based survey administered through the Qualtrics Survey Software platform between October 24th, 2018 and December 5th, 2018. The e-mail requested faculty member's participation and included the purpose and importance of the research study, the URL hyperlink to the web-based survey, a URL hyperlink to opt out of future communications regarding the study, the projected time to complete the survey, and a deadline date for survey completion (Appendix B). The e-mail also provided contact information for the primary investigator and project advisor for comments, questions, or concerns about the research study or the survey instrument. Reminder e-mails were sent to participants at the end of weeks 1, 2, 3, 4 and 5 of the study period (Appendix C). Participant consent was assumed upon completion and voluntary submission of the completed survey. Once a participant completed the survey, a thank-you statement was automatically generated in

Qualtrics. This statement also contained a separate survey URL hyperlink via the same Web-based survey platform. This hyperlink provided the option for participants who completed the survey in its entirety to voluntarily provide their contact information to be entered into a drawing for one of three \$25 Amazon gift cards (Amazon.com, Inc., Seattle, WA) (Appendix D). Separation of participant contact information via this embedded URL hyperlink from the FAC-CON survey data was intended to ensure anonymous survey data were collected and to protect participant identities. Gift card winners were selected via an online random number generator. Individual winners were contacted and the gift cards were delivered after the data collection period ended.

3.8 Analysis

Raw data were exported from the web-based survey host, Qualtrics, for analysis. The number of responses for items differed due to skip logic (i.e., respondents were directed to a different item according to the previous response). Raw data was de-identified, and cleaned to identify errors in the dataset and begin preparation for descriptive analyses (i.e., frequency, median, mean, standard deviation) of the data by using IBM SPSS Statistics Software (Version 25.0. Armonk, NY: IBM Corp). ID numbers were generated for each participant response and any identifiable information, non-responders, or duplicate responders were deleted. In the case of duplicate responses, the following rules were applied. If there was one survey response that was complete and one that was only partially complete, only the completed survey response was kept and the partial survey was deleted from the data set. If both survey responses were complete, only the survey with the earliest date was retained. If a participant submitted one response only completing the first half of the survey and then submitted another response only completing the

second half of the survey, then the participant's responses were combined into a single case. Variables were re-named to allow for consistency and ease of analysis. Frequency was run on all variables to confirm that the number of responses in the dataset equated to the number of study participants, variable coding was correct, that no invalid or inconsistent values were present, and to identify any potential missing data. After running variable frequencies, any identifiable problems were addressed as previously described.

Descriptive (i.e., frequency, median, mean, standard deviation) and inferential statistics were calculated. Independent variables consisted of the following: 1) faculty who have or have not experienced a concussed SA in the classroom; 2) faculty who have or have not personally suffered a concussion; 3) faculty who have or have not had a family member suffer a concussion; and 4) faculty who have or have not been formally educated about concussions. Dependent variables comprised of faculty responses to survey items regarding the importance of appropriate managed concussion care, their concussion knowledge, and the confidence in their knowledge regarding concussions in SAs. Additionally, faculty awareness and perceptions of concussion management strategies were also included as dependent variables. Separate Mann Whitney U tests ($p < 0.05$) were conducted to identify group differences (i.e., faculty who had or had not been formally educated, faculty who had or had not previously encountered a SA who experienced an academic decline, personal or family concussion history) for Likert-scale items (importance of appropriate concussion care, perceived knowledge of concussions, and confidence in their knowledge). Cohen's d guidelines (1988) were used to calculate and report small (0.1), medium (0.3), and large (0.5) effect sizes.

4.0 Results

The recruitment email to participate in this study was emailed to 154 faculty members. One recruitment email was returned as undeliverable. Therefore, 153 faculty members were given the opportunity to access the survey. Only 70 faculty members accessed the survey, which resulted in a 45.7% response rate. Of the 70 participants who accessed the survey, 67 completed the survey in its entirety for an overall completion rate of 43.5%.

Three respondents indicated teaching strictly at the graduate level and were therefore excluded from data analysis. Thus, final sample data included 64 faculty members (n=33, 51.6% female; n=31, 48.2% male) with 68.8% classified as full-time (n=44) and 31.3% (n=20) classified as part-time employees (Table 2). Of these faculty members, 87.5% (n=56) taught exclusively undergraduate students and 12.5% (n=8) taught both undergraduate and graduate students with slightly more than half of respondents (56.3%; n=36) possessing \leq 10 years of experience teaching in higher education.

Table 2 Sample Characteristics

	Faculty Members (n=64)	
	n	%
<i>Sex</i>		
Female	33	51.6%
Male	31	48.2%
<i>Employment Status</i>		
Full-time	44	68.8%
Part-time	20	31.3%
<i>Student Demographic Taught</i>		
Undergraduate	56	87.5%
Undergraduate & Graduate	8	12.5%
<i>Years Teaching</i>		
\leq 2 years	6	9.4%
3-5 years	16	25.0%

Table 2 continued

6-10 years	14	21.9%
11-15 years	11	17.2%
16-20 years	8	12.5%
≥ 21 years	9	14.1%

4.1 Concussion Knowledge and Confidence in Knowledge

Overall, faculty knowledge ($M=2.37$, $SD=0.77$) and confidence in their knowledge ($M=2.31$, $SD = .845$) were minimal to moderate in nature (Table 3). Specifically, results revealed that just over half of respondents felt that they were “minimally knowledgeable” or “moderately knowledgeable” regarding concussion preventative measures (34.4%, $n=22$; 42.2%, $n=27$ respectively), physical signs and symptoms of concussions, (35.9%, $n=23$; 42.2%, $n=27$ respectively) and cognitive signs and symptoms of concussions (35.9%, $n=23$; 39.1%, $n=25$ respectively). A similar pattern emerged for faculty’s confidence in their concussion knowledge regarding the same concussion aspects. Over half of respondents expressed that they were “minimally confident” or “moderately confident” in their knowledge as it pertains to preventative measures (31.3%, $n=20$; 43.8%, $n=28$ respectively), physical signs and symptoms of concussions (28.1%, $n=18$; 40.6%, $n=26$ respectively), and cognitive signs and symptoms (39.1%, $n=25$; 29.7%, $n=19$ respectively).

The majority of faculty members also reported that they were “minimally knowledgeable” (43.8%; $n=28$) or “not knowledgeable at all” (21.9%; $n=14$) regarding how to treat or manage a concussion and were “minimally confident” (39.1%; $n=25$) or “not confident at all” (31.3%; $n=20$) in the knowledge they possess in this area. Likewise, respondents felt that they were “minimally knowledgeable” or “not knowledgeable at all” regarding academic accommodations (42.2%,

n=27; 20.3%, n=13 respectively) or return-to-learn (RTL) criteria (35.9%, n=23; 40.6%, n=26 respectively). Equally, faculty reported that they were “minimally confident” or “not confident at all” in their knowledge pertaining to academic accommodations (37.5%, n=24; 26.6%, n=17 respectively) or RTL criteria (31.3%, n=20; 45.3%, n=29 respectively).

Table 3 Faculty Selection of Concussion Knowledge and Confidence in Knowledge

	Faculty Members (n=64)		
	Mode	Mean	SD
<i>How knowledgeable of concussions:</i>			
Prevention	3.00	2.52	0.85
Physical signs and symptoms	3.00	2.67	0.82
Cognitive signs and symptoms	3.00	2.61	0.87
Treatment and management	2.00	2.28	0.98
Academic accommodations	2.00	2.28	0.92
Return-to-learn criteria	2.00	1.88	0.88
<i>How confident in knowledge:</i>			
Prevention	3.00	2.47	0.85
Physical signs and symptoms	3.00	2.66	0.82
Cognitive signs and symptoms	2.00	2.50	0.87
Treatment and management	2.00	2.16	0.98
Academic accommodations	2.00	2.23	0.92
Return-to-learn criteria	2.00	1.84	0.88

1 = Not at all; 2 = Minimally; 3 = Moderately; 4 = Extremely

When further examining faculty’s concussion knowledge, the majority selected “brain” (90.6%; n=58) while a small number selected “skull” (9.4%; n=6) when identifying the structure involved during a concussion. Additionally, the majority of faculty recognized that a concussion does not “only occur when the student-athlete loses consciousness” (96.9%; n=62) and that when a report of a headache and dizziness is reported by a potentially concussed student-athlete (SA), it is “moderately serious” (32.8%; n=21) or “extremely serious” (67.2%; n=43). When asked regarding the immediate presentation and actions when a concussion occurs, half of faculty recognized that a headache might be the sole identifiable sign and symptom of a concussion (50%;

n=32). Others identified that a SA experiencing a headache “will likely demonstrate other signs and symptoms of a concussion” (20.3%; n=13), while over a quarter were “not sure” (29.7%; n=19). Moreover, when a SA is diagnosed with a concussion, the majority of faculty identified that an “immediate removal from physical activity” is required (92.2%; n=59) and that a concussed SA “who displays any sign or symptom of a concussion should not be allowed to return to play until symptoms resolve” (89.1%; n=57). Table 4 summarizes these results.

Table 4 Faculty Recognition of Immediate Concussion Presentation and Actions

	Faculty Members (n=64)		
	True	False	I don't know
A concussion only occurs when the student-athlete loses consciousness (blacks out)	0	62	2
A concussion requires immediate removal or modification of physical activity	59	1	4
A student-athlete who reports they are experiencing a headache will likely demonstrate other signs and symptoms of a concussion	13	32	19
A student-athlete who displays any sign or symptom of a concussion should not be allowed to return to activity until symptoms resolve	57	3	4

If these recommendations were not followed, faculty were able to recognize that if a SA returned to physical activity too soon after a concussion the following may occur: brain damage (84.4%; n=54), prolonged recovery (81.3%; n=52), emotional disturbances (79.7%; n=51), more likely to sustain another concussion (76.3%; n=49), and/or trouble in school (76.6%; n=49), changes in social life” (75%; n=48). Similarly, faculty identified that a SA who suffers multiple concussions increased the risk of the following: brain damage (98.4%; n=63), trouble in school (84.8%; n=54), emotional disturbances (82.8%; n=53), changes in social life (82.8%; n=53), prolong recovery (78.1%; n=50) and/or more likely to sustain another concussion (71.9%; n=46).

