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An Analysis of Connecticut Return to Learn Policies

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The purpose of this study was to examine the comprehensiveness of Return to Learn (RTL) policies within Connecticut Public Schools. A secondary purpose of this study was to evaluate group differences in concussion knowledge between classroom teachers in schools with and without RTL policies. Results from this study suggest that within public schools in the state of Connecticut, RTL policies are uncommon. Similarly, of the identified policies, there is a significant difference in comprehensiveness between academic and medical intervention offered to students following a concussion. In addition to unveiling underdeveloped policies and procedures to support students academically following a concussion, this project also attempted to ascertain whether teacher concussion knowledge is impacted by the presence or absences of an RTL policy. The results from the present analysis regarding teacher knowledge are unclear. However, additional research regarding teacher education for concussion intervention is imperative. Results from this study as well as recent research indicate that most states within the United States have limited academic resources available to students following a concussion. These limitations place state and local school districts in a challenging position of supporting students in their classrooms. It is indisputable that students who sustain a concussion require appropriate academic and medical intervention upon their return to school.

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CHAPTER ONE

INTRODUCTION

Traumatic Brain Injury (TBI) is the leading cause of disability and death in children and

adolescents in the United States (Centers for Disease Control, 2017). According to the Centers

for Disease Control (2017), Traumatic Brain Injury (TBI) is a leading source of childhood injury,

with an estimated 564,00 emergency department visits annually by children ages zero to 19

years. Concussions or mild traumatic brain injuries (mTBI) represent 70 to 90% of all traumatic

brain injuries (Cassidy et al., 2004). The two most at risk groups for a concussive injury are

children aged zero to four and 15 to 19. When compared to adults, school-aged children should

be treated much more conservatively than adults following a concussive injury. The developing

brain is different from a mature brain; it is more apt to manifest symptoms later and have long-

term consequences if the child is not allowed to rest and recover (Lovell et al., 2003). The

impact of concussive symptomology on student functioning can be significant. Given the high

incidence of concussive injuries within the school-aged population, school professionals must be

able to support students following an injury.

In order for students to benefit from their education, they must have the ability to

comprehend, retain, and apply knowledge. Students who return to school following a concussive

injury may be compromised in their ability to learn for a significant length of time (Jantz, Davies

& Butler, 2014). By definition, a concussion causes the movement of the brain inside the skull

which causes a disturbance in brain function (McCrory et al., 2013). The difficulty students

experience learning following a head injury is directly related to these central nervous system

sequelae. These symptoms include an array of cognitive, emotional and physical side effects,

which inhibit their ability to learn efficiently in their classrooms. Lundin and colleagues (2006)

and Ransom and colleagues (2013) suggest that the cognitive symptoms that are common in the first week following a concussion may include impairments in concentration, processing, and working memory. These impairments are directly related to the learning process with difficulties most markedly on tasks such as studying for tests, paying attention in a classroom and completing homework (Ransom et al., 2013). Therefore, the need for school-based supports for a student following a concussive injury is imperative.

Pediatric Concussion Management

Research regarding pediatric concussion management has increased markedly in the last decade. Despite this growth, little progress has been made in the development of educationally-based protocols to support children following a concussive injury. In contrast, the efforts regarding pediatric concussion management have largely been focused around the issue of safe return to athletic competition, or return to play (RTP; Thompson et al., 2016). As of 2017, 49 states and the District of Columbia have laws regarding return to athletics following a concussive injury; however, only eight states require schools to implement academic accommodations following such an injury (Zirkel & Eagan Brown, 2015). Confounding this issue even further, only four of these states include any specific standards within their protocols to assess efficacy or outcomes. As a result, the issue of Return to Learn (RTL) is often neglected at the school district level. A 2015 survey of school principals suggests that formalized concussion plans were present in less than 25% of high schools. The absence of formalized legislature and school-based plans significantly fragments care for students (Heyer, Weber, Rose, Perkins & Schmittauer, 2015).

Established Concussion Management initiatives exist in several states nationwide. A pioneer in this space, BrainSTEPS of Pennsylvania and Colorado, is now considered a national

model for RTL supports. Within the BrainSTEPS framework, students are supported through a systematic protocol led by a school-based Concussion Management Team (CMT), who support the student medically and academically upon their return to school. Return to school protocols must be designed to support student recovery and concurrent learning while limiting symptom exacerbation. In order to accomplish this goal, a district-wide or school-wide protocol is required. A RTL protocol is seen as a critical component of returning a student to the demands of learning. Without such a plan, students may experience an increase in symptoms and prolonged recovery (Brown et al., 2014).

Within Connecticut, both public and private schools are mandated to have an active return to play (a systematic plan to ensure students reach pre-injury level prior to activity re-entry) policy to support a student's return to athletics following a concussive injury. Conversely, an academic policy is not required. Guidelines for returning students to school following a concussive injury have recently started to develop within the professional literature. At this point in time, a universal consensus regarding RTL protocols has yet to emerge. Nevertheless, systematic school-based supports have been deemed essential in supporting student recovery (Ransom et al., 2013).

Careful examination of RTL policies that exist within Connecticut has yet to occur. Such an analysis will afford meaningful information regarding the cohesion and quality of academic supports provided to students following a concussive injury. The outcome of the aforementioned research will allow for further development of comprehensive school-based concussion management supports for Connecticut students. Given the indisputable statistics regarding the incidence of concussive injuries on a national scale and the developing research

regarding the necessity of school-based learning supports, this research will offer opportune information regarding the status of RTL policies within Connecticut.

Through a RTL approach, students are supported in their transition back to the learning environment in an effort to promote healing and ensure efficient return to pre-injury functioning. Current research regarding the long-term educational outcomes for students who have sustained a concussion is in its infancy; however, it is evident that concussions can result in immediate academic difficulties. Therefore, strategic RTL supports are recommended in order to ensure student success. To date, a small number of Connecticut public schools have comprehensive RTL policies. Exploratory research is needed in order to determine the degree to which Connecticut schools are equipped to support students academically following a concussive injury.

Most students with concussions will require some level of academic support upon their return to school. Therefore, a well-established RTL plan is critical in supporting proper management of mild traumatic brain injury within the school setting. A RTL plan will offer schools a systematic approach to support students in their transition back to regular classroom activities following a concussion. Although a universally agreed upon protocol does not exist, RTL plans should offer student supports that are rooted in frequent collaboration amongst key stakeholders, recurring assessment of symptomology, and fluid academic, physical and social-emotional adjustments based on the students presenting needs (McAvoy, 2012).

Students who have sustained a concussion require varying levels of instructional modifications and academic accommodations during their injury recovery (McAvoy, 2012). Cognitive rest refers to the reduction of mentally-taxing activities such as: analytical problem solving, mathematical equation work, prolonged reading, and computer use, all of which

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regularly occurs within a traditional classroom setting (Ransom, et al., 2015). Ransom and colleagues (2015) examined the relationship between post concussive symptoms and learning in elementary and high school students. Their findings suggest that high levels of post concussive symptoms were directly related to learning difficulties. In addition, an increase in students' symptoms was found when they were asked to engage in tasks that required cognitive exertion. These findings are of particular importance given that sustained symptom exacerbation can result in prolonged recovery times. However, if managed strategically, more than 80% of concussions resolve successfully within the first three weeks post injury.

Presently, clear gaps exist regarding the long-term academic effects of concussive injuries, and the literature regarding a model of best practice for RTL is still emerging. As a result, researchers have looked to return to school protocols for related illnesses and injuries for guidance. As a direct result of the aforementioned research, the following components have been deemed necessary in a comprehensive School Concussion Management Plan:

1. Concussion management policy and procedures

2. Development of school concussion resource team

3. Examination of teaching supports and methods in order to support recovery

4. Maximize learning and reduce symptom exacerbation

5. Teacher/staff education and training

6. A list of concussion resources for staff and families (Gioia, 2016, p. 94).

At this time, it has been demonstrated that comprehensive RTL plans must include concurrent academic and medical components in order to ensure student success. Gioia (2016) states that a "well prepared medical-school partnership is imperative to implement proper management following a mild traumatic brain injury" (p. 94). The goal of a RTL plan is to

integrate medical and academic supports in an effort to promote healing. Gioia (2016) further emphasizes, "The management of youth following a mild traumatic brain injury has no greater complexity than the return to their biggest "job" – school" (p. 93). Supporting students following a concussive injury requires a multifaceted approach with systematic strategies in order to assist the student's return to school. McAvoy (2012) states that, "when a student returns to school following any injury, it is the school team's responsibility is to: assess the child's needs, design an intervention plan, monitor the effectiveness of the plan, and adjust and readjust until the student no longer has special needs resulting from the condition" (p. 2). In addition to medical management and collaboration with treating physicians, school districts must be prepared to provide academic supports to recovering students.

Concussions cause adverse effects on academic learning and performance within the school setting. Anecdotal reporting of students who have sustained a concussion demonstrates that between 27 and 90% of student report trouble doing schoolwork or experience grade declines. In addition, surveys form parents and school professionals suggest that up to 73% of concussed students receive academic adjustments (Wasserman et al., 2016). Beyond having clear guidelines for medical and academic intervention, school systems must also address practical barriers of concussion management. School professionals must be equipped with the resources and knowledge to support students in their classrooms and families must have knowledge of the systems that are in place for recovering students. These logistical aspects of concussion management are critical to intervention implementation.

<div align="center">**Statement of the Problem**</div>

From national and local lens, RTL laws are scarce and fewer than 25% of schools have documented RTL policies (Thompson et al., 2016). School systems must be prepared to support

students in their return to the academic, physical, and social-emotional demands of the school setting immediately following an injury. Without such a system, students and educators suffer. Halestead, McAvoy, and Brown (2016) suggest that the most effective means of concussion intervention would be to educate general education teachers about concussions and how to accommodate students in their classrooms. Thompson and colleagues (2016) suggest that in more than one-fifth of schools there is an absence of a clearly designated person managing RTL procedures and coordination amongst teachers is absent in nearly 80% of cases. In order to support schools in establishing procedures for managing RTL, a minimum standard of care must be established.

Gioa (2016) states, "Fundamentally, an expeditious, yet appropriately managed, return to school after mild traumatic brain injury is critical to the over- all health and well-being of the recovering student. Time away from school can pose a significant threat to their academic and psychological well-being" (p. 93). The process of returning to school is challenging for students, 90% of children report one or more symptom-related academic issue upon reentry to school. Further, this population is also at-risk for depression and anxiety in the absence of immediate and individualized supports (Thompson et al., 2016). Therefore, there is a critical need for institutional change.