Table 5 summarizes these results.

Table 5 Faculty Selection of Concussion Consequences

Faculty Members (n=64)		
	n	%
<i>Consequence of PA too soon after a concussion</i>		
Brain damage	54	84.4%
Prolong recovery	52	81.3%
Emotional disturbances	51	79.7%
More likely to sustain another concussion	49	76.6%
Trouble in school	49	76.6%
Changes in social life	48	75.0%
Skin rash	0	0%
No bad things can ever happen	0	0%
<i>Consequence of suffering multiple concussions</i>		
Brain damage	63	98.4%
Trouble in school	54	84.8%
Emotional disturbances	53	82.8%
Changes in social life	53	82.8%
Prolong recovery	50	78.1%
More likely to sustain another concussion	46	71.9%
Skin rash	2	3.1%
No bad things can ever happen	0	0%

4.2 Awareness and Perceptions of Concussion Management Strategies

Respondents felt that it is moderately to extremely important that a concussed SA's care be managed appropriately ($M=3.65$, $SD=.37$) (Table 6). All faculty identified that the management practice of restricting a concussed SA from physical activity is either "moderately important" (17.2%; n=11) or "extremely important" (82.8%; n=53). However, 20.3% (n=13) did not feel the same regarding the limiting of cognitive activity for a concussed SA with faculty identifying the management practice as "minimally important" (17.2%; n=11) or "not important at all" (3.1%; n=2). Furthermore, the majority of faculty felt that it is "extremely important" for a SA to report any such concussion symptoms to a medical professional (98.4%; n=63), while only 75% (n=48)

felt the same regarding academic personnel. Hence, why only 75% (n=48) of faculty acknowledged that it is “extremely important” for a faculty member to know the appropriate management steps to follow if a SA has a concussion.

Table 6 Faculty Selection of Perceived Importance of Appropriate Managed Care

	Faculty Members (n=64)		
	Mode	Mean	SD
<i>How important is it:</i>			
for a concussed student-athlete to not participate in physical activity	4.00	3.83	0.38
for a concussed student-athlete to limit cognitive activities	3.00	3.11	0.80
for a student-athlete to report possible concussion symptoms to a medical professional	4.00	3.98	0.13
for a student-athlete to report possible concussion symptoms to academic personnel	4.00	3.67	0.64
as a faculty member to know the steps to follow if a student-athlete has a concussion	4.00	3.66	0.67

1 = Not important at all; 2 = Minimally important; 3 = Moderately important; 4 = Extremely important

When questioned whether institutions of higher education should have an established written concussion management policy in place, 79.7% (n=51) of faculty believed they should, 3.1% (n=2) did not, and 17.2% (n=11) were not sure if concussion management policies were necessary. Yet, the majority of faculty did not know (90.6%; n=58) or identified that their institution did not have (4.7%; n=3) an established written concussion management policy, while only 4.7% (n=3) acknowledge there was one in place. Similarly, when asked if institutions of higher education should have an established concussion management team (CMT), 76.6% (n=49) felt they should, 10.9% (n=7) did not, and 12.5% (n=8) were unsure if one was necessary. Again, the majority of faculty did not know (84.4%; n=54) or stated that their institution did not have (9.4%; n=6) an established CMT, while only 6.3% (n=4) acknowledge that there was one established. The rows portraying the bulleted numbers reading left to right in the Table 7 matrix summarizes these results.

Table 7 Faculty Knowledge and Awareness of Concussion Management Policies and the CMT and the Relationship with Previous Experiences Matrix

	<i>Concussion Ed</i>			<i>Concussed SA in Classroom</i>			<i>Personal Concussion</i>			<i>Concussed Family Member</i>		
<i>Should institutions:</i>	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
<i>have concussion policies?</i>												
Yes	22	29	51	27	24	51	15	36	51	24	27	51
No	1	1	2	1	1	2	1	1	2	1	1	2
I don't know	2	9	11	3	8	11	4	7	11	3	8	11
Total	25	39	64	31	33	64	20	44	64	28	36	64
<i>have a CMT?</i>												
Yes	21	28	49	23	26	49	14	35	49	21	28	49
No	2	5	7	4	3	7	4	3	7	2	5	7
I don't know	2	6	8	4	4	8	2	6	8	5	3	8
Total	25	39	64	31	33	64	20	44	64	28	36	64
<i>Does your institution:</i>	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
<i>have concussion policies?</i>												
Yes	1	2	3	0	3	3	0	3	3	1	2	3
No	3	0	3	2	1	3	3	0	3	3	0	3
I don't know	21	37	58	29	29	58	17	41	58	24	34	58
Total	25	39	64	31	33	64	20	44	64	28	36	64
<i>have a CMT?</i>												
Yes	3	1	4	1	3	4	2	2	4	2	2	4
No	4	2	6	4	2	6	2	4	6	4	2	6
I don't know	18	36	54	26	28	54	16	38	54	22	32	54
Total	25	39	64	31	33	64	20	44	64	28	36	64

4.3 Previous Experiences

4.3.1 Formal Concussion Education

Less than one-half of faculty who felt that institutions of higher education should have a concussion management policy had previous formal concussion education (40.7%, 22/51). Similarly, 42.8% (21/49) who felt the same regarding a CMT had formal concussion education. Moreover, only one faculty member who had previous formal concussion education identified that

the institution had a concussion management policy while no one acknowledged the presence of the CMT (first column in Table 7 matrix). To identify differences in faculty responses regarding concussion knowledge, confidence in their knowledge, and the importance of appropriate managed care regarding those who had (39.1%; n=25) and had not (60.9%; n=39) been formally educated about concussions, Mann Whitney U tests were conducted. Differences in composite mean scores for faculty members with and without previous formal concussion education were identified for concussion knowledge ($U=180.50$, $p=.001$, $r=0.43$), confidence in their knowledge ($U=101.00$, $p=.001$, $r=0.44$), and the importance of appropriate managed care ($U=260.50$, $p=.001$, $r=0.40$), than those who did not have previous formal concussion education (Table 8).

4.3.2 Experienced a Concussed Student-Athlete in the Classroom

Of faculty who identified that institutions should have concussion management policies, slightly over half revealed that they encountered a concussed SA in their classroom (52.9%; 27/51) while 46.9% (23/49) who felt the same regarding a CMT encountered a concussed SA in their classroom. However, only one faculty member who acknowledged they encountered a concussed SA in their classroom correctly recognized that the institution has a CMT, while no one recognized that the institution has a concussion management policy (Second column in Table 7 matrix). Additionally, composite mean scores differed between faculty who did (48.4%; n=31) and did not experience (51.6%; n=33) a concussed SA in their classroom for concussion knowledge ($U=342.50$, $p=.023$, $r=0.08$) and importance of appropriate care ($U=344.00$, $p=.021$, $r=0.08$), but not confidence in their knowledge ($U=376.00$, $p=.068$, $r=0.05$) (Table 8). However, specific differences were identified with faculty member's confidence in their knowledge regarding

academic accommodations ($U=341.50$, $p=.017$, $r=0.09$) and RTL criteria ($U=363.50$, $p=.033$, $r=0.07$).

4.3.3 Personal and Family Concussion History

Only 29.4% (15/51) of faculty members who identified that institutions should have concussion management policies revealed that they personally sustained a concussion. Similarly, only 28.5% (14/49) who identified the same regarding a CMT personally sustained a concussion. However, no one who personally sustained a concussion correctly identified that the institution has a concussion management policy, while only two identified that the institution has a CMT. (third column in Table 7 matrix). Additionally, composite mean scores differed among faculty who had (31.3%; $n=20$) and had not (68.8%; $n=44$) personally sustained a concussion for concussion knowledge ($U=206.00$, $p=.001$, $r=0.18$) and confidence in their knowledge ($U=225.00$, $p=.002$, $r=0.15$) but not importance of appropriate care ($U=360.00$, $p=.234$, $r=0.02$) (Table 8).

Just under half of faculty (47.1%; 24/51) who identified that institutions should have concussion management policies revealed that they ever had an immediate concussed family member. Similarly, only 42.8% (21/49) who identified the same regarding a CMT had a concussed family member. However, only one individual who had an immediate family member sustain a concussion correctly identified that the institution has a concussion management policy, while only two identified that the institution has a CMT. (fourth column in Table 7 matrix). Likewise, composite mean scores differed among faculty who had (43.7%; 28/64) and had not (56.3%; 36/64) had a concussed immediate family member for concussion knowledge ($U=322.00$, $p=.013$, $r=0.10$) and confidence in their knowledge ($U=315.00$, $p=.010$, $r=0.10$) but not importance of appropriate care ($U=407.00$, $p=.178$, $r=0.03$) (Table 8).