Halestead and colleagues (2013) suggest that concussions are likely to impact a student's ability to learn because many of the symptoms associated with a concussive injury inhibit concentration, focusing, and the acquisition and retention of new information. Similarly, Ransom and colleagues (2015) examined the impact of concussions on learning. It was determined that the majority of students returning to the classroom following a concussive injury

have difficulty sustaining their attention and with educational activities such as taking notes, studying and comprehending material.

Brown and colleagues (2014) assessed the impact of cognitive rest on recovery following a concussive injury in children. Those who engaged in full cognitive activity took approximately 100 days to recover in comparison to 20 to 50 days for those who engaged in modified activity. The compilation of the aforementioned research supports that cognitive adjustments and strategic school-based supports are critical to the recovery process (Brown et al., 2014). The Centers for Disease Control (2017) similarly suggest that the effects of a concussion on learning vary from student to student however; a premature return to learning activities that require significant cognitive exertion may cause symptoms to linger, reappear or worsen.

The purpose of this study is to explore the comprehensiveness of RTL policies in Connecticut public schools. Connecticut public schools have been chosen as the sample for this research due to the accessibility of the districts, their policies and educators. However, it is believed that these obtained data may be pertinent to other school districts at a local, regional, and national level. This project will also examine group differences in concussion knowledge between districts with and without formalized Return to Learn policies.

Significance of the Problem

Presently, there are no universally adopted standardized medical procedures for retuning students to learning following a concussion. As of May 2016, only eight states within the United States have legal mandates requiring RTL provisions within their schools. Similarly, only 25% of schools have a formal RTL management plan. Researchers from the University of Washington suggest that although the medical aspects of a concussion are now well understood, it has not translated to comprehensive state guidelines for the return to educational activities (Thompson et

al., 2016). Graff and Caperell (2016) aimed to assess the impact of an online training module on educator's knowledge and understanding of RTL recommendations. Their findings revealed that there are significant deficits in the knowledge of educators regarding concussions and classroom management. However, following explicit teaching, significant improvements were noted. Graff and Caperell (2016) state, "the importance of 'educating the educators' cannot be overemphasized" (p. 1572). Similarly, Brown and colleagues (2014) suggest that teachers and administrators should have knowledge of how concussions affect academic performance. The Center for Disease Control (2017) reports that teachers and educational professionals are often the first to notice cognitive abnormalities that are symptoms of concussion, due to the demands of learning, which often exacerbate concussive symptoms.

Therefore, it is imperative that improvements must be made at the state level in order to pair educational protocols with existing RTP policies in an effort to promote comprehensive supports to all students, regardless of their athletic participation and affiliations. Most students with concussions will require some level of academic support upon their return to school. Therefore, a well-established plan is fundamental in order to support proper management of mild traumatic brain injury within the school setting. Thompson and colleagues (2016) examined RTL policies at the state level across the United States; their findings indicate that 8 of the 50 states have laws requiring RTL protocols in their schools. Even more staggering, is that only half of these states have put forth explicit requirements for their RTL laws, which further limit implementation efforts. Careful examination of return to learn policies that exist within Connecticut will offer desirable and advantageous information regarding interventions for students following this ever-present injury.

Research Questions and Hypotheses

Two research questions will be explored in order to better understand the comprehensiveness of RTL policies within Connecticut Public School and the level of concussion knowledge of Connecticut Public School teachers. Hypotheses are presented for each research question based on a review of existing research.

1. What is the comprehensiveness of RTL policies within Connecticut Public Schools as measured by the policy accessibility, academic, and medical components of the Return to Learn Assessment protocol?

It is hypothesized that the RTL plans will vary significantly; some districts will have plans that are well established in targeting the predetermined essential areas, while others may be limited in their scope. Given this perceived discrepancy, it is further hypothesized that as a sum, Connecticut's RTL plans, are underdeveloped and need to be improved in order to serve the students of Connecticut. A secondary hypothesis is that school districts will have greater medical comprehensiveness within their plans as compared to academic comprehensiveness. At this time, school districts appear to have a stronger understanding of medical supports for students following an injury; this may be associated with the Connecticut Public Act 14-66 (2014), which mandates RTP guidelines within Connecticut public schools. Thompson and colleagues (2016) suggest that 87.5% of concussion laws hold schools responsible for establishing an RTL management plan. There is presently no data available regarding the extent to which RTL laws have been implemented at the district or school level.

2. Does the presence of a RTL policy effect general concussion knowledge as measured by the Concussion Care Survey?

It is hypothesized that districts with formal RTL polices will have greater concussion

knowledge as compared to those districts without a formalized RTL plans. Review of public information has revealed that 16 of the 176 public school districts in Connecticut have RTL policies. Given this small percentage, it is believed that the quality of the plans remains in their infancy. Further, Connecticut legislature does not mandate that schools have formalized RTL policies. This limitation strengthens the hypothesis that the present RTL plans are lacking in their ability to support students. In conjunction with Connecticut Public Act 14-66, An Act Concerning Youth Athletics and Concussions (2014), the State of Connecticut released Concussion Education Plan and Guidelines for Connecticut Schools. Within this plan, it states, "School districts should customize the concussion education plan by incorporating their local or regional board of education policies and procedures related to concussion education, prevention and management, including: Identification of a School Concussion Management Team and identification of roles and responsibilities of members of the School Concussion Management Team and school personnel" (CT Public Act No. 14-66, p. 18). However, it does not explicitly mandate the requirement for a school based educational supports for students following a concussion.

Limitations

As with most research studies, this study design has several limitations. The primary threat to the internal validity of this proposed dissertation project is instrumentation. For the purpose of this project, instrumentation is the manner in which these data are collected. Specifically, how the RTL plans are coded utilizing the grading protocol that was developed for this project. The protocol was developed to promote strong inter-rater reliability. However, personal biases and interpretation must be considered instrumentation factors. In conjunction, the implementation and research methods must also be considered as a threat to internal validity. The grading

protocol was developed utilizing analysis of Best Practice RTL protocols. The intent of the protocol is to identify how well the plans adhere to the trends and patterns evidenced in Best Practice. However, the design of the grading protocol is novel and must be considered a potential threat to internal validity.

Construct validity must also be considered a threat to external validity for this project. In the development of the grading protocol, three essential themes were identified as overarching areas of focus: Academic Comprehensiveness, Medical Comprehensiveness and Policy Accessibility. As a result, each protocol will be given an overall score as well as sub-scores for the aforementioned constructs. For the purpose of this project, construct validity refers to the whether the developed protocol adequately measures the RTL plans under each of the essential themes. In addition, a small sample of RTL plans will be examined due to the limited number of districts with RTL plans within the state of Connecticut. A small sample is considered a threat to the generalizability of the obtained data. Within the state of Connecticut, it is currently estimated that only a small percentage of public schools have established RTP policies. Further, this project will be unable to quantitatively assess the effects of RTL plan implementation as measured by academic outcomes for students.

Summary

This chapter provided an introduction to the research on RTL policies and the impact of concussions on students' academic, social and emotional functioning. The purpose of the study, research questions, hypotheses, limitations, and definitions of terms were reviewed. This chapter provided a foundation for the literature review that follows.

Definition of Terms

For clarification purposes, the researcher chose to define the following terms. Other terms are defined in the literature review.

1. *Academic Accommodations:* Reasonable accommodations are modifications or adjustments to the tasks, environment or to the way things are usually done that enable individuals with disabilities to have an equal opportunity to participate in an academic program or a job (U.S. Department of Education, 2007)

2. *Academic Features:* Academic features of the Return to Learn assessment protocol measure the degree to which the Return to Learn plan has the necessary academic components in order to ensure classroom-based supports for the injured student. Such features may include: accommodations and modifications to the curriculum, limiting excess stimuli, shortened tasks, etc.

3. *Comprehensiveness:* The compilation of scores obtained using the Return to learn Assessment Protocol. Comprehensiveness will be determined using scores from three domains: Academic Features, Medical Features and Policy Accessibility Features. The overall scores score will give an indicator as to how well the plan, if implemented with reliability, provides supports to students following a concussive injury.

4. *Concussion:* The Centers for Disease Control (CDC) defines concussions as brain injuries, typically caused by falls or impact to the head or body that alter the normal functions of the brain. McAvoy (2012) further suggests that a concussion is a brain injury that impacts mental, physical and emotional functioning.

5. *Concussion Assessment Protocol:* The Return to Learn Assessment Protocol was developed through a systematic review of Best Practice Return to Learn policies,

associated literature and consultation with medical professionals within the field. Utilizing the aforementioned resources, the assessment protocol was developed by synthesizing essential areas of importance under academic, medical and policy accessibility features. The protocol will be utilized to determine the level of comprehensiveness of the Return to Learn plans that exist within Connecticut Public Schools.

6. *Concussion Care Survey:* This survey was generated in order to evaluate group differences in concussion knowledge between districts with and without formalized Return to Learn polices. The survey data from the Concussion Care survey will be evaluated in order to assess whether there is a difference in general concussion knowledge between districts with the presence of a Return to Learn plan as compared to districts without a formalized policy.

7. *Concussion Knowledge:* basic knowledge of concussion cause, symptoms and treatment as well as how to support students in school following a head injury.

8. *Cognitive Rest:* limiting or restricting text messaging, watching television, reading or completing school work is based upon the conceptual framework that an increase in the brain's energy demand while performing cognitive tasks may exacerbate symptoms (Master, Gioia, Leddy & Grady, 2012)

9. *Policy Accessibility Features:* Accessibility features of the Return to Learn assessment protocol measure the degree to which the Return to Learn plan has the necessary functional components in order to ensure that the plan is accessible and includes characteristics that promote ease of understanding and explicit implementation guidelines.

Such features may include: a clearly defined purpose, indication of staff training, contact information, etc.

10. *Instructional Modifications:* changes to the instructional delivery. Such changes can include modification to assessment, evaluation, instructional delivery, student work, etc.

11. *Learning:* the acquisition of knowledge or skills through experience, study or being taught (Merriam Webster, 2017).

12. *Medical Features:* Medical features of the Return to Learn assessment protocol measures the degree to which the Return to Learn plan has the necessary medical components in order to ensure safety and required student supports. These features may include: immediate removal from activity, notifying parents and guardians, collaboration with the treating physician, etc.

13. *Mild Traumatic Brain Injury (mTBI):* synonymous with concussion. Reference concussion definition in Chapter 2.

14. *Post Concussion Syndrome (PCS):* is a disorder in which various symptoms such as headaches and dizziness last for weeks and sometimes months after the injury that caused the concussion. In most individuals, symptoms occur within seven to ten days and remediate within three months. Occasionally, they can persist for a year or more. Post concussion symptoms include: headache, dizziness, fatigue, irritability, anxiety, insomnia, loss of concentration and memory, ringing in ears, blurry vision, noise and light sensitivity and rarely decrease in taste and smell (Concussion Legacy Foundation, 2018).

15. *Return to Learn (RTL):* a systematic plan that supports students medically, academically and emotionally following a concussive injury via a strategic framework of support including collaboration between key stakeholders, recurring monitoring of symptoms and

adaptations to the learning process and environment in an effort to ensure an efficient and complete recovery.

16. *Return to Play (RTP):* Following a concussive injury, an athlete should only return to sports practices with the approval and under the supervision of their heath care provider (Centers for Disease Control, 2017). The premature return to athletic competition following a concussive injury may prolong or exacerbate symptoms (McGrath, 2010).

17. *Traumatic Brain Injury (TBI):* The National Institute of Neurological Disorders and Stroke (2017) define a Traumatic Brain Injury (TBI) as a form of acquired brain injury that occurs when a sudden trauma causes damage to the brain. A TBI can occur when the head suddenly and violently hits an object or when an object pierces the skull and enters the brain tissue. TBI symptoms can be mild, moderate or severe. A TBI can cause loss of consciousness for a few seconds or a few minutes. Other symptoms of a mild Traumatic Brain Injury (mTBI) include: headache, confusion, lightheadedness, dizziness, blurred vision or tired eyes, ringing in the ears, bad taste in the mouth, fatigue or lethargy, a change in sleep patterns, behavioral or mood changes, and trouble with memory, concentration attention or thinking. Moderate or severe TBIs may show these symptoms in addition to a headache that gets worse or does not go away, repeated vomiting or nausea, convulsions or seizures, an inability to awaken from sleep, dilation of one or both pupils, slurred speech, weakness or numbness in the extremities, loss of coordination, increased confusion, restlessness or agitation (National Institute of Neurological Disorders, 2017).

CHAPTER TWO

REVIEW OF THE LITERATURE

Traumatic Brain Injury (TBI) is a significant cause of death and disability within the United States (CDC, 2018). Within the pediatric population, TBI is considered a public health problem. In 2013, there were approximately 2.8 million emergency department visits, hospitalizations and deaths in the United States. More specifically, there are an estimated 3,000 deaths, 29,000 hospitalizations and 400,000 emergency department visits annually for children and youth aged zero to 14 years (CDC, 2018). Presently, TBI is reported to be the leading cause of disability in young people within the United States (CDC, 2000).

The Centers for Disease Control (CDC, 2018) defines a concussion as a type of traumatic brain injury "caused by a bump, blow or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth" (p. 1). As a result of the force, the brain moves within the skull, causing chemical changes and at times, damaging brain cells (CDC, 2018). Within the literature, the terms concussion and mTBI are often used interchangeably. Therefore, for the purpose of the present review, these terms will be considered synonymous. Concussive injuries have a significant impact on patient's well-being with an array of physical, cognitive and emotional side effects. From a neurometabolic perspective, concussions cause a deficit in available neurological energy, which is typically used to conduct activities of daily living. Recovery from a concussion is considered to be the reestablishment of equilibrium within the brain (McAvoy et al., 2012; Schneider et al., 2013).

There is a growing research base that suggests concussions have a direct and marked impact on a wide array of an individual's functioning. It is important to understand the various social, emotional, and cognitive sequelae of concussion and the associated consequences in order

to promote an efficient and safe recovery. The scope of this chapter will include a review the most common etiology of concussions as well as the best practices for their diagnosis and treatment; prior to doing so, national and local statistics will be reviewed along with emerging trends in best practice. Focusing more specifically on the implications of concussions in youth populations, this chapter will also include a review the physical, cognitive, and emotional implications of a concussion within the youth population and the correlated implications for schools and a child's learning. Furthermore, Return to Learn (RTL) practices and the role of schools in concussion management will be addressed in order to identify current trends and correlated areas of need.

Etiology of Concussion

The International Conference on Concussion in Sport (2012) has identified specific criteria that are currently utilized in defining a concussive head injury. These constructs are as follows:

1. Concussions may be caused by either a direct blow to the head, face or neck or elsewhere on the body with an impulsive force transmitted to the head.

2. Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, symptoms and signs may evolve over a number of minutes to hours.

3. Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.

4. Concussion results in a graded set of clinical symptoms that may or may not involve a loss of consciousness. Resolution of the clinical and cognitive symptoms typically

follows sequential course. However, it is important to note that in some cases symptoms

may be prolonged (McCrory, et al., p. 1-2).

A 2016 analysis suggests that 19.5% of adolescents in grades eight, 10 and 12 report at

least one concussion in their lifetime, and 5.5% report being diagnosed with more than one

concussion (Veliz, McCabe, Eckner & Schulenberg, 2017). The CDC (2018) reported increasing

rates of TBI-related emergency department visits from 2001 through 2010 with concussions

representing 75% of these visits. Similarly, there has been a documented eight-time increase in

emergency department visits for TBI between 2006 and 2010. However, it is important to note

that these statistics likely represent an underestimation as many concussions go untreated and

therefore undocumented (Bradley-Klung et al., 2015).

It is now indisputable that there has been a marked increase in concussion diagnosis

within the United States with the most significant increase documented in the adolescent

population. In 2016, Zhang and colleagues conducted a cross-sectional analysis on a population

of more than eight-million patients; their study revealed that the population that had the greatest

increase in concussion incidence were among patients ages 10 to 19 years. Similarly, there has

been a 60% increase in concussions diagnosed between 2007 and 2014 with the largest increase

in ages 10 to 14 at 143% and 15 to 19 at 87%. Also, the study found that 56% of concussions are

diagnosed in emergency departments followed by 29% in a doctor's office (Zhang et al., 2016).

Presently, falls account for the greatest number of pediatric concussions within the United States.

However, sports-related concussions account for a significant percentage of injuries with an

estimated 3.8 million concussions occurring annually, which presently accounts for nearly nine

percent of high school athletic injuries (Gillooly, 2016). While these statistics are staggering, a

review of this information provides an important perspective for understanding. Fewer than 10

years ago, concussions were injuries that did not receive significant attention (Zhang et al., 2016). However, it is now evident that concussions can cause significant physical, emotional, and cognitive consequences for individuals; therefore, explicit knowledge of this public health crisis is warranted.

Along with the rise of concussion diagnosis, an influx in knowledge regarding the neuropsychological significance of concussive injuries has resulted in a stark increase in concussion awareness and education within the last decade (Zhang et al., 2016). This growth can be attributed to a number of factors including an increase in public knowledge regarding the significant risks and longstanding side-effects that are now clearly associated with concussions. Second Impact Syndrome (SIS) is fatal brain swelling that occurs in an individual who has sustained a second concussion prior to complete recovery from an initial injury (Bey & Ostick, 2009). SIS is believed to be a condition that is unique to the pediatric population and therefore has received significant attention in youth sports. For youth athletes, returning to the playing field prior to their concussion fully resolving can be extremely dangerous. Although uncommon, sustaining a second injury prior to resolution of the first concussion can have catastrophic effects (Graham, Rivara, Ford & Spicer, 2014). In response to increased awareness regarding the potentially lethal effects of repeated concussions, the HeadsUp campaign release by the CDC in 2003 has placed greater emphasis on concussion diagnosis, treatment and management in youth sports.

In addition to youth sports initiatives, there has been an increase in public discussion regarding the long-standing effects of repeated concussions that can manifest to disorders such as Chronic Traumatic Encephalopathy (CTE) (Belson, 2017; Kounang, 2017; Kounang, 2018 LaMotte, 2015; Ward, Williams & Manchester, 2017). CTE is understood to be a degenerative

disease found in individuals who have a history of repeated brain trauma (Boston University Research: CTE Center, 2018). The greatest incidence of CTE has been identified in football, soccer, baseball, boxing, and the military. As of 2017, 99% of studied brains of deceased football players have tested positive for CTE (Mez, Daneshvar, Kiernan et al., 2017). CTE can result in memory loss, impaired judgment, aggression, depression, anxiety, deficits in impulse control confusion, and even suicidal behavior (Mez, Daneshvar, Kiernan et al., 2017). As a result of these findings, concussion awareness and education has also received an increase in public attention through organizations such as the National Football League (NFL) and National Hockey League (NHL), which have taken steps in order to address chronic head injuries and associated side effects in their athletes.

<p align="center">**Legislative Trends in the United States**</p>

In response to mounting public concern supported by empirical evidence, the policies and procedures surrounding concussion law have evolved markedly in the last decade. As of 2014, all 50 states within the United States have laws that govern Return to Play (RTP) procedures. Although these laws vary in their scope, they provide parameters for instructing coaches and school staff on identifying warning signs of a concussion as well as guidance on when student athletes can safely return to athletic completion (CDC, 2018; Thompson, et al., 2016). Despite the significant increase in concussion awareness and prevention within the athletic arena, little progress has been made in the development of guidelines and legal parameters for informing decisions on supports for students in their classrooms following a concussion. This process is formally known as RTL. The disconnect between athletic and academic intervention for students following a concussive injury is further exemplified by Thompson and colleagues (2016) research which states, "although concussion is a clinically

<p align="center">21</p>

understood as a complex pathophysiological injury with emotional, behavioral, cognitive and physical dimensions, this understanding has not translated to multifaceted state guidelines for the return of injured youth to school and educational activities" (p. 2).

In an effort to better understand the scope of RTL laws, Thompson and colleagues (2016) examined the prevalence of RTL laws on a national scale; their findings revealed that RTL laws are not common. As of 2016, only eight states have laws mandating RTL procedures (Illinois, Massachusetts, Maryland, Maine, Nebraska, New York, Virginia, and Vermont). Of these eight states, more than half do not have RTL procedures in place for non-sport related injuries. Further, Illinois is the only state that has a law in place that is aligned with Centers for Disease control guidelines. Thompson and colleagues (2016) state, "of the existing eight state laws many are missing key elements including robust protocol standards, required RTL education for school personnel, and a designed RTL coordinator…heightening the risk that well-intentioned policies will not provide optimal structure to injured students" (p. 5).