Table 8 Faculty Concussion Knowledge, Confidence, and Importance of Managed Care and the Relationship with Faculty Previous Experiences Matrix

		Knowledge		Confidence		Importance	
n		Mean	SD	Mean	SD	Mean	SD
<i>Concussion education</i>							
Yes	25	3.03*	0.68	3.04*	0.72	3.83*	0.21
No	39	1.94	0.48	1.84	0.53	3.53	0.41
<i>Concussed SA in classroom</i>							
Yes	31	2.61*	0.91	2.53	1.01	3.75*	0.34
No	33	2.15	0.54	2.10	0.60	3.56	0.38
<i>Personal concussion</i>							
Yes	20	2.90*	0.79	2.85*	0.89	3.74	0.30
No	44	2.13	0.64	2.06	0.71	3.61	0.40
<i>Concussed family member</i>							
Yes	28	2.68*	0.84	2.65*	0.94	3.74	0.28
No	36	2.13	0.64	2.04	0.66	3.58	0.42

1 = Not at all; 2 = Minimally; 3 = Moderately; 4 = Extremely

* p < 0.05

5.0 Discussion

Although there has been emerging research into the knowledge of concussions in K-12 educators, to the author's awareness, this is the first study to investigate higher education faculty's knowledge and confidence regarding concussions, their awareness and perceptions of concussion management strategies for concussed student-athletes (SAs) in the classroom, and their previous concussion experiences. Overall, most faculty felt minimally or moderately knowledgeable and confident regarding concussion prevention and recognition of physical and cognitive signs and symptoms. Specifically, faculty were able to appropriately identify that a concussion directly affects the brain as well as recognize that the injury can present with a wide range of clinical signs and symptoms that must be immediately and appropriately managed to deter detrimental physical and cognitive consequences. However, only half of faculty members surveyed acknowledged that a headache can potentially be the sole identifiable sign or symptom of a concussion even though they expressed that it is moderately to extremely serious when a headache is experienced after a blow to the head. It has been stated that a headache is the most commonly reported symptom by concussed individuals and tends to last longer than any other concussion symptom (Harmon et al., 2013; Halstead et al. 2013). Therefore, the misinterpretation that the disclosure of only a headache may not necessarily constitute a concussive injury is in direct contrast to faculty members' perceived seriousness of the symptom and is a gross misconception that needs to be addressed and corrected.

Even though faculty portrayed strength in acknowledging that a concussion injury can result in cognitive consequences that may manifest as emotional disturbances, alterations in social life, or trouble in school, over half of faculty surveyed identified being minimally to not

knowledgeable or confident in the areas of overall treatment and management of concussions, academic accommodations, or return-to-learn (RTL) strategies. This observation may be attributed to the apparent disparity between the rankings of importance of appropriate concussion management practices. Faculty regarded the restriction of physical activity as more important than the restriction of cognitive tasks with 100% ranking the limiting of physical activity as either moderately to extremely important compared to only 80% for the limiting of cognitive activity. Even though this is considered a high proportion, 20% of surveyed faculty members felt that the limiting of cognitive activity to reduce exacerbation of concussion signs and symptoms was minimally important or not important at all. These results reveal that faculty may not be comfortable in the knowledge they possess regarding cognitive management strategies, thus decreasing their perception of importance of limiting cognitive activity. This observation will collectively lead to faculty feeling uncomfortable in the management of such ailments within a classroom setting.

Additionally, a quarter of faculty members minimized the importance of notifying academic personnel about a concussed SA and over 90% were unaware that a concussion management policy or a concussion management team (CMT) existed at their institution. This identifies a gap in faculty perceived roles and the strategies within concussion management practices to manage a SA's overall academic concussion management and failure by institutions to educate faculty regarding available concussion management resources. It can be concluded that although faculty acknowledge that a concussion may affect a SA's cognitive well-being and may infiltrate their academic coursework, they do not sense the importance of their role in the overall concussion management process nor are they aware of resources available and intended to guide and direct their academic practice. These results are in sharp contrast with the awareness of

academic accommodations and RTL measures by educators in K-12 settings. Graff et al. (2016) and Kasamatsu et al. (2017) both concluded that K-12 teachers were moderately familiar with academic accommodations and concussion management strategies. It is likely that this heightened awareness equates to an increased perception of importance regarding the need for cognitive accommodations for concussed student populations. Such an increase in the mindfulness of academic accommodations and RTL criteria in K-12 educators is likely attributed to in-service programming to ensure familiarity with federal and state mandated delivery of accommodations through 504 plans and IEPs for students diagnosed with disabilities.

Approximately 39.1% of faculty in this study were formally educated about concussion, which is slightly lower than the 51.4%, 44%, and 42% of K-12 teachers who received formal concussion education reported by Graff and Caperell (2016), Kasamatsu et al. (2017), and Dreer et al. (2017), respectively. However, faculty who possessed formal concussion education perceived themselves as more knowledgeable, expressed more confidence in their knowledge, and placed a higher importance on appropriate managed care of a concussion than faculty who did not. Given these results, formal education for this population is necessary as well as added opportunities for comprehension of this topic through concussion education opportunities. Graff and Caperell (2016) previously identified that online education programs increased concussion knowledge in K-12 teachers. There are significant advantages to the online environment as an ideal context for professional development within a broader context of a higher educational setting. It permits access to focused programming at any time during the day, allows the learner to control the pace of their learning, allows for continued access to resources, and promotes reflection on one's own learning and teaching practices in a location that is convenient to the learner. Therefore, this educational approach may also benefit faculty in higher education to increase overall

knowledge regarding concussions, enhance the overall awareness of institutional concussion policies, and thus, the self-confidence needed to deploy appropriate academic management strategies within the classroom.

In addition to previous educational opportunities, a faculty member's personal experiences with concussive injuries also influence overall knowledge and confidence regarding concussions and their management strategies. Nearly equal proportions of faculty in this study reported they had or had not personally encountered a concussed SA who experienced a decline in academic performance after a concussion. Those who had encountered a concussed SA had increased concussion knowledge, perceived themselves more confident in their knowledge regarding, specifically, academic accommodations and RTL strategies, and placed a higher importance on appropriate managed care than those who did not. These results are plausible and emulated outcomes reported by Kasamatsu et al (2017) when investigating K-12 educators. In theory, a faculty member who has interacted with a concussed SA in the classroom and witnessed a decline in their academic performance should appreciate the importance of proper concussion management as well as possess greater knowledge and confidence in their ability to arrange and implement academic accommodations than their counterparts.

Likewise, faculty who have either personally sustained a concussion or had an immediate family member afflicted with the injury portrayed an increase in perceived knowledge as well as confidence in that knowledge than those who did not. It is conceivable that a faculty member's personal observation of a concussed SA, a concussed family member, or their own experiences with concussive signs and symptoms evoked more empathy and/or investigation into supplemental educational resources regarding concussion management and support strategies to increase their personal knowledge and/or to deploy in their own lives as well as within their classrooms.

However, there was no identifiable difference in the rating of importance of appropriate concussion care between either groups. This may be attributed to a lack of perceived concussion severity and/or symptomology that yielded no dysfunction among these groups that ultimately skewed their perception of importance in appropriate managed care.

However, regardless of the nature of previous experiences by faculty, it does not appear to affect their disposition or awareness concerning concussion management policies or a CMT to help guide proper physical and cognitive management of concussed SAs. Although more than three-quarters of respondents agreed that institutions of higher education should have both an established concussion management policy and CMT, an overwhelming majority did not know if their institution had one or the other. Additionally, only one faculty member who identified as interacting with a concussed SA who portrayed a decrease in academic performance in their classroom correctly acknowledged that the institution has a CMT. Even more concerning, no one correctly recognized that the institution has a concussion management policy. Interestingly, under 30% of faculty who believed that an institution of higher education should have an established concussion management policy or CMT have ever personally experienced a concussion. Again, this may be due to a skewed opinion of the need for such policies based off a lack of self-perceived symptom severity or an absence of association between the signs and symptoms they experienced and the concussion injury.

This identified disparity is alarming and of utmost concern revealing that even though respondents portrayed that concussion management strategies are needed, they are not aware of approved governing and supportive practices at their institution. These findings are less than what previous authors acknowledged in K-12 educators. In particular, Graff and Caperell (2016) identified that 97% of teachers were familiar with academic classroom interventions at their

school. Likewise, Kasamatsu et al. (2017) reported that 27% of K-12 educators indicated that their school had an established academic team and 64% believed there should be an academic team with most stating moderate familiarity with academic accommodations and extreme familiarity with IEPs and 504 plans. This variance is likely contributed to a lack of educational programming regarding the topic of concussion management in higher education. Again, in K-12, programming occurs for teachers to encourage familiarity with state and federal mandates ordering the deployment of 504 plans and IEPs to protect a student with a disability and ensure that a learning occurs in the least restrictive environment.

Failure to recognize the presence of appropriate strategic policies and resources, or the presence of a concussed SA in the classroom for that matter, may not all be attributed to a lack of education or oversight by faculty in higher education. Due to legal ramifications prohibiting institutions from seeking disability status, a concussed SA must seek support and disclose their disability to the appropriate institutional offices before accommodations can be rendered (Bolt, 2011). It is feasible that the identified gap in faculty awareness may be attributed to a complete omission in the disclosure of a concussive injury to appropriate institutional personnel or departments by the SA themselves. This will negate the need for obtaining academic accommodations or RTL strategies as well as never trigger necessary communication to faculty members ultimately affecting their overall awareness of concussed SA in their classrooms and thus, institutional concussion policies and strategies.

Although not a direct outcome measured in this study, there are further underlying possibilities that may contribute to the identified discrepancies between physical and cognitive management strategies that are far more distressing if true. Due to the invisible nature of concussion symptoms, often owing to covert cognitive ailments that are subjectively identified,

there is potential that a concussed SA may experience unique problems in obtaining and thus, deployment of appropriate academic and RTL concussion management strategies due to other factors. It is possible that faculty perceptions of academic decline in a concussed SA could breed from a variety of notions, particularly regarding issues of academic competency and special services, and not the obscure injury itself. Umbach and Wawrzynski (2005) stated that faculty misconceptions could impede student engagement as well as overall academic experiences and outcomes. Supporting this opinion, Engstrom et al. (1995) and Baucom et al. (2001) have previously noted that there is potential for faculty to harbor greater prejudicial attitudes and typecasts towards NCAA SAs than their non-athlete peers. Further compounding this issue, Simons et al. (2007) identified that SAs themselves feel negatively perceived by faculty. These negative views and biases can both lead to poor interactions between SAs, faculty, and other academic personnel affecting the appropriate mitigation of cognitive disablement in the classroom.