Systematic academic supports for students following a concussive injury are not yet commonplace. Heyer and colleagues (2015) examined the presence of academically focused concussion plans through a survey to school principals; their research found that plans with specific academic accommodations and guidelines were present in less than 25% of schools. In order to provide more routine and fundamental guidelines for schools to follow, Thompson and colleagues (2016) suggests that there should be universal procedures for concussion management and a recommended standard of care. Universal procedures that are aligned with best practice recommendations will limit the stark variability that currently exists among current RTL procedures on a national scale. Now that the social and political factors shaping this issue have been addressed, diagnostic considerations will be reviewed.

Recognizing and Diagnosing Concussions in Youth Populations

The diagnosis of a concussion is extremely complex. At this time, most concussion diagnoses are predicated on the presentation of symptoms (Halestead et al., 2013). Currently, there are no approved diagnostic tests or biomarkers for concussion diagnosis. The present procedure for concussion diagnosis is "confirming the presence of a constellation of signs and symptoms after an individual has experienced a hit to the head or body" (Graham, Rivara, Ford & Mason, 2014, p. 102). Concussion diagnosis are further complicated within the pediatric population due to the requirement of self-reported symptoms. Children may not be able to clearly articulate their symptoms or may under-report due to their desire to continue with the presenting activity. Rivara and colleagues (2014) suggest that, "using multiple evaluation tools such as symptom scales and checklists, balance testing and neurocognitive assessments may increase the sensitivity and specificity of concussion identification" (p. 11). Neuroimaging techniques are typically utilized for more severe head injuries when fractures of the skull or internal bleeding are in question. The American Academy of Neurology current does not recommend that a Computer Tomography (CT) scan be used to evaluate a suspected sports related concussion without presenting signs of a more serious TBI (Graham, Rivara, Ford & Mason, 2014).

The symptoms of concussion generally fall into four overarching categories: physical, cognitive, emotional, and sleep. Each concussion is unique and will present with its own manifestation of symptoms (Halestead et al., 2013). The presentation of concussion symptoms will likely vary from student to student and even from concussion to concussion for children who have sustained repeated injuries (Halestead et al., 2013). Understanding and strategically supporting children with concussive symptoms is of particular concern for physicians, educators,

and families due to the significant consequences that can arise from pre-mature RTP or symptom exacerbation that can occur without strategic RTL supports.

Pediatric and adult brains are in different stages of development; as a result, the manifestation of concussive symptoms varies between these two markedly different populations. The pediatric population is believed to be at a greater risk for concussive injuries when compared to adults because of anatomical and structural differences. For example, head shape and size, brain water content, vascularization, myelination, and weaker neck muscles all contribute to variance in injury severity and recovery (Gilloly, 2016). Additionally, a delayed period of symptom presentation is also common in pediatric patients. Specifically, pediatric patients often present with fewer symptoms immediately following an injury, followed by an increase in symptomology after a brief window of time. Similarly, the highly researched concept of SIS appears to be unique to the pediatric population (Meehan, Taylor, & Proctor, 2011)

It is understood that recovery from a concussion progresses differently in children as compared to their adult counterparts. As a result, specialized knowledge and treatment is encouraged within the pediatric population (Manzanero et al., 2017). When compared to adults, children and adolescents appear to be more likely to experience slowed recovery. The difference in injury recovery is believed to be associated with variances in brain tissue maturation between adult and pediatric patients (Foley, Gregory & Solomon, 2014). McCrory and colleagues (2013) note that the majority of adults suffering from a concussion were believed to recover within seven to 10 days. However, recent literature suggests that recovery within the adult population is now between 10 and 14 days (Manzanero et al., 2017). It is important to understand that children do not seem to follow the aforementioned recovery trajectory. Currently, a typical recovery duration for children is estimated to be 28 days post injury (Manzanero et al., 2017).

Within the pediatric population, some symptoms may occur immediately following an injury, while other symptoms may not be noticed for days or even months. The most prevalent physical symptoms of a concussion include headache, fuzzy or blurred vision, nausea or vomiting, dizziness, sensitivity to noise or light, balance problems, feeling tired and having no energy (CDC, 2018). The most common cognitive symptoms of a concussion include difficulty thinking clearly, feeling slowed down, difficulty concentrating and difficulty remembering new information (Gioa, 2016). Concussions may also elicit an array of emotional symptoms that include increased irritability, poor mood regulation, and poor control of emotional responses to stressors (Gioa, 2016). Lastly, concussions have also been noted to negatively impact sleep patterns. More specifically, individuals who have sustained a concussion may experience sleeping more than usual, sleeping less than usual and trouble falling asleep (CDC, 2018). Given the clear challenges that exist in recognizing and treating pediatric concussions, a comprehensive review of medical, academic and social-emotional school-based intervention strategies will now be examined. For students, their greatest job is school; therefore, supporting a safe and strategic return to the learning environment is paramount to their success.

<div align="center">**Return to Learn**</div>

The following sections will describe the various components that encompass the concept of Return to Learn (RTL).

Medical Intervention

Following a head injury, children and adolescents will likely be provided with immediate medical intervention. However, the nature and scope of medical intervention often varies by virtue of where the injury occurs. For example, if the injury were to occur within the confines of the academic setting, each school district must be equipped with an immediate triage

plan in order to provide the child with urgent medical attention as well as systems to support the child once they return to school. Within a routine emergency department medical assessment, a developmental history and neurological examination that assesses mental status, cognitive functioning, gait and balance will occur (McCrory et al., 2013). In addition, medical providers will also examine whether there has been an improvement or deterioration of symptoms since the onset of the injury. The medical provider will determine if there is emergent need for neuroimaging, which will assess the presence of a more significant abnormality (McCrory et al, 2013).

Using an RTL framework, medical intervention is one of the three primary facets that are fundamental to comprehensive care. Halestead and colleagues (2013) state:

> The role and responsibility of the medical team is to evaluate the concussion, assess for a more serious structural or neurologic injury, and prescribe physical and cognitive rest, as appropriate, until symptoms improve. As recovery continues, the medical team should gather data from the family and from the school teams to aid in the decision of when to start to allow safe progression back to normal activities (p. 952).

Following the diagnosis of a concussion, the most routinely recommended treatment is physical and cognitive rest. Physical rest is recommended in order to keep the patient's heart rate down in order to prevent symptom exacerbation. "The critical management point in these guidelines is to avoid diverting glucose from the brain during the period of reduced bioavailability in the acute post-injury phase" (Master et al., 2014, p. 2).

In addition to physical rest, cognitive rest is generally recommended as an initial treatment. Baker and colleagues (2014) have put forth guiding principles for RTL after a concussion. These recommendations emphasize re-injury prevention as well as an immediate

period of physical and cognitive rest. The goal of cognitive rest is to avoid activity that may elicit symptoms such as headache or fatigue. Activities that have been found to cause an increase in symptoms are reading, school work and exposure to screen time. Within the medical community, the practice of cognitive rest is referred to as "sub-symptom threshold cognitive activity" (Master et al., 2014, p. 2).

Following a concussive injury, most students are likely to have encountered several medical providers prior to their return to school. Medical care may be provided in hospital emergency room, outpatient clinic or pediatrician's office. In more severe cases, students may also be treated by a neurologist or concussion specialist. Given the broad level of care provided outside of the academic setting, it becomes paramount for students to be provided with supports in their transition from a medical establishment to their academic institution. The discrepancy that exists in medical providers ability to translate their findings into meaningful school-based supports is an area of concern.

Medical providers are often faced with several primary questions that must be answered for students in their return to school following a concussive injury. Gioa (2016) suggests that the primary questions that must be addressed are:

1. When should the student return to school?

2. When the student returns to school, should it be for a full day or partial day? If a partial day is recommended, how and when should they transition into a full day?

3. What types of in-school accommodations should the student receive and for how long?

4. What tools are available to guide Return to School planning?" (p. 96).

Gioa (2016) also notes that these questions are best addressed in conjunction with the "mild traumatic brain injury–prepared school personnel" (p. 95). Medical providers must see school-based personnel as partners in their ability to make medically related decisions for students.

The primary goal of concussion recovery is to limit the disruptions to a student's life and expeditiously restore them to their previous level of functioning. Therefore, even though a child may be exhibiting symptoms, the aim is to return the child to school as soon as possible (Halestead et al., 2013). Given the complexity and variability in concussion presentation in pediatric populations, school districts are presented with the unique challenge of supporting students' individual needs. For each student who sustains a concussion, there is significant variability in the clinical presentation and length of the recovery process. A seamless transition back to the learning environment is seen as a critical step due to the importance of school in a child's life. In order to accomplish this goal, a well-established medical and school partnership is a fundamental aspect of management following a mild traumatic brain injury (Gioia, 2016).

Medical professionals supporting students following a concussive injury must have an intimate understanding of systems within schools in order to make accurate recommendations for their patients (Halestead et al., 2013). In conjunction, Gioa (2016) suggests that a well-established medical-school partnership is essential to implement proper management following a mild traumatic brain injury. Pediatricians must have understanding of the level of supports available to students within the school environment. The implementation of academic supports will likely vary from district to district and school to school which necessitates clear communication and collaboration amongst medical and academic providers.

Halestead and colleagues (2013) suggest that having a liaison within the school to communicate with treating pediatricians or medical providers will streamline the process of

concussion care within the school setting. Within schools, there are a number of qualified

individuals who can help facilitate the communication between education and medical agencies.

For example, this point person can be a school counselor, school psychologist or school nurse.

Additionally, when a school based athletic trainer is on staff, this individual can also serve as a

liaison and address any concerns pertaining to RTP eligibility. Now that the medical aspects of

concussion management have been reviewed, the next section will aim to address the role of the

school in supporting a student academically following a concussive injury.