5.1 Limitations

A limitation of this study was its small sample size, as this limited the generalizability of the quantitative findings to only those participants who voluntarily completed the online FAC-CON survey. Moreover, the results of this study were only reflective of one institution of higher learning; an NCAA Division III private, four-year institution located in southwestern Pennsylvania. This study did not include any other institutions representative of other regions of the state or country, institutional category (for-profit, non-private, private, or public), enrollment size, or other collegiate athletic associations such as the National Junior College Athletic Association (NJCAA) or the National Association of Intercollegiate Athletics (NAIA) where

differences in concussion management governance may exist. Therefore, it cannot be determined if similar results would hold true and may not be a representative sample of college faculty at other institutions of higher education.

Similarly, the response rate for this study was another limitation. A total of 154 faculty members at the research site were contacted. However, the total sample size that attempted the survey for this study was rather small ($n = 70$). Out of that total, 67 participants completed the survey in its entirety for a completion rate of 43.5%. Increasing the sample size and gaining greater faculty participation would not only increase the power of the study results but also attribute to the diversity of the participants capturing a better representation of faculty found within most institutions. In particular, employment status (full-time/adjunct) or the department that a faculty member taught within were not examined. The author speculates that these two unaccounted demographics may yield advanced concussion knowledge and awareness of management strategies due to familiarity with the subject matter or increased communication and exposure to institutional policy and resources.

Lastly, the survey instrument used in this study was a limitation. Since there was no current instrument available to investigate the study population, the FAC-CON survey was created by gathering questions from existing instruments and made applicable to the current study population. Even though content validity was demonstrated prior to dissemination via a review panel of three content experts who appraised the survey, overall validity and reliability of the survey was not established. Additionally, participant comprehension of particular survey questions may not have yielded the data they were intended to acquire. To account for this limitation, a more in-depth and extensive analysis of question content and formatting would have been useful at the onset of this

study in an effort to yield a more illustrative snapshot of the sample's knowledge, confidence, and perceptions regarding concussions and concussion management strategies.

5.2 Implications for Future Inquiry

Although this study examined faculty perceptions at a small, private NCAA Division III four-year institution, future inquiry will consider how institutional size, resources, and departmental affiliation can increase the generalizability of the study. The present study found that faculty possessed moderate concussion knowledge and adequate confidence in their knowledge, but minimal knowledge and inadequate perceptions of concussion management policies and the CMT regardless of previous experiences with concussions or concussed SAs within their institution. However, the present study does not establish whether such findings are comparable to larger institutions where ample funding and resources are more inclined to be available nor does it account for faculty department affiliation or faculty employment status of which, independently or collectively, may amplify the study results. Therefore, replication of the current study at multiple sites from various athletically affiliated institutions within a particular conference, division, or regional demographic, while enhancing the capturing of departmental and employment status information, is critical. These efforts will assist in identifying potential associations among faculty responses yielding an improved representation of the study population and will provide further insight into the data. Nevertheless, this volunteer sample permitted an exploration of the knowledge and perceptions of concussions and their management in a faculty population for which research is lacking.

Further inquiry will also evaluate how faculty members and related academic personnel approach professional development at the post-secondary level. Specifically, inquiry into the feasibility and effectiveness of different faculty development initiatives to increase knowledge and awareness of how concussions can affect concussed student-learning outcomes, their impact on academia, and student-centered concussion management strategies. Given the lack of existing research regarding the causal relations among faculty current beliefs, knowledge, and confidence in this area, it is essential that implemented concussion education for faculty include a more comprehensive view aimed towards professional growth and development in the area of concussion management policies and CMTs. Additionally, initiatives will also focus on facilitating advancement not only in beliefs about teaching and learning, but also in faculty member's abilities in curriculum design, instructional practices, and aligning content to allow for the appropriate pedagogy to accommodate a concussed SA.

Additional investigations will also focus on the technical aspects of the communication process that is currently utilized when a disability for a SA arises. Currently, communication is accomplished through a pre-defined channel suggested by the institution where information is funneled from referring campus personnel to overseeing institutional departments where the referral is analyzed and plans of actions are formulated. Strategies are then disseminated to faculty members and staff for deployment. Therefore, it is necessary to understand to whom and how information pertaining to concussed SA is being presently communicated and analyzed by all involved parties to ensure appropriate actions are taken in the classroom. Moreover, investigation into how faculty reciprocate communication and what prompts that communication back to the Office of Disability and members of the CMT will ensue to gain further understanding of currently established communicative tools and processes. By doing so, a concerted effort to foster an

effective culture of communication among members of the CMT, streamline decision making regarding a concussed SA, and help identify the “why” behind the established institutional concussion management policies will transpire.

Inquiry into a SA’s own perceptions of concussion management will also be investigated. This will help to identify any issues, such as unforeseen procedural missteps, which may infringe and have a profound effect on the ability to seek and obtain academic accommodations, or even worse, disclose the injury all together. Additionally, this evaluation will also identify whether SAs feel knowledgeable of available resources, are comfortable in disclosing a concussive disability without fear of stereotyping or dismissal of cognitive struggles by academic personnel regardless of necessity, and whether available resources are adequate to meet their cognitive recovery needs. By altering the investigative lens, data will be compared to the current study to guarantee appropriate concussion management strategies appropriately materialize for those that such tactics are intended to serve.

Additionally, the vast majority of concussion rehabilitation research examines management of the SA, and the present study followed the same trend. Obviously, SAs are not the only individuals that sustain concussions in higher education and suffer from their potentially debilitating cognitive deficits. Therefore, the data considered in this study do not generalize to the full range of students enrolled in institutions of higher learning, and may be more specific to only NCAA Division III collegiate SAs or portions of those athletes. Non-SAs are just as vulnerable. In fact, the potential for the mismanagement of cognitive dysfunction because of concussive injuries may be far more pervasive in this population than compared to that of a SA. Most, if not all, institutions of higher education that sponsor athletic programs have some form of a sports medicine program to oversee the health and well-being of its SAs. Due to such medical oversight,

it is conceivable that SAs are provided with easily accessible medical services to properly identify, treat, and manage concussive injuries than their non-athlete peers. Furthermore, SAs receive easily accessible academic support, such as advanced tutoring and access to SA-focused academic advisors in addition to traditional academic advisors. Often, the general student body is not afforded these services. Therefore, in lieu of accessibility and oversight, non-SAs may opt to forego appropriate medical care or may be completely unaware of campus resources that can help assure the provision of their full rights during cognitive recovery from a concussion. Thus, further investigation will occur to ensure that there is proper knowledge and awareness of available entry points into established institutional support systems for all concussed students regardless of institutional extra-curricular activity involvement.

Lastly, further vetting of the FAC-CON survey as an appropriate investigative tool in this area of research will occur. Survey questions will be evaluated and validated to ensure that every question is necessary and that questions are deployed in an efficient and effective manner to elicit the intended results. For example, asking direct questions independently of others to avoid vague or poorly worded questions that may confuse or make the data less useful. Additionally, the current survey deploys multiple grids for responses that may have led to the incorrect completion of the grid. Similarly, the deletion of “I don’t know” as a response option will occur to yield true binary responses and ease overall analysis. Furthermore, the incorporation of an interview after participants complete the survey is needed to allow for both clarification and expansion of participant survey answers to assist in the recording of participants’ true feelings regarding subject matter.

5.3 Implications for Practice

There are several important implications drawn from this study that will facilitate changes in policy and practice for faculty, institutional administrators, medical staff, and all students at the institution. With faculty possessing singular power and influence in executing prescribed cognitive accommodations and with new facts regarding concussions and concussion management constantly emerging, it is essential for these professionals to increase and maintain their knowledge regarding concussions and its associated effects on academia. Additionally, to ensure all stakeholders involved in the CMT are proficient in the appropriate deployment of cognitive concussion management strategies, as well as the ability to recognize a struggling concussed SA and intervene as necessary, development and deployment of educational opportunities will occur. Currently, there are various platforms at the institution to facilitate such opportunities. For example, focused education can occur through currently established institutional faculty development programming during convocation week. These academic seminars and workshops are opportunities afforded to all academic personnel prior to the start of the academic year for professional development and would serve as an optimal conduit for education in this area. In addition, educational programming formulated and offered as a “Third Thursday” lecture series can also be an option. These informational sessions are sponsored by the institution’s Human Resource Office and offered to all institutional employees in an effort to keep them abreast of important issues and special topics. Moreover, numerous faculty development events sponsored by the institution’s Center for Teaching Excellence (CTE) can also be utilized as a means to provide education. Throughout the academic year, the CTE provides faculty of all ranks with pedagogical support necessary to cultivate educational skills and scholarly practice through sponsored series such as new faculty orientation programming as well as teaching and scholarship

discussion groups. Any one of these face-to-face platforms will allow for the development of an infrastructure to foster collaboration concerning concussion management strategies and their implementation process, reinforcement of communication channels, augmentation of personal concussion education endeavors, and affirmation of institutionally approved concussion management procedures for all stakeholders.

Second, the findings from this study reveal a need to improve institutional systems to facilitate the identification of SAs potentially afflicted by concussions as well as the dissemination of information to all personnel involved. It is reasonable to assume that at the forefront of any perceived indifference towards appropriate concussion management strategies is an absence of or breakdown in communication. Thus, to permit a collaborative process to navigate any cognitive disability resulting from a concussion, informative and efficient communication is essential between all members of a CMT. To ensure cognitive management is effective, it is suggested and prudent that institutions strategically identify an academic point-person within the CMT. This point-person is charged with streamlining communication among all stakeholders involved in the SA's academic care, limit over- and under-accommodation of the SA's needs, and facilitate their full transition to cognitive activity. Although the institution in this study has a standing CMT that incorporates not only faculty members but also the Office of Disability Services, professionals from the institution's sports medicine department, athletic department administrators, NCAA faculty athletic representatives, and the concussed SA, a strategic academic point-person, or case manager, is not appointed. In regards to cognitive recovery from a concussion, it is logical that a faculty member or other academic administrator that is already interwoven in academia play this important role within the CMT. Through their unique position, these professionals will bolster lines of communication among all members of the CMT in an effort to guarantee a multifactorial

and holistic approach to cognitive concussion management. Therefore, awareness and broad discussions of the creation of this essential paradigm with academic professionals and institutional leaders will transpire.