The School's Role

A concussion has indisputable effects on learning. Baker and colleagues (2014) suggest

that there is complex and dynamic set of injury mechanisms at work in the brain after a

concussion associated with a window of dysfunction and increased vulnerability. Bradley-Klug

and colleagues (2015) state, "the high nationwide prevalence of concussion, coupled with

evidence that youth are disproportionately affected, positions school professionals in the critical

role of supporting students who have sustained a concussion" (p. 184). There is now evidence to

suggest that using a concussed brain to learn can worsen concussion symptoms and may even

prolong recovery (Brown et al., 2014). The increase in recovery time is hypothesized to be

associated with the added stress that learning elicits to *an energy-deprived brain*, which can

exacerbate symptoms. "The fundamental goal during concussion recovery is to avoid

overexerting the brain to the level of worsening or reproducing symptoms. Determining the

appropriate balance between how much cognitive exertion and rest is needed is the hallmark of

the management plan during cognitive recovery" (Halestead et al., 2013, p. 949).

As mentioned previously, cognitive, emotional, and behavioral impairments are directly

associated with concussive injuries. Cognitive implications often include decline in attention

and concentration, working memory, new learning and memory, processing speed, and executive functions.   A sample of school-aged students revealed that 58% of the population experienced difficulties paying attention, 44% struggled to understand new material, and 49% had difficulties completing homework (Gioa, 2016). Simultaneously, 66% of students experienced headaches that interfered with learning and 54% of students reported fatigue in the classroom. Within the aforementioned sample, students with a higher rating on the Post-Concussion Symptom Inventory experienced a more severe presentation of school-related learning problems. These findings suggest that concussive symptomology is directly related to academic difficulty. Additionally, approximately 70% of concussions affect the frontal lobe capacities, which manage the primary functions of navigating higher order intellectual tasks, learning, and retention of new material (Gioia, 2017). For educators, the lack of visible symptoms with a concussion make it difficult to understand the extent of the injury, resulting in limited classroom interventions that support recovery.

In an effort to ensure that students are supported in their transition back to the learning environment following concussion, and for educators to feel equipped in supporting their injured students, strategic medical, educational and social-emotional intervention supports must be provided. In order for educators to effectively support students following a concussion, they must have knowledge of potential symptoms and correlated classroom intervention strategies to support recovery. A RTL policy is a systematic plan that guides educators through the process of supporting a student in their transition back to the learning environment. McAvoy (2012) suggests that a RTL protocol should broadly include assessment, intervention, progression monitoring and intervention adjustment based on student need.

For most students who transition back to school following a concussion, they will have to navigate the various symptoms of their injury within the classroom setting. The most commonly reported symptom of a concussion is headache (CDC, 2018). Headaches within the classroom can inhibit focus and can vary throughout the day being triggered by a number of factors including light and noise. Dizziness and lightheadedness are also common symptoms of concussion, which may make standing quickly or walking in a crowded environment a challenge. Students who experience visual symptoms such as light sensitivity or blurred vision may struggle to see slide presentations, movies, smart boards, computers, have difficulty reading, copying and paying attention to visual tasks (Halestead et al., 2013). In addition, students who experience the symptom of noise sensitivity may want to avoid the lunchroom or loud classes such as music, may require delayed or early passing time between classes. Students who experience difficulty with concentration or retention of new material may struggle to learn new concepts, recall previously learned information, have lack of focus within the classroom and struggle with test taking. Lastly, students who experience sleep disturbances as a result of their injury may experience excessive fatigue which is associated with memory decline and feelings of lethargy, which may require napping due to the disruption in their sleep cycle (Halestead et al., 2013).

In order to ensure that students are strategically supported upon returning to school and that their educators are prepared to provide the necessary supports within their classrooms, guidance for school personnel is imperative. In order to address this need, Gioa (2016) suggests that there is a national need to implement systematic school-based concussion awareness, education, and management programs. When establishing a concussion support plan for students within schools, two primary areas of focus must be considered. First, how the concussion affects the neuropsychological functions related to school and learning, and second, the effect of school

learning on symptom exacerbation (Gioa, 2016). Halestead and colleagues (2013) similarly suggest that a student returning to school after a concussion will benefit from a multidisciplinary team to support an efficient recovery.

Not all concussive injuries are alike. Therefore, school staff must have a diverse understanding of the various needs of their students in order to property accommodate for their students presenting symptoms. Halestead and colleagues (2013) state that, "returning students to the classroom while symptomatic from a concussion requires an individualized approach" (p. 953). An entire day of school has been likened to a "marathon for the brain" (p. 4), which is required to engage in long periods of sustained cognitive attention (Master et al., 2012). While students may not present with similar patterns of symptom manifestation following a concussion, obstacles that the students face within the academic setting can often be addressed with similar strategies. "In the first few weeks after a concussion, most interventions can be made in the general education classroom, by the general education teacher, with minimal support and check-ins with the school physician, school nurse, school counselor, school psychologist, school social worker, or certified athletic trainer" (Halestead et al., 2013, p. 953). Schools must also remain cognizant that recovering from a concussion and performing academic tasks can be conflicting goals. In order to promote recovery, students will require support to reduce their academic workload and associated stressors (Baker et al., 2014).

Halestead and colleagues (2013) suggest that the most frequent cognitive symptoms of a concussion will likely present within the classroom setting. The American Medical Society of Sports Medicine recommends, "academic accommodations such as reduced workload, extended test-taking time, days off, or a shortened work day" (p. 217). However, at this time, there are no common guidelines for academic accommodations for students in schools. Therefore, school

districts are left to develop their own procedures for supporting students following a concussive injury. As a result, school districts currently vary widely in their practice of supporting students with an array of academic supports. The disparities that exist among schools and districts can generate significant obstacles for students returning to school following a concussion (Popoli, Burns, Meehan & Reisner, 2014).

Gioa (2016) states, "The student's academic needs can be effectively addressed only through a prepared school system, skilled in translating the student symptom profile into academic supports and accommodations" (p. 96). The importance of such a system cannot be underestimated. Popoli and colleagues (2014) suggest that, "appropriate recognition and treatment of concussion is imperative for symptom relief and prevention of functional disruptions to the patient's life" (p .221). Within the pediatric population, "it is essential to consider the impact of concussion on academic performance" (p. 221). Cognitive symptoms are more difficult to identify than physical symptoms. However, cognitive symptoms can result in significant challenges for the individual. Specifically, academic decline and struggles in school have been linked to increased occurrence of mental health concerns (Popoli, Burns, Meehan & Reisner, 2014). Now that the cognitive, medical and emotional symptoms of a concussion have been identified and discussed, specific school-based accommodations that can be utilized in supporting students with concussive symptoms will be reviewed.

Cognitive and Physical Accommodations for the Classroom

Classroom teachers are trained to alter their instruction to meet the learning, behavioral and emotional needs of their students. Supporting a student who has returned to school following a concussion should be no different. Immediately following an injury, students will likely require academic adjustments within the classroom setting. Halestead and colleagues

(2013) support that when teachers are equipped to provide *a few reasonable adjustments* when the concussed student return to school that this nominal intervention often is enough to support the student through his or her recovery in the typical recovery time frame of one to three weeks (p. 953). As mentioned previously, the type of adjustments provided to students must be directly linked to their symptom presentation and the required academic demands of the classroom environment. The following paragraph will aim to identify explicit strategies that classroom teachers can use for their students who present with the most commonly reported concussive symptoms.

Upon return to school, students who have sustained a concussion will likely benefit from adjustments to their environment in order to manage their symptoms. For example, when headaches arise, frequent breaks are recommended along with identifying and removing the source of the discomfort (such as noise or light) or resting within the nurse's office. For symptoms of dizziness or lightheadedness, reduced exposure to visual stimuli such as computers or smart boards is recommended. Similarly, visual symptoms such as light sensitivity, double vision or blurred vision can be addressed with the accommodation of reducing the brightness on a screen, allowing the child to wear a hat or sunglasses, using audiological supports instead of visuals, turning off florescent lighting, or a change in seating. For students who experience noise sensitivity, a classroom adjustment could include being seated in a quiet area. In the case of students who experience difficulty with retention of material or focusing, they should be provided with an extension on projects or tests when possible and provided a copy of class notes. Lastly, for students who experience sleep disturbances, adjustment to the school day or breaks thought the school day may be beneficial (Halestead et al., 2013).

Physical and cognitive symptoms such as headache and dizziness hallmark a concussive injury. However, there are also significant social-emotional symptoms that must be considered. Concussions can present with an array of emotional symptoms that must be supported when a child returns to the learning environment. Among the most common social-emotional symptoms of a concussion are: irritability, sadness, feeling more emotional, and nervousness. Eisenberg, Meehan and Mannix (2014) examined the presences of post-concussion symptoms in a sample of students; their findings suggest that over 30% of students experienced emotional symptoms of their concussion including depression, frustration, irritability, and restlessness. It is also important to note that a survey of teacher knowledge revealed that less than half of sampled educators identified that can concussions can elicit emotional symptoms such as changes in mood, depression or irritability (Dreer et al., 2016). Therefore, it is critical that RTL plans include teacher education regarding the emotional implications associated with a concussion, monitoring of student functioning, and appropriately managed supports for those students who experience an increase in emotional symptomology.

In order for teachers and school systems to feel adept at offering students the supports that they need, a structured means for understanding and service delivery is warranted. Therefore, Halestead and colleagues (2013) have utilized key terms that are often used within the educational arena to identify levels of intervention supports that can be offered to injured students. According to Halestead and colleagues (2013) the term academic adjustment is used to reference non-formalized adaptations to the student's environment during the initial recovery period, which most often lasts between one and three weeks. The *academic adjustment* phase does not need to include modifications to the curriculum, nor does it need to impact standardized test taking. However, it is also important to consider that some students may not respond to

these initial adjustments and may benefit from more intensive, targeted supports (p. 953). As a result, Halestead and colleagues (2013) use the term *academic accommodations* to refer to long-term academic needs that are required more than three weeks following a concussive injury (p. 955). These adjustments may include adaptations to standardized tests, extra time on tests or an alternative schedule. Often, this level of support can be achieved through a Section 504 plan. Finally, the term *academic modification* is utilized when referring to prolonged supports that require specialized supports within the academic setting that are likely delivered via an Individualized Education Program (IEP) (Halestead et al., 2013, p. 954-955). The following section will further elaborate on intensive supports that can be offered to students who experience prolonged concussive symptoms.