Additionally, this study suggests alterations to current institutional practices to meet NCAA regulations. Currently, NCAA guidelines require the institution to provide NCAA-approved concussion fact sheets and educational programming annually to SAs, coaches, team physicians, sports medicine staff, and athletics directors. These individuals are required to acknowledge that all parties have read and understand concussion facts and their institution's concussion management policy prior to the start of each academic year. It is reasonable to assume that this standard encompasses and extends to academic personnel, including faculty, as well. Currently this practice is not mandated by the NCAA and, therefore, does not occur at the institution. However, holding academic personnel to the same standard will embed in them the critical role they play in the larger context of concussion management. This will positively translate into increased familiarity with concussion management strategies as well as their implementation at the institution. This endeavor can be facilitated by the institution's sports medicine staff and incorporated into yearly educational sessions for academic personnel.

Additionally, academic personnel at the institution need to be acutely aware that concussion management has legal implications and the threat of lawsuits are increasing. Not only do all personnel involved with the diagnosis and management of concussions share a professional responsibility to provide appropriate care for a concussed SA, they also share a legal duty. This legal duty can extend to academic personnel as well. Their responsibility is to deploy effective cognitive concussion management strategies in a systematic manner using objective assessments to ensure the implementation of proven evidence-based techniques in an effort to ensure optimal

academic reintegration. Therefore, consultation with the institution's legal counsel will occur to confirm not only that the institution's concussion management policies and practices are legally sound, but to instill in faculty the notion of a legal basis to fulfill appointed concussion management obligations. This concerted effort will aid in the avoidance of potential liabilities and minimize the risk of litigation.

Lastly, concussions are costly to institutions. Therefore, the importance of ensuring all stakeholders are aware and adhere to institutional concussion management policies is vitally important to mitigate the injury and overall expenditures. As injury claims and healthcare costs continue to rise and risk avoidance remains the hallmark for athletic insurers, expenses will continue to be passed on to consumers in the form of higher insurance premiums or reductions in coverage. One way the institution in this study has lessened the financial burden of increasing insurance premiums, has been to share its concussion management plan with partnered insurance carriers to elicit substantial discounts on premiums. Historically, the institution's insurance carrier requires the completion and subsequent submission of a worksheet/checklist regarding the concussion management policy where questions are posed regarding proof of physical and cognitive concussion management strategies and education for all stakeholders occurs. However, who completes the documentation or whether the information is correctly portrayed or sufficiently provided is unknown. Thus, conversations with institutional insurance brokers will take place to ensure proper completion of such documentation. This further bolsters the need for faculty to be acutely aware of concussion management strategies and policies to ensure the insurance carrier's requirements are met and that the fruits of such labor are fully attained.

5.4 Summary

Overall, faculty in this study felt knowledgeable and confident regarding concussion prevention and recognition of physical and cognitive signs and symptoms. Even though faculty in this study portrayed strength in acknowledging that a concussion injury can affect a SA's cognitive well-being and needs to be appropriately managed, over half identified as being minimally to not knowledgeable or confident in the areas of overall treatment and management of concussions, academic accommodations, or return-to-learn (RTL) strategies. Therefore, faculty may not sense the importance of their role in the overall concussion management process or are unaware of resources available to guide and direct their academic practice for concussed SAs. Furthermore, previous concussion experiences appear to affect faculty overall knowledge, confidence in their knowledge, and their perception of importance of appropriate managed care. However, regardless of the nature of previous experiences by faculty, it does not appear to affect their disposition or awareness concerning concussion management policies or a CMT to help guide proper physical and cognitive management of concussed SAs. Despite this conclusion, the collective data from this study illustrate the need for faculty education regarding SA concussions, preferences in concussion education methods, individualized roles within the CMT, institutional classroom management strategies, and the consequences that may result due to the mishandling of this injury. The more equipped this population is in terms of cognitive issues resulting from a concussion, the more likely concussion recovery and academic performance will be maximized. Additionally, the identification of an academic point-person to monitor academic progression and streamline the institutionally approved communication process is necessary for proper implementation and modification of academic adjustments, as well as to improve collaboration between faculty and the CMT.

Appendix A FAC-CON Survey

Section 1: Faculty level of knowledge and confidence regarding concussions and associated academic accommodations for student-athletes.

Instructions: The following section will consist of questions to assess your knowledge of concussions and its effects on physical and cognitive functions. Please answer each question honestly and to the best of your ability.

Q1: What part of the body is hurt/injured with a concussion?

- Skull
- Face
- Brain
- Neck
- I don't know what body part is hurt with a concussion

Q2: How serious do you feel it is when a student-athlete experiences a headache and dizziness following a blow to the head or body?

- Not serious at all
- Minimally serious
- Moderately serious
- Extremely serious

Q3: Please select the consequence(s) listed below that you think can occur to a student-athlete returning to physical activity too soon after a concussion. (Select all that apply)

- No bad things can ever happen
- The individual may be more likely to sustain another concussion
- Skin rash
- Brain damage
- Trouble in school
- Emotional disturbances
- Changes in social life
- The individual may be more likely to prolong their recovery from a concussion

Q4: Please select the consequence(s) listed below that you think can occur to a student-athlete who suffers multiple concussions? (Select all that apply)

- No bad things can ever happen
 - The individual may be more likely to sustain another concussion
 - Skin rash
 - Brain damage
 - Trouble in school
 - Emotional disturbances
 - Changes in social life
 - The individual may be more likely to prolong their recovery from a concussion
-

Q5: Please respond to each statement to the best of your ability:

	True	False	I don't know
A concussion only occurs when the student-athlete loses consciousness (blacks out).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A concussion requires immediate removal from physical activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A student-athlete who reports they are experiencing a headache will likely demonstrate other signs and symptoms of concussion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A student-athlete who displays any sign or symptom of concussion should not be allowed to return to play until symptoms resolve.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6 Please respond to each statement to the best of your ability:

	Not important at all	Minimally important	Moderately important	Extremely important
How important is it for a student-athlete to not participate in physical activity (e.g. fitness class, practice, or game) when experiencing signs and symptoms of a concussion?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How important is it for a student-athlete to limit cognitive activities (e.g. coursework, reading, TV, video games) immediately following a concussion?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How important is it for a student-athlete to report possible concussion symptoms to a medical professional (e.g. physician, athletic trainer, school nurse)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How important is it for a student-athlete to report possible concussion symptoms to academic personnel (academic advisor, faculty member, faculty athletic representative)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How important is it as a faculty member, to know the steps to follow if a student-athlete has a concussion?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 How knowledgeable are you of each of the following:

	Not knowledgeable at all	Minimally knowledgeable	Moderately knowledgeable	Extremely knowledgeable
Prevention of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical signs and symptoms of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cognitive signs and symptoms of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Treatment and management of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic accommodations following a concussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Return-to-learn criteria following a concussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8 How confident are you in your own knowledge of each of the following:

	Not confident at all	Minimally confident	Moderately confident	Extremely confident
Prevention of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical signs and symptoms of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cognitive signs and symptoms of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Treatment and management of concussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic accommodations following a concussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Return-to-learn criteria following a concussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Section 1:

Start of Block: Section II: Faculty members' level of awareness and perception of concussion management strategies

Instructions: The following section will ask about your perceptions of and experiences with academic accommodations and the concussion management team for student-athletes following a concussion. Please answer each question honestly and to the best of your ability.

Q1 Have you personally encountered a situation where a concussed student-athlete experienced a decrease in school and/or academic performance as a direct result of concussion symptoms?

- Yes
- No

Q2 Do you believe an institution of higher education should have a written concussion policy in place?

- Yes
- No
- I don't know

Q3 Does the institution for which you primarily teach have a written concussion policy in place?

- Yes
- No
- I don't know

Q4 Do you believe an institution of higher education should have an established concussion management team to support the academic needs for concussed student-athletes?

- Yes
- No
- I don't know

Q5 Does the institution for which you primarily teach have an established concussion management team to support the academic needs for concussed student-athletes?

- Yes
- No
- I don't know

Display This Question:

If Does the institution for which you primarily teach have an established concussion management team... = Yes

Q5a Who is involved in the concussion management team for concussed student-athletes? (Select all that apply)

- Athletic Director
- Student Health Center

- Provost or Academic Dean
- Faculty Athletic Representative
- Directing or Team Physician
- Student-athlete's Family or Referring Physician
- Athletic Trainer
- Office of Disability Services
- School Counselor
- Academic Counselor
- Faculty Member
- Parent
- I don't know who is involved in the concussion management team
- Other _____

Instructions: The following section will consist of questions about your communication, if any, with an Athletic Trainer, the Student Health Center, and the Office of Disability Services at your institution. Please answer each question honestly and to the best of your ability. Questions about "the institution" refer to the institution of higher education where you are employed as a faculty member. In addition, an "Athletic Trainer" is defined as a health care professional who collaborates with physicians to optimize any activity and participation of patients and clients.

Q6 In you role as a faculty member, have you ever communicated with the athletic trainer at your institution?

- Yes
- No

Display This Question:

*If In you role as a faculty member, have you ever communicated with the athletic trainer at your ins...
= Yes*

Q6a How did you primarily communicate with the athletic trainer at your institution? (Select all that apply)

- In person
- Phone
- Email
- Progress note
- Text (SMS) message
- Video conferencing (e.g. skype, Google Hangout)

Other _____

None of the above

Display This Question:

*If In your role as a faculty member, have you ever communicated with the athletic trainer at your ins...
= Yes*

Q6b On average during the course of the academic year, how often do you communicate with the athletic trainer at the institution where you primarily teach?

- Daily
- 2-3 times a week
- Weekly
- Bi-weekly
- Monthly
- As needed
- Other _____

Display This Question:

*If In your role as a faculty member, have you ever communicated with the athletic trainer at your ins...
= Yes*

Q6c How often is the care of concussed student-athletes at the institution where you primarily teach discussed between you and the athletic trainer

- Always (100%)
- Almost always (76-99%)
- Often (51-75%)
- Sometimes (26-50%)
- Rarely (1-25%)
- Never (0%)

Q7 In your role as a faculty member, have you ever communicated with the Student Health Center at the institution?

- Yes
- No

Display This Question:

*If In your role as a faculty member, have you ever communicated with the Student Health Center at
th... = Yes*

Q7a How do you primarily communicate with the Student Health Center (Select all that apply)

- In person
- Phone

- Email
 - Progress note
 - Text (SMS) message
 - Video conferencing (e.g. skype, Google Hangout)
 - Other _____
 - None of the above
-

Display This Question:

If In your role as a faculty member, have you ever communicated with the Student Health Center at th... = Yes

Q7b On average during the course of the academic year, how often do you communicate with the Student Health Center at the institution where you primarily teach?

- Daily
- 2-3 times a week
- Weekly
- Bi-weekly
- Monthly
- As needed
- Other _____

Display This Question:

If In your role as a faculty member, have you ever communicated with the Student Health Center at th... = Yes

Q7c How often is the care of concussed student-athletes at the school where you primarily teach discussed between you and the Student Health Center?

- Always (100%)
- Almost always (76-99%)
- Often (51-75%)
- Sometimes (26-50%)
- Rarely (1-25%)
- Never (0%)

Q8 In your role as a faculty member, have you ever communicated with the Office of Disability Services at the institution?

- Yes
- No

Display This Question:

If In your role as a faculty member, have you ever communicated with the Office of Disability Services? ...
= Yes

Q8a How do primarily communicate with Office of Disability Services (Select all that apply)

- In person
- Phone
- Email
- Progress note
- Text (SMS) message
- Video conferencing (e.g. skype, Google Hangout)
- Other _____
- None of the above

Display This Question:

If In your role as a faculty member, have you ever communicated with the Office of Disability Services? ...
= Yes

Q8b On average during the course of the academic year, how often do you communicate with the Office of Disability Services at the institution where you primarily teach?

- Daily
- 2-3 times a week
- Weekly
- Bi-weekly
- Monthly
- As needed
- Other _____

Display This Question:

If In your role as a faculty member, have you ever communicated with the Office of Disability Services? ...
= Yes

Q8c How often is the care of concussed student-athletes at the school where you primarily teach discussed between you and the Office of Disability Services?

- Always (100%)
- Almost always (76-99%)
- Often (51-75%)
- Sometimes (26-50%)
- Rarely (1-25%)

- Never (0%)
 - End of Block: Section II: level and knowledge and collaboration with CMT
-

Start of Block: Section III: Demographics

Q1 Have you ever suffered a concussion?

- Yes
- No

Q2 Has an immediate family member ever suffered a concussion?

- Yes
- No

Q3 Have you ever been formally educated about concussions?

- Yes
- No

Display This Question:

If Have you ever been formally educated about concussions? = Yes

Q3a What was the source/program for your concussion education? (Select all that apply)

- Seminar
- Lecture/Speaker
- Self-study course
- Webinar
- Formal class
- Other _____

Q4 What is your employment status at the institution where you primarily teach?

- Full-time
- Adjunct/Part-time

Q5 What demographic of students do you primarily teach?

- Exclusively undergraduate level
- Exclusively graduate level
- Both undergraduate and graduate level

Q6 How many years have you been teaching in higher education?

- ≤ 2 years
- 3-5 years
- 6-10 years

- 11-15 years
- 16-20 years
- ≥ 21 years

Q7 What is your gender?

- Male
 - Female
-

End of Block: Section V: Demographics

End of Survey

End of Survey Message with Link

We thank you for your time spent taking this survey.

Your response has been recorded.

If you would like to be entered into a chance to win one of three \$25 Amazon gift cards, please click on the following link to register.

https://pitt.co1.qualtrics.com/jfe/form/SV_9XMQtoQA6GFglbb

Appendix B Recruitment Email

Dear WU Colleague,

I am reaching out one final time for your participation in a survey to gain a greater understanding of faculty knowledge, perceptions, and management practices with concussed student-athletes in the classroom setting. This research project is in partial fulfillment of my doctoral studies in the Health and Physical Activity program at the University of Pittsburgh.

The purpose of this study is to explore your knowledge of concussions and management practices regarding the deployment of academic accommodations for collegiate student-athletes with concussions. Based on your expertise and role within your University, I am highly interested in your input regarding this topic and would appreciate your participation in this study. It is my hope that this research will contribute to the existing body of literature to enhance the awareness and cognitive care of concussed student-athletes in higher education.

Participation in this survey is strictly voluntary. Survey responses will be collected via a secure online platform called Qualtrics and will require 10 minutes of your time. Although you are not required to answer each question, I ask that you attempt to answer each question honestly, utilizing your extensive teaching experience. There are no direct benefits or compensation for participation in this study. However, participants who submit a completed survey in its entirety will be entered into a drawing for a chance to win one of three \$25 Amazon gift cards. There are no associated risks with participation, and you may choose to discontinue the survey at any time. The Institutional Review Board (IRB) at both the University of Pittsburgh and Waynesburg University have granted approval for this survey.

Your de-identified information will be kept strictly confidential and will not be connected to any responses you provide. The data collected will only be available to me, as the primary investigator, as well as my Advisor and Committee Chairperson, Dr. Carl Fertman, PhD. The results of this research study may be presented at scientific or professional meetings or published in scientific journals. Your individual privacy will be maintained in all published and written data resulting from this study. Should you wish to receive results from this study, or have any questions or concerns about the study, you may contact either myself (asp83@pitt.edu), Dr. Fertman (carl@pitt.edu), or the representative from Waynesburg University Dr. Heidi Fletcher (hfletche@waynesburg.edu).

Should you agree to participate in this study, by clicking the link below to access the survey, you are indicating that you have received informed consent, are participating voluntarily, and grant me permission to utilize your de-identified data as part of any study reports.

Thank you in advance for your consideration and willingness to contribute to this study.

Respectfully,

Andrew S. Palko

Follow this link to the Survey:
\${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
\${l://SurveyURL}

Follow the link to opt out of future emails:
\${l://OptOutLink?d=Click here to unsubscribe}

Appendix C Follow-up Email

Dear WU Colleague,

Recently you were sent a request to participate in an important survey to gain a greater understanding of faculty knowledge, perceptions, and management practices with concussed student-athletes in the classroom setting. This research project is in partial fulfillment of my doctoral studies in the Health and Physical Activity program at the University of Pittsburgh.

The purpose of this study is to explore your knowledge of concussions and management practices regarding the deployment of academic accommodations for collegiate student-athletes with concussions. Based on your expertise and role at Waynesburg University, I am highly interested in your input regarding this topic and would appreciate your participation in this study.

Participation in this survey is strictly voluntary and will require 10 minutes of your time. Although you are not required to answer each question, I ask that you attempt to answer each question honestly, utilizing your extensive teaching experience.

There are no direct benefits or compensation for participation in this study. However, participants who submit a completed survey in its entirety will be entered into a drawing for a chance to win one of three \$25 Amazon gift cards. There are no associated risks with participation, and you may choose to discontinue the survey at any time. The Institutional Review Board (IRB) at both the University of Pittsburgh and Waynesburg University have granted approval for this survey.

Your de-identified information will be kept strictly confidential and will not be connected to any responses you provide. The data collected will only be available to me, as the primary investigator, as well as my Advisor and Committee Chairperson, Dr. Carl Fertman, PhD. The results of this research study may be presented at scientific or professional meetings or published in scientific journals. Your individual privacy will be maintained in all published and written data resulting from this study. Should you wish to receive results from this study, or have any questions or concerns about the study, you may contact either myself (asp83@pitt.edu), Dr. Fertman (carl@pitt.edu), or the representative from Waynesburg University Dr. Heidi Fletcher (hfletche@waynesburg.edu).

Should you agree to participate in this study, by clicking the link below to access the survey, you are indicating that you have received informed consent, are participating voluntarily, and grant me permission to utilize your de-identified data as part of any study reports.

I thank you in advance for your consideration and willingness to participate in this important research.

Respectfully,

Andrew S. Palko

Follow this link to the Survey:
\${!://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
\${!://SurveyURL}

Follow the link to opt out of future emails:
\${!://OptOutLink?d=Click here to unsubscribe}

Appendix D Amazon Gift Cards Survey

Start of Block:

Q1 Please provide your contact information: (Please note, this information will only be used to enter you into the random drawing to win one of three \$25 Amazon gift cards).

First Name _____

Last Name _____

End of Block:

End of Survey

End of Amazon Survey Message

Again, we thank you for your time spent taking this survey.

Your information has been recorded.

Bibliography

Americans with Disabilities Act of 1990. PL 101–336. 42 U.S.C. § 12101.