Supporting Students with Prolonged Concussive Symptoms

While most concussions will resolve within three weeks when appropriate supports are in place, some injuries may be prolonged and have long-term effects. In the case of prolonged symptom presentation, schools must be prepared to provide more extensive supports to students weeks following their injury. "For students with symptoms lasting longer than three weeks, further medical management considerations and accommodations, rather than academic adjustments, may be needed" (Halestead et al., 2013, p. 954). Fortunately, schools are already equipped with support plans via Section 504 and Individualized Education Programs (IEPs), which can be utilized to support students with more severe concussive injuries. In the circumstance of more severe injuries, school districts may also elect to involve concussion specialists who have expertise in supporting students medically and academically following a significant injury.

A Section 504 plan can be provided to students who have sustained a concussion through the Rehabilitation Act of 1973 and Americans with Disabilities Act of 1990. Generally, 504 plans are offered to students who have a medical condition that limit one or more major life function. This plan would be instituted for a student who requires more long-term academic accommodations in his or her regular education classroom. In order for a student to qualify for a 504 plan, the treating physician must provide medical documentation to support the child's presenting condition (Halestead et al., 2013). When students do not respond to this level of support, they may require more significant adjustments to their academic program in the form of modifications and alterations to the site of instructional delivery. This may occur through small group instruction or individualized one-to-one supports.

When symptoms persist for greater than five to six months, a school district may then elect to consider supporting a child via a more intensive support plan in the form of an Individualized Education Program (IEP). IEPs are offered to students who have a condition that prevents them from accessing the general education curriculum without specialized modifications and individualized programing. Through an IEP, a student's academic instruction will be altered in order to meet the students' needs within the educational environment. When additional supports are deemed necessary, Halestead and colleagues (2013) suggest, "the school academic team, including the school psychologist, can provide formal recommendations to the school to make the creation of the 504 plan or IEP that is most relevant to the particular student's greatest needs in the academic setting" (p. 955). In view of the many symptoms impacting the learning process, return to learn initiatives will now be reviewed in order to provide the reader with an understanding of how this ever-present injury is being managed across the United States.

Return to Learn Initiatives

In contrast to RTP policies, which govern the return to athletic competition for our nation's youth athletes, RTL policies are scarce. Presently, all 50 states within the United States are mandated to have active RTP policies and protocols to support student athletes following a head injury. However, as of 2018, only eight states have RTL laws that mandate systematic procedures for students in their return to school and learning following a concussion. Aside from the limited legal mandates to guide RTL, several states have pioneered RTL initiatives that have begun to lead the nation in comprehensive RTL policy development. However, it is interesting to note that Oregon, Pennsylvania and Colorado, states which are presently pioneers for concussion education programs, do not have explicit RTL legislature (Thompson et al., 2016). Nevertheless, Oregon, Pennsylvania, and Colorado have separated themselves from other states in their RTL initiatives, which have led their policies to be considered best practice in the RTL arena.

The BrainSteps program of Pennsylvania advocates for the use of their protocol due to the research, which supports that high levels of cognitive activity prolong concussion recovery. Within Pennsylvania, there have been over 600 school-based concussion management teams established since 2013 (BrainSteps, 2018). The BrainSteps model is multifaceted and provides guidance and supports to students following an array of head injuries. The BrainSteps Concussion Return to School Protocol operates in conjunction with their Concussion Management Team (CMT) model. This initiative is in place in order to support students returning to the demands of school while simultaneously promoting recovery following a concussive injury. The CMT is in place to support student's academics during the school day. This specialized team monitors student athletes and non-athletes alike. In addition to systematic

procedures highlighted within the BrainSteps protocol, a secondary tier of supports is available to students who have not recovered within four weeks via a specialized BrainSteps team.

The purpose of the BrainSteps Return to School Protocol is "to assist local education agencies in understanding the importance of monitoring a student's return to academics following a concussion" (BrainSteps, 2018, p. 2). The BrainSteps Return to School Protocol and CMT is anchored by the use of an Academic Monitor and Symptom Monitor. The Academic Monitor oversees student academic performance using a one-page tool one time per week. Similarly, the Symptom Monitor monitors the student's symptoms using a self-report questionnaire several times per week. The two-person team then meets weekly to guide student supports. This framework is in place to support appropriate academic accommodation implementation within classrooms and then adjust or discontinue accommodations as necessary. This systematic process streamlines supports for students, families and educators in an effort to promote healthy and efficient recovery for students (BrainSteps, 2018).

The REAP (Rest, Educate, Accommodate and Pace) program of Colorado is founded by well-known concussion researcher Dr. Karen McAvoy. Dr. McAvoy and her team have established guidelines for schools and families on how to navigate the return to school and daily activities following a head injury. The REAP model views the first three weeks following a concussive injury as a *window of opportunity* (McAvoy, 2011, p. 1). This belief stems from the growing research base to support that most children recover from a concussion in three weeks if managed appropriately (McAvoy, 2011). Similar to the BrainSteps program, the REAP model operates from a team-based lens, which includes the student, family, school team and medical team. The REAP model explicitly defines roles, responsibilities and recommendations for each key stakeholder in the first three weeks post injury. REAP also suggest the use of an Academic

Monitor and Symptom Monitor along with recurring data collection and meetings to support student recovery (McAvoy, 2011).

The Center on Brain Injury Research and Training (CBIRT) in Oregon has established a recommended protocol for supporting students and student athletes following a concussion. Similar to BrainSteps and REAP, the CBIRT model also recommends a CMT. The CBIRT CMT is typically comprised of four to five members such as teachers, administrators, support staff, nurse and medical providers. In addition, CBIRT also suggests a graduated RTL framework, which includes six levels of reentry ranging from complete cognitive rest to full school participation (Center on Brain Injury Research and Training, 2018). The CBIRT model for RTL is structured as a three-tiered framework and is very similar to the Response to Intervention (RTI) model typically used for academic intervention supports. Through the CBIRT model, tier one supports task the concussion management team to collect data on symptoms while monitoring progress and making modifications as needed. The tier two level of supports offers a more formalized academic plan such as a Health Plan, RTI plan or 504 plan for students who require more significant academic accommodations beyond the typical three to four week recovery window. The tier three level of supports provides intervention for students who experience more severe neurocognitive and physical effects that are long-lasting and may require intervention via an IEP (Center on Brain Injury Research and Training, 2018).

State Level Concussion Mandates

Along with most other states in our nation, Connecticut is lacking in present initiatives to support youth following a concussion. Connecticut Public Act No. 14-66: An Act Concerning Youth Athletics and Concussions (2014) requires that on or before January 1, 2015:

The State Board of Education, in consultation with the Commissioner of Public Health,

the governing authority for intramural and interscholastic athletics, an appropriate

organization representing licensed athletic trainers, and an organization representing

county medical associations, develop or approve a concussion education plan for use by

local and regional boards of education (p. 3).

Each local and regional board of education must then implement such a plan by using

written materials, online training or videos, or in-person training that addresses, at a minimum

the following:

1. The recognition of signs or symptoms of concussion;

2. The means of obtaining proper medical treatment for a person suspected of

sustaining a concussion;

3. The nature and risks of concussions, including the danger of continuing to

engage in athletic activity after sustaining a concussion;

4. The proper procedures for allowing a student athlete who has sustained a

concussion to return to athletic activity;

5. Current best practices in the prevention and treatment of a concussion (p. 5).

As a result of the aforementioned legislature, the Connecticut Concussion Education

Plan and Guidelines for Schools (2015) was developed. Within the guidelines, there is extensive

information regarding the parameters for return to play progression and correlated requirements

of coaches and athletic staff. Yet, the guidelines do not include any explicit requirements for

schools to follow in transitioning students back to the learning environment. Within the

guidelines it states, "school concussion management teams may be formed to create and

implement a concussion management plan with sound procedures that support a concussed

student" (Connecticut Concussion Education Plan and Guidelines for Schools, 2015, p. 21). The

guidelines do not reference any specific RTL procedures or policies. Specifically, the guidelines state, "school districts should customize the concussion education plan by incorporating their local or regional board of education policies and procedures related to concussion education, prevention and management" (p. 18). In addition, the guidelines reference the potential use of a concussion management team, concussion education for student athletes and parents and reporting procedures. It is clear that significant state-level improvements must be made in order to better support students who have sustained a concussion in their return to school. The following section will review explicit strategies schools can adopt in order to enhance their current RTL procedures.

Improving School Readiness

Given the present statistics on concussion frequency within the United States, the likelihood of schools encountering a child who has sustained a concussion is an eventual inevitability. Schools must be provided with the framework and education in order to institute effective systems to manage students who return to school following a concussion. With explicit guidelines and procedures, schools will be equipped to offer students the necessary interventions in order to ensure safe and efficient return to pre-injury functioning. Fortunately, schools are already experts in instituting programs to provide supports to students (e.g., scientifically research based interventions, 504 plans, Individualized Education Plans). Given this foundation, schools are structurally equipped to adopt an RTL program.

In order to adopt a comprehensive RTL policy, the establishment of team-based procedures is essential. Fortunately, team-based committees and initiatives are commonplace within schools; and the adoption of a school-based RTL committee can easily fall within a schools existing structure. In order to ensure well-managed care for injured students,

collaboration between the student, family, healthcare professionals, and school staff is critical. School-based CMT would be logical choice for spear-heading these collaborative efforts (Brainsteps, 2018; CBIRT, 2018; Halestead et al., 2013; REAP, 2011). Each CMT will be tasked with ensuring that lines of communication are open amongst key stakeholders and that the required intervention supports are adequate in meeting student needs. Through a team approach, schools will likely encounter fewer obstacles with providing care to their students. Halestead and colleagues (2013) suggest, "a comprehensive team approach to care may help reduce mistakes in management, which could potentially risk re-injury during the healing phase, lengthen recovery, or result in untoward long-term outcomes" (p. 956). Similarly, Baker and colleagues (2014) identify a team approach as a guiding principal of an effective RTL program.

The school team, medical team, and child's family must work cohesively in order to effectively communicate and collaborate on behalf of the child. Halestead and colleagues (2013) suggest that all three teams must be actively involved in managing a concussion. Further, all schools must recognize the importance of a team approach for supporting students following a concussion in order to ensure smooth reentry to school. The primary goal of a CMT is to identify necessary adjustments that are required in order to promote efficient healing and limit symptom exacerbation. Halestead and colleagues (2013) suggest that, "the multidisciplinary teams should be well versed in their roles and responsibilities in concussion management and keep communication open among all parties regarding decisions to progress, regress, or hold steady during the RTL process" (p. 951). Once a school identifies an RTL framework that meets their needs, it is important that direct education occurs for all staff members. Teachers and school staff must have the necessary knowledge in order to recognize and support concussions in

their schools. Therefore, avenues for providing school-based education on concussion management will now be reviewed.