Baker, J. G., Rieger, B. P., McAvoy, K., Leddy, J. J., Master, C. L., Lana, S. J., & Willer, B. S. (2014). Principles for return to learn after concussion. *The International Journal of Clinical Practice*, 68(11), 1286–1288. <https://doi.org/10.1111/ijcp.12517>

Baker, K. Q., Boland, K., & Nowik, C. M. (2012). A campus survey of faculty and student perceptions of persons with disabilities. *Journal of Postsecondary Education and Disability*, 25(4), 309–329. Retrieved from <http://files.eric.ed.gov/fulltext/EJ1002143.pdf>

Baucom, C., & Lantz, C. D. (2001). Faculty attitudes toward male Division II student-athletes. *Journal of Sport Behavior Psychology Database Pg*, 24(3). Retrieved from <https://search-proquest-com.pitt.idm.oclc.org/docview/215868611/fulltextPDF/1A66177C5F2B45FBPQ/1?accountid=14709>

Bolt, S. E. (2011). Students' perceptions of accommodations in high school and college. *Career Development for Exceptional Individuals*, 34(3), 165–175. <https://doi.org/10.1177/0885728811415098>

Broglio, S. P., Cantu, R. C., Gioia, G. A., Guskiewicz, K. M., Kutcher, J., Palm, M., & McLeod, T. C. V. (2014). National Athletic Trainers' Association position statement: Management of sport concussion. *Journal of Athletic Training*, 49(2), 245–265. <https://doi.org/10.4085/1062-6050-49.1.07>

Broglio, S. P., Collins, M. W., Williams, R. M., Mucha, A., & Kontos, A. P. (2015). Current and emerging rehabilitation for concussion: A review of the evidence. *Clinical Journal of Sport Medicine*, 34(2), 213–231. <https://doi.org/10.1016/j.csm.2014.12.005>

Broglio, S. P., McCrea, M., McAllister, T., Harezlak, J., Katz, B., Hack, D., ... Dykhuizen, B. H. (2017). A national study on the effects of concussion in collegiate athletes and US Military Service Academy members: The NCAA–DoD Concussion Assessment, Research and Education (CARE) Consortium structure and methods. *Sports Medicine*, 47(7), 1437–1451. <https://doi.org/10.1007/s40279-017-0707-1>

Brown, N. J., Mannix, R. C., O'Brien, M. J., Gostine, D., Collins, M. W., & Meehan 3rd, W. P. (2014). Effect of cognitive activity level on duration of post-concussion symptoms. *Pediatrics*, 133(2), 299–304. <https://doi.org/10.1542/peds.2013-2125>

Brutlag-Hosick, M. (2016). DI to distribute revenue based on academics | NCAA.org - The Official Site of the NCAA. Retrieved June 20, 2018, from

<http://www.ncaa.org/about/resources/media-center/news/di-distribute-revenue-based-academics>

Buckley, T. A., Baugh, C. M., Meehan III, W. P., & DiFabio, M. S. (2017). Concussion management plan compliance: A study of NCAA power 5 conference schools. *The Orthopaedic Journal of Sports Medicine*, 5(4), 1–7. <https://doi.org/10.1177/2325967117702606>

Cantu, R. C. (2003). Recurrent athletic head injury: Risks and when to retire. *Clinical Journal of Sport Medicine*, 22(3), 593–603. [https://doi.org/10.1016/S0278-5919\(02\)00095-9](https://doi.org/10.1016/S0278-5919(02)00095-9)

Carney, N., Ghajar, J., Jagoda, A., Bedrick, S., Davis-O'Reilly, C., Coudray, H., ... Riggio, S. (2014). Concussion guidelines step 1: Systematic review of prevalent indicators. *Neurosurgery*, 75(3), S3–S1. <https://doi.org/10.1227/NEU.0000000000000433>

Carson, J. D., Lawrence, D. W., Kraft, S. A., Garel, A., Snow, C. L., Chatterjee Md, A., ... Fremont, P. (2014). Premature return to play and return to learn after a sport-related concussion: Physician's chart review. *Candian Family Medicine*, 60(June), e310–e315.

Centers for Disease Control and Prevention. (n.d.). Get a heads up on concussion in sports policies: Information for parents, coaches, and school and sports professionals. *National Center for Injury Prevention and Control*.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences: 2nd edition*. Hillsdale, N.J.: Lawrence Erlbaum.

Comeaux, E. (2011). A study of attitudes toward college student-athletes: Implications for faculty-athletics engagement. *The Journal of Negro Education*, 80(4), 521–532.

Daneshvar, D. H., Nowinski, C. J., McKee, A., & Cantu, R. C. (2011). The epidemiology of sport-related concussion. *Clin Sports Med*, 30(1), 1–17. <https://doi.org/10.1016/j.csm.2010.08.006>

DiFabio, M. S., Baugh, C. M., & Buckley, T. A. (2016). Division I power-five institution's compliance with NCAA concussion management plan. *Medicine & Science in Sports & Exerices*, 48(5S), 527.

Dreer, L. E., Crowley, M. T., Cash, A., O'Neill, J. A., & Cox, M. K. (2016). Examination of teacher knowledge, dissemination preferences, and classroom management of student concussions: Implications for return-to-learn protocols. *Health Promotion Practice*, 1–9. <https://doi.org/10.1177/1524839916650865>

Eastman, A., & Chang, D. G. (2015). Return to learn: A review of cognitive rest versus rehabilitation after sports concussion. *NeuroRehabilitation*, 37(2), 235–244. <https://doi.org/10.3233/NRE-151256>

Engstrom, C. M., Sedlacek, W. E., & McEwen, M. K. (1995). Faculty attitudes toward male revenue and nonrevenue student-athletes. *Journal of College Student Development*, 36(3),

217–227. Retrieved from
<https://pdfs.semanticscholar.org/cff6/32db6235b57dcc3fb5368cdf60d8bf40475c.pdf>

Gioia, G. A. (2016). Medical-school partnership in guiding return to school following mild traumatic brain injury in youth. *Journal of Child Neurology*, 31(1), 93–108.
<https://doi.org/10.1177/0883073814555604>

Graff, D. M., & Caperell, K. S. (2016). Concussion Management in the Classroom. *Journal of Child Neurology*, 31(14), 1569–1574. <https://doi.org/10.1177/0883073816666205>

Guskiewicz, K., McCrea, M., Marshall, S. W., Cantu, R. C., Randolph, C., Barr, W., ... Kelly, J. P. (2003). Cumulative effects associated with recurrent concussion in collegiate football players: The NCAA concussion study. *Journal of the American Medical Association*, 290(19), 2549–2555.

Hall, E. E., Ketcham, C. J., Crenshaw, C. R., Baker, M. H., McConnell, J. M., & Patel, K. (2015). Concussion management in collegiate student-athletes: Return-to-academics recommendations. *Clinical Journal of Sport Medicine*, 25(3), 291–296.
<https://doi.org/10.1097/jsm.0000000000000133>

Halstead, M. E., McAvoy, K., & Brown, B. E. (2016). Expanding concussion laws not necessary for return to learning after concussion. *Pediatrics*, 138(6), e3194–e3194.
<https://doi.org/10.1542/peds.2016-3194>

Halstead, M. E., McAvoy, K., Devore, C. D., Carl, R., Lee, M., & Logan, K. (2013). Returning to learning following a concussion. *American Academy of Pediatrics*, 132(5), 948–957.
<https://doi.org/10.1542/peds.2013-2867>

Harmon, K. G., Drezner, J., Gammons, M., Guskiewicz, K., Halstead, M., Herring, S., ... Roberts, W. (2013). American Medical Society for Sports Medicine position statement: Concussion in sport. *Clinical Journal of Sport Medicine*, 23(1), 1–18.

Hartman-Hall, H. M., & Haaga, D. A. F. (2002). COLLEGE STUDENTS' WILLINGNESS TO SEEK HELP FOR THEIR LEARNING DISABILITIES. *Learning Disability Quarterly*, 25, 263–274. Retrieved from
<http://journals.sagepub.com.pitt.idm.oclc.org/doi/pdf/10.2307/1511357>

Heyer, G. L., Weber, K. D., Rose, S. C., Perkins, S. Q., & Schmittauer, C. E. (2015). High school principals' resources, knowledge, and practices regarding the returning student with concussion. *The Journal of Pediatrics*, 166(3), 594–599.
<https://doi.org/10.1016/j.jpeds.2014.09.038>

Johnson, R., Kasamatsu, T., Valovich McLeod, T. C., & Welch Bacon, C. E. (2017). The impact of athletic trainer access on school counselors' perceptions of academic adjustments for concussed student-athletes in the secondary school setting. *Journal of Athletic Training*, 52(6 (Supplement)), S78.