Concussion Education

Individuals who are involved in supporting students following a concussion, namely families, medical providers and school personnel, should have general knowledge regarding the presentation of concussions and correlated symptoms in order to best support the child and his or her recovery. Presently, mandated RTL education for school personnel is uncommon. Based on a review of RTL legislature conducted by Thompson and colleagues in 2016, only two states (Maryland and New York) in the United States mandate concussion education for school staff. Halestead and colleagues (2013) indicate that explicit concussion education should be provided to an array of school personnel including administrators, athletic directors, teachers, school counselors, school psychologists, coaches, school nurses and athletic trainers. Concussion education sessions can then be customized based on the practitioner's role and student involvement. Further, specific information should be provided regarding concussion management procedures and the schools adopted model of intervention. In addition to school staff, it is also suggested that medical processionals undergo a formalized education on concussion management and supports in order to effectively collaborate with school staff during this critical time of recovery for children.

Concussion education is an essential component of effective RTL support plans within the academic setting. Gioa (2016) suggests that a critical component of effective RTL management is developing a school or system-wide education program regarding concussion etiology and effects. It is suggested that concussion education occur at the start of the school year, so all staff are prepared to support students with a concussive injury when it occurs.

Fortunately, most schools already provide several trainings to their staff at the start of the school year such as blood born pathogens, school safety, and child abuse reporting. Concussion education and intervention procedures could similarly be offered to staff during a professional development that occurs prior to the start of the school year. Additionally, Gioa (2016) relays that school staff must be familiarized with the basic principals involved in support a child's return to school including classroom teachers and coaches. Similarly, Graff and Caperell (2016) purport that the majority of those working in education are not familiar with concussion guidelines and how concussions and classroom work are interconnected.

In order to improve the symptoms and ensure an efficient recovery for all students, it is necessary to educate all those involved in the child's treatment (Graff & Caperell, 2016). Dreer, Crowley, Cash, O'Neill and Cox (2016) utilized a cross-sectional survey to assess teacher knowledge related to supporting students following a concussion. Their results suggest that 82% of teachers felt the need for additional concussion education in order to effectively support their students. Professional development is required in order to ensure that all educational staff is equipped to support students upon their return to school. Concussion education can occur through a traditional professional development model delivered by a school or community-based expert, a contracted specialist or online training. Exploration of the success of an online training platform for concussion education was reviewed by Graff and Caperell in 2016. Their findings suggest that online training modules can be effective in improving educator's knowledge of best practice RTL recommendations.

Summary

There is a growing research base that suggests concussions have a direct and marked impact on school functioning. Specifically, approximately 70% of concussions affect the frontal

lobe, which mediates higher intellectual tasks, learning and retention of new information, all facets that are fundamental to learning (Graff & Caperell, 2016). It is imperative that teachers and school staff have a clear understanding that concussions can impair cognitive functioning including delayed processing speed, trouble concentrating, weakness in memory recall and retention and limited mental stamina (Baker et al., 2014). As a result, it is critical that school districts and educators are prepared to support students upon their return to school following a concussive injury. Gioia (2016) suggests that there is a national need to implement systematic school-based concussion awareness, education, and management programs. On a national scale, initiatives regarding concussion awareness, prevention and protocols has evolved within the athletic arena. However, these developments have yet to carry over to schools. In order to best serve our students, significant efforts must be made in order to better understand and institute policies and procedures to support students following a concussion. Accordingly, it is important that a strategic assessment occurs regarding the status of RTL policies and procedures in order to determine next steps for schools, educators and families.

CHAPTER THREE

METHODOLOGY

This chapter will review the methodology for the present study. The study was designed to be implemented in two phases. The purpose of Phase I of this study was to review Return to Learn (RTL) concussion policies within Connecticut public schools to evaluate their comprehensiveness in order to support students following a concussive injury. The purpose of Phase II of this study was to examine the impact of RTL policies on the general concussion knowledge of Connecticut's classroom teachers. While strategic RTL supports are recommended in order to ensure student success, a small number of schools have comprehensive RTL policies. In 2015, the state of Connecticut released Concussion Education Plan and Guidelines for Connecticut Schools. Within this plan, it states, "school districts should customize the concussion education plan by incorporating their local or regional board of education policies and procedures related to concussion education, prevention and management, including: identification of a school concussion management team and identification of roles and responsibilities of members of the school concussion management team and school personnel" (Connecticut State Department of Education, p. 18). However, these guidelines do not explicitly mandate the requirement for school-based educational supports for students following a concussion. Therefore, exploratory research was deemed necessary in order to determine the educational comprehensiveness of RTL plans within Connecticut's public schools. The following sections will review the design, population, sample and instruments used in the present study.

Research Design

This study utilized a descriptive research design with embedded causal-comparative research and evaluation methods. Gall, Gall, and Borg (2003) state that research methods can be characterized as having four general purposes: description, prediction, improvement, and explanation. Descriptive research aims at explaining the characteristics of a sample at one point in time. This project aimed to assess how well-equipped Connecticut schools are to support their students following a concussive injury. At the time of the present analysis, a review of Connecticut's return to learn policies had yet to occur. McMillian (2000) offers that descriptive research is valuable when an area is first investigated.

Phase I: Return to Learn Assessment Protocol

Data collected during Phase I of research examined the comprehensiveness of Connecticut public school RTL policies. Comprehensiveness was operationalized to include academic (i.e. educationally-rooted accommodations and modifications), medical (i.e. emergency and short-term medical management strategies) and policy accessibility (i.e. accessibility of the policy, location, contents) features. The RTL Assessment Tool was strategically designed to address the research question. Similarly, the developed protocol for data collection and analysis was systematically followed in order to ensure a high level of fidelity. Following the development of the protocol and procedures, the RTL policies were methodically collected using public records and then analyzed for comprehensiveness using the Return to Learn Assessment tool by multiple trained coders. These data were then analyzed using measures of central tendency and a chi-square test of independence.

The dependent variables examined for this study were the comprehensiveness of Connecticut Return to Learn plans as measured by the Return to Learn Assessment protocol (see

Appendix A). Review of the literature suggests that a comprehensive RTL plan contains

components under the following key themes: medical, academic and accessibility features (Gioia

et al., 2016; Halestead et al., 2013 & 2016; Ransom et al., 2015). For the purpose of this project,

the aforementioned aspects of the RTL plans were considered independent variables.

Phase II: Concussion Care Survey

During Phase II of research, data were collected regarding classroom teachers concussion

knowledge using the Concussion Care survey (See Appendix D). In order to derive these data, a

survey was generated that aimed to ascertain teacher concussion knowledge. The survey was

created using synthesized information from best practice concussion education materials. The

survey was distributed to Connecticut public school principals were contacted via email and

asked to disseminate a short Concussion Care survey to classroom teachers. These data collected

from the survey were used to determine if the presence of a RTL policy enhances teacher

knowledge and competence in supporting students following a concussive injury. The

anonymous survey data were grouped based on the presence or absence of a RTL policy.

Following the collection of survey data, the results were analyzed using causal-comparative

methods. A causal-comparative method seeks to investigate cause and effect relationships

between variables (Gall, Gall & Borg, 2003). Through this design, the presence or absence of a

RTL policy was evaluated to determine if the groups differ in their ability to support students

following a concussion. The evaluation methods that were used in order to determine this

difference were: a *t*-test and Measures of Central Tendency. The total Concussion Knowledge

score, as measured by the Concussion Care survey, was considered a dependent variable.

Connecticut Public Schools with and without Return to Learn Policies were considered an

independent variable.

Population and Sample

The following section will review the population and sample for this project. The information will be strategically reviewed by phase.

Phase I: Return to Learn Assessment Protocol

During the first phase of research, the identified RTL policies were evaluated. There is a total of 163 public school districts within the state of Connecticut. Of the 163 school districts, a total of 14 districts are considered regional or magnet organizations. Regional and magnet schools were excluded from the sample as they educate students from a variety of originating school districts which precluded the ability to the determine the presence or absences of RTL due to convergence of school district policies. As a result, a total of 149 school districts were identified for inclusion in the sample. For the present analysis, the investigator conducted a comprehensive review by strategically accessing publicly available information via school websites and direct follow up with school principals in order to determine the presence or absence of a RTL policy for each of the 149 Connecticut public school districts. In order to be included within the sample, schools were identified based on the presence of a RTL policy, or a concussion management plan that indicates the implementation of academic supports for students following a concussive injury. The aim of this phase of the study was to evaluate the presence and comprehensiveness of RTL policies; therefore, Return to Play (RTP) policies were not considered in the present analysis. Following this review, the identified RTL policies were then evaluated using the Return to Learn Assessment tool. This tool provided information regarding the overall comprehensiveness of the policy as well as indicators for the academic, medical and policy accessibility features.

Phase II: Concussion Care Survey

During the second phase of research the Concussion Care survey was distributed. The population for the Concussion Care Survey were the 149 Connecticut public school districts utilized within the sample for Phase I. School districts were not excluded based on the presence or absence of an RTL policy. The survey was emailed to Connecticut public school principals with the request that it was disseminated to classroom teachers for their completion. Classroom teachers were identified as ideal candidates to complete the survey as they directly work with students who have sustained concussive injuries. These data were then analyzed based on the grouping criteria and assessed for overall concussion knowledge. The sample for this portion of the investigation consisted of teachers who completed the survey. The survey results were then sorted based on the presence or absence of an RTL policy within their respective districts.

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Instruments

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The following section will describe and review the instruments used for Phase I and Phase II of this project.

Phase I: Return to Learn Assessment Protocol

The comprehensiveness of the RTL plans was determined utilizing the Return to Learn Assessment Protocol. This protocol was utilized to code the RTL plans and determine an overall score under three major domains: accessibility features, academic features and medical features. The overall and aforementioned sub-scores scores gave an indicator as to how well the plan, if implemented with reliability, provides supports to students following a concussive injury. The inter-rater reliability and validity of the instrument was perceived to be strong. The Return to Learn Assessment Protocol was developed through a systematic review of Best Practice RTL policies, associated literature and consultation with medical professionals within the field.