- Kasamatsu, T., Cleary, M., Bennett, J., Howard, K., & McLeod, T. V. (2016). Examining academic support after concussion for the adolescent student-athlete: Perspectives of the athletic trainer. *Journal of Athletic Training*, 51(2), 153–161. <https://doi.org/10.4085/1062-6050-51.4.02>
- Kasamatsu, T. M., Mcleod, T. C. V., Register-Mihalik, J. K., & Welch Bacon, C. E. (2017). Teachers' beliefs and practices regarding academic support following concussion. <https://doi.org/10.1016/j.tate.2017.09.005>
- Kerr, Z. Y., Snook, E. M., Lynall, R. C., Dompier, T. P., Sales, L., Parsons, J. T., & Hainline, B. (2015). Concussion-related protocols and preparticipation assessments used for incoming student-athletes in National Collegiate Athletic Association member institutions. *Journal of Athletic Training*, 50(11), 1174–1181. <https://doi.org/10.4085/1062-6050-50.11.11>
- Kontos, A. P., Covassin, T., Elbin, R. J., & Parker, T. (2012). Depression and neurocognitive performance after concussion among male and female high school and collegiate athletes. *Archives of Physical Medicine and Rehabilitation*, 93(10), 1751–1756. <https://doi.org/10.1016/j.apmr.2012.03.032>
- Langlois, J. A., Rutland-Brown, W., & Wald, M. M. (2006). The epidemiology and impact of traumatic brain injury: A brief overview. *Journal of Head Trauma Rehabilitation*, 21(5), 375–378. [https://doi.org/00001199-200609000-00001 \[pii\]](https://doi.org/00001199-200609000-00001)
- Lawrence, J. H. (2009). Faculty perceptions of intercollegiate athletics. *New Directions for Institutional Research*, 144, 103–112. <https://doi.org/10.1002/ir>
- Lyons, V. H., Moore, M., Guiney, R., Ayyagari, R. C., Thompson, L., Rivara, F. P., ... Vavilala, M. S. (2017). Strategies to address unmet needs and facilitate return to learn guideline adoption following concussion. *Journal of School Health*, 87(6), 416–426. <https://doi.org/10.1111/josh.12510>
- Majerske, C. W., Mihalik, J. P., Ren, D., Collins, M. W., Reddy, C. C., Lovell, M. R., & Wagner, A. K. (2008). Concussion in sports: Post-concussive activity levels, symptoms, and neurocognitive performance. *Journal of Athletic Training*, 43(3), 265–274. <https://doi.org/10.4085/1062-6050-43.3.265>
- Mcavoy, K. (2011). *REAP: The benefits of good concussion management*. Denver, CO. Retrieved from http://www.concussiontreatment.com/images/REAP_Program.pdf
- Mccrory, P., Meeuwisse, W., Aubry, M., Cantu, B., Dvorak, J., Echemendia, R. J., ... Tator, C. H. (2013). Consensus statement on concussion in sport—the 4th International Conference on Concussion in Sport held in Zurich, November 2012. *Clinical Journal of Sport Medicine*, 23(2), 89–117. <https://doi.org/10.1016/j.cjsm.2013.02.012>
- Mccrory, P., Meeuwisse, W., Dvorak, J., Aubry, M., Bailes, J., Broglio, S., ... Vos, P. E. (2017). Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016. *Br J Sports Med*, 0, 1–10. <https://doi.org/10.1136/>

- McGrath, N. (2010). Supporting the student-athlete's return to the classroom after a sport-related concussion. *Journal of Athletic Training*, 45(5), 492–498. <https://doi.org/10.4085/1062-6050-45.5.492>
- Mohr, D., & Bullock, L. (2005). Traumatic brain injury: Perspectives from educational professionals. *Preventing School Failure*, 49(4), 53–58.
- Moser, R. S., Glatts, C., & Schatz, P. (2012). Efficacy of immediate and delayed cognitive and physical rest for treatment of sports-related concussion. *The Journal of Pediatrics*, 161(5), 922–926. <https://doi.org/10.1016/j.jpeds.2012.04.012>
- Murray, C., Wren, C. T., & Keys, C. (2008). University faculty perceptions of students with learning disabilities: Correlates and group differences. *Learning Disability Quarterly*, 31, 95–113. Retrieved from <http://journals.sagepub.com/doi/pdf/10.2307/25474642>
- NCAA. Autonomy proposal: Concussion safety protocol, Pub. L. No. 3.2.4.17 (2014). Retrieved from https://web3.ncaa.org/lsdbi/reports/pdf/searchPdfView?id=3176&businessCode=PROPOSAL_SEARCH_VIEW&division=1
- NCAA. (2017). 2017 NCAA Division III Manual. Indianapolis. Indiana. Retrieved from <http://www.ncaapublications.com/productdownloads/D318.pdf>
- NCAA. (2018). *Division III 2017-2018 Facts and Figures*. Retrieved from https://www.ncaa.org/sites/default/files/2018DIII_FactsandFigures_20170906.pdf
- NCAA Sport Science Institute. (2016). *Interassociation consensus: Diagnosis and management of sport-related concussion best practices*. Retrieved from http://www.ncaa.org/sites/default/files/Concussion Diagnosis and Management Best Practices_Reference_20170116.pdf
- O'Neill, J. A., Cox, M. K., Clay, O. J., Johnston, J. M., Novack, T. A., Schwebel, D. C., & Dreer, L. E. (2017). A review of the literature on pediatric concussions and return-to-learn (RTL): Implications for RTL policy, research, and practice. *American Psychological Association*, 62(3), 300–323. <https://doi.org/10.1037/rep0000155>
- Piebes, S. K., Gourley, M., & Valovich McLeod, T. C. (2009). Caring for student-athletes following a concussion. *The Journal of School Nursing*, 25(4), 270–281. <https://doi.org/10.1177/1059840509339782>
- Ransom, D. M., Vaughan, C. G., Pratson, L., Sady, M. D., McGill, C. A., & Gioia, G. A. (2015). Academic effects of concussion in children and adolescents. *Pediatrics*, 135(6), 1043–1050. <https://doi.org/10.1542/peds.2014-3434>
- Rao, S. (2004). Faculty attitudes and students with disabilities in higher education: a literature review. *College Student Journal*, 38(2), 191–199. Retrieved from http://go.galegroup.com.pitt.idm.oclc.org/ps/i.do?p=AONE&u=upitt_main&id=GALE%7CA119741925&v=2.1&it=r&sid=summon

- Ridpath, D. B. (2016). It is time to re-frame college athletes' time commitments. Retrieved June 20, 2018, from <https://www.forbes.com/sites/bdavidridpath/2016/01/26/it-is-time-to-re-frame-college-athletes-time-commitments/#14624ef1bc62>

Rioux, M. H., & Valentine, F. (2005). Does theory matter? Exploring the nexus between disability, human rights, and public policy. In D. Pothier & R. Devlin (Eds.), *Critical Disability Theory: Essays in philosophy, politics, policy, and law* (pp. 47–69). Vancouver, BC: UBC Press. Retrieved from http://health.yorku.ca/files/2015/09/does_theory_matter.pdf

Ritter, K., McLeod, I., Robinson, K., Welch-Bacon, C., Mistry, D., Rodeo, S., & Valovich McLeod, T. (2017). Influence of prior concussion education on club swim coaches' perceived importance, knowledge, and confidence regarding sport-related concussion. *Journal of Athletic Training*, 52(6), S-231. Retrieved from <https://search-proquest-com.pitt.idm.oclc.org/docview/1914566436/fulltextPDF/607672D69BA84B63PQ/1?accountid=14709>

Simons, H. D., Bosworth, C., Fujita, S., & Jensen, M. (2007). The athlete stigma in higher education. *College Student Journal*, 41(2), 251–274. Retrieved from http://go.galegroup.com.pitt.idm.oclc.org/ps/i.do?p=AONE&u=upitt_main&id=GALE%7CA163678994&v=2.1&it=r&sid=summon

Thomas, D. G., Apps, J. N., Hoffmann, R. G., McCrea, M., & Hammeke, T. (2015). Benefits of strict rest after acute concussion: A randomized controlled trial. *Pediatrics*. <https://doi.org/10.1542/peds.2014-0966>

Thompson, L. L., Lyons, V. H., McCart, M., Herring, S. A., Rivara, F. P., & Vavilala, M. S. (2016). Variations in state laws governing school reintegration following concussion. *Pediatrics*, 138(6). <https://doi.org/10.1542/peds.2016-2151>

Umbach, P. D., & Wawrzynski, M. R. (2005). Faculty do matter: The role of college faculty in student learning and engagement. *Source: Research in Higher Education AIR Forum Issue*, 46(2), 153–184. <https://doi.org/10.1>

Valovich McLeod, T. C., Lewis, J. H., Whelihan, K., & Welch Bacon, C. E. (2017). Rest and return to activity after sport-related concussion: A systematic review of the literature. *Journal of Athletic Training*, 52(3), 262–287. <https://doi.org/10.4085/1052-6050-51.6.06>

Vasek, D. (2005). Assessing the knowledge base of faculty at a private, four-year institution. *College Student Journal*, 39(2), 307–316. Retrieved from http://go.galegroup.com.pitt.idm.oclc.org/ps/i.do?p=AONE&u=upitt_main&id=GALE%7CA133606101&v=2.1&it=r&sid=summon

Wasserman, E. B., Bazarian, J. J., Mapstone, M., Block, R., & Van Wijngaarden, E. (2016). Academic dysfunction after a concussion among US high school and college students. *American Journal of Public Health*, 106(7), 1247–1253. <https://doi.org/10.2105/AJPH.2016.303154>

- Weber, M. L., Welch, C. E., Parsons, J. T., & Mcleod, T. C. (2015). School nurses' familiarity and perceptions of academic accommodations for student-athletes following sport-related concussion. *The Journal of School Nursing*, 31(2), 146–154. <https://doi.org/10.1177/1059840514540939>
- Welch Bacon, C. E., Register-Mihalik, J. K., Kasamatsu, T. M., & Valovich McLeod, T. C. (2017). A comparison of healthcare professional and school personnel perceptions and familiarity of academic adjustments for concussed adolescents. *British Journal of Sports Medicine*, 51, A13. <https://doi.org/10.1136/bjsports-2016-097270.31>
- Williams, R. M., Welch, C. E., Parsons, J. T., & Valovich McLeod, T. C. (2015). Athletic trainers' familiarity with and perceptions of academic accommodations in secondary school athletes after sport-related concussion. *Journal of Athletic Training*, 50(3), 262–269. <https://doi.org/10.4085/1062-6050-49.3.81>
- Williams, R. M., Welch, C. E., Weber, M. L., Parsons, J. T., & Valovich McLeod, T. C. (2014). Athletic Trainers' management practices and referral patterns for adolescent athletes after sport-related concussion. *Sports Health*, 6(5), 434–439. Retrieved from <http://journals.sagepub.com/doi/pdf/10.1177/1941738114545612>
- Wing, R., Amanullah, S., Jacobs, E., Clark, M. A., & Merritt, C. (2016). Heads up: Communication is key in school nurses' preparedness for facilitating "return to learn" following concussion. *Clinical Pediatrics*, 55(3), 228–235. <https://doi.org/10.1177/0009922815592879>
- Zirkel, P. A., & Brown, B. E. (2015). K-12 students with concussions: A legal perspective. *The Journal of School Nursing*, 31(2), 99–109. <https://doi.org/10.1177/1059840514521465>