Specifically, BrainSTEPs, Center on Brain Injury Research and Training (CBIRT) and the REAP model were reviewed and analyzed in the development of the RTL Assessment Protocol. Further, a medical expert was also consulted in order to ensure that the protocol met appropriate medical standards of care. Following review of the aforementioned resources, the assessment protocol was created by synthesizing essential areas of importance under three primary domains: academic, medical, and accessibility features.

As reviewed in the previous chapter, medical care is a critical component of comprehensive care for students who have sustained a concussion. Therefore, essential medical features were outlined in the development of the RTL assessment protocol. This domain aimed to measures the degree to which the Return to Learn plan had the necessary medical components in order to ensure safety and required student supports. These features may include: immediate removal from activity, notifying parents and guardians, collaboration with the treating physician, etc. (Brainsteps, 2018; CBIRT, 2018; REAP, 2011). The medical aspects of the identified RTL protocols were assessed using the Medical Features section of the Return to Learn protocol that was developed as an assessment tool for this project.

As reviewed in the previous chapter, strategic academic interventions are important components of comprehensive care for students who return to the learning environment following a concussion. Therefore, essential academic intervention features were outlined in the development of the RTL assessment protocol. The academic features of the RTL assessment protocol aimed to measure the degree to which the identified RTL plan has the necessary academic intervention components in order to ensure comprehensive classroom-based supports for the injured student. Such features may include: accommodations and modifications to the curriculum, limiting excess stimuli, shortened tasks, etc. (Brainsteps, 2018; CBIRT, 2018;

REAP, 2011). The academic aspects of the identified RTL protocols were assessed using the Academic Features section of the RTL protocol that was developed as an assessment tool for this project.

In addition to medical and academic interventions, a comprehensive RTL protocol must also contain important fundamental features that ensure ease of access and implementation. Therefore, the overall accessibility of the RTL assessment protocol aimed to measure the degree to which the RTL plan had the necessary functional components in order to ensure that the plan was accessible and included characteristics that promoted ease of understanding and explicit implementation guidelines. Such features included: a clearly defined purpose, indication of staff training, contact information, etc. The accessibility aspects of the identified RTL were assessed using the Policy Accessibility Index section of the Return to Learn protocol that was developed as an assessment tool for this project.

Return to Learn Assessment Protocol Scoring Procedures

The Return to Learn Assessment Protocol evaluated each of the identified RTL policies using a structured framework that provided an overall score under three primary domains: Policy Accessibility Features, Medical Features and Academic Features. Under each domain there were a set of criteria that had to be reviewed in order to determine the presence or absence of a critical feature. Depending upon the content of the policy, each sub-domain question was scored using a three-point Likert scale indicating a 0-Low, 1- Moderate and 2- High score for the criteria. The sub-scores were then totaled into domain scores for the policy. Therefore, the higher the domain and total scores, the more comprehensive the protocol. The three domains within the RTL Assessment Protocol were not equally distributed. The Policy Accessibility Index was comprised of 5 questions with a total of 10 possible points, the Medical Index was comprised of

12 questions with 24 possible points, and the Academic Index was comprised of 16 questions with 32 possible points.

Phase II: Concussion Care Survey

The Concussion Care survey was generated in order to evaluate group differences in concussion knowledge between districts with and without formalized Return to Learn polices. The survey was generated utilizing materials from established RTL training programs and publications (Centers for Disease Control, 2017; Rocky Mountain Youth Sports Medicine Institute, 2017; Concussion CORPS, 2017). Following review and synthetization of these programs and publications essential facts and strategies were identified. Once these facts and strategies were reviewed, key terms and information of critical importance were identified and transposed into a true or false question format for the survey. The questions were then reviewed for clarity and in order to limit redundancy. In addition, a medical expert was consulted in order to ensure that the survey questions met appropriate medical standards. Questions that were determined to be unclear or extraneous were revised or removed. Ultimately, the survey items chosen for this instrument aimed to explicitly assess classroom teachers' basic knowledge of concussions and concussion management within the educational setting.

The first four questions of the survey required participants to answer demographic information regarding their school district, grade levels taught, prior concussion training and their knowledge of the presence or absence of a RTL policy. Following the demographic questions, participants were then asked to complete 27 survey items that aimed to ascertain their concussion knowledge. All 27 questions were answered by the respondents either selecting if the statement was true or false. Responses to each of these items was forced; therefore, a selection was required for each item on the instrument. In total, the higher the obtained score on

the instrument the greater level of concussion knowledge. The survey included distractor items that were reverse scored if answered correctly. In total, participants could score 26 possible points on the survey. The final survey question (item 35) was administered in a matrix format and did not factor into the total score. This question asked participants to select appropriate school-based accommodations for students who have sustained a concussion. Respondents could select accommodations from a list of twelve possible choices. The Concussion Care Survey can be found in Appendix C.

Following development of the instrument, the Concussion Care survey was distributed to Connecticut public schools classroom teachers in order to discern if teachers who work in schools that have RTL policies had greater levels of concussion knowledge as compared to teachers who work in schools without RTL policies. The survey was distributed to all middle and high school principals in Connecticut who work in one of the 149 school districts included within the preliminary sample.

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Procedures

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The following section will outline and describe the procedures used for Phase I and Phase II of this project.

Phase I: Return to Learn Assessment Protocol

Careful examination of return to learn policies that exist within Connecticut afforded meaningful information regarding the cohesion and quality of academic supports provided to students following a concussive injury. Connecticut public schools were identified based on the presence of a RTL policy, or a concussion management plan that indicates the implementation of academic supports for students following a concussive injury. For the purpose of this project, 149 public school districts within the state of Connecticut were included in this review for

inclusion in the sample. Return to Play policies were not considered in the present analysis. The districts with a formal RTL policy were included in the analysis and their policies were obtained. Policies were identified via school websites, policy manuals, handbooks and direct contact with school personnel. In order to ensure that accurate data collection occurred. The following procedures were adhered to in order to strategically collect policies from each Connecticut public school district:

1. Retrieve a list of all 163 Connecticut public schools from the State Department of Education website (Connecticut State Department of Education, 2018).

2. Transfer list of schools to a data tracking system (e.g. Microsoft Excel)

3. Systematically review the list in alphabetical order adhering to the following sub-steps in order to retrieve a school districts RTL policy.

   a. Visit the school district website and record the school website URL within the data tracking system.

   b. Access the school district policy manual. Within the policy manual, identify the presence of a formalized concussion policy. This policy will likely be found under the "Series 5000, Students" subsection.

      i. Once the policy is located, the document will then be saved to the hard drive of the investigator's computer for further review using the following naming procedure "District Name_RTL Policy".

      ii. The data tracking system will be updated to reflect that a policy was located.

c. If the policy was not located within the aforementioned step, visit the websites of the high, middle, and elementary schools within the district and identify the policy under the:

    i. nurse's home page

    ii. student/parent handbook

    iii. athletic home page

    iv. general search via search bar for *concussion*

d. If the policy cannot be located under any of the aforementioned areas the presence of a policy will be coded as "not located" within the data tracking system

e. Prior to leaving the district's website, email addresses for middle and high school building principals within the district were collected and stored within the data tracking system. This information was used to distribute the Concussion Care survey and confirmation on the presence or absence of an RTL policy.

f. A follow up email requesting the district's RTL policy will be made within the email to principals containing the Concussion Care survey.

Following a review of the 149 Connecticut school districts for the presence or absence of an RTL policy, the policies were then de-identified and assigned a code. The policies were then evaluated using the Return to Learn Assessment Protocol by multiple trained coders. The use of multiple coders was aimed at ensuring strong fidelity of the derived results. Additional information regarding the cross-coding procedure will be reviewed in Chapter 4. The RTL Assessment Protocol provided an overall score for Comprehensiveness and three sub-domain scores: Medical, Academic, and Accessibility features. Following the scoring of the policies, the derived data were analyzed to determine levels of comprehensiveness of each school district.

Phase I: Independent Variables

Review of the literature suggests that a comprehensive RTL plan contains components under the following key themes: medical, academic and accessibility features. For the purpose of this project, the aforementioned aspects of the RTL plans were considered independent variables. In addition, Connecticut Public Schools with and without Return to Learn Policies were also considered independent variables.

Phase I: Dependent Variables

The dependent variables for phase I of this study were the comprehensiveness of Connecticut Return to Learn plans as measured by the Return to Learn Assessment protocol. In addition, the domain General Knowledge as measured by the Concussion Care survey, was also considered a dependent variable. Connecticut public schools with and without RTL Policies were considered an independent variable. Table 2 summarizes the latent and observed variables, information source, and the validity and reliability of each variable.

Phase II: Concussion Care Survey

The Concussion Care survey was distributed via Qualtrics to Connecticut public school principals for completion. Classroom teachers were identified as ideal candidates to complete the survey as they work directly with students who have sustained concussive injuries. The survey was distributed to districts with and without formalized RTL policies. The survey was emailed to building principals with the request that it was disseminated to classroom teachers for their completion. Participation in the survey was voluntary. The email to principals explained the purpose of the study, the estimated time of completion, a description of the survey used, information on how to withdrawal from the study, as well as information about IRB approval. Additionally, the survey included informed consent. All data collected were kept confidential.

The only identifying information that was collected were email addresses. This information was used to enter the participants into a raffle to win a drawing for a $50 Amazon gift card. This information was kept separate from the survey data that were collected.

Following survey distribution and data collection, the survey results were then aggregated based on the presence or absence of an RTL policy. Following the aggregation of the survey responses, these data were then analyzed for overall differences in general concussion knowledge and concussion intervention knowledge. All survey results from districts with the presence of an RTL plan were included in one sample while districts without a formalized RTL policy were included in a second sample. The survey results were analyzed to determine if there is a difference in general concussion knowledge based on the presence of a RTL policy.

Phase II: Independent Variables

Connecticut public schools with and without RTL Policies were considered independent variables for Phase II of this study.

Phase II: Dependent Variables

The dependent variable for Phase II of this study was the domain General Knowledge as measured by the Concussion Care survey. The following table summarizes the latent and observed variables, information source, and the validity and reliability of each variable:

Table 1

Latent Variables, Observed Variables, Information Source, Validity, and Reliability

Latent Variable	Observed Variable	Instrument/ Source	Validity	Reliability
Comprehensiveness	Medical Academic Accessibility sub scores	RTL Assessment Protocol	--	--
Medical Features	Medical Features	RTL Assessment Protocol	--	--
Academic Features	Academic Features	RTL Assessment Protocol	--	--
Accessibility Features	Accessibility Features	RTL Assessment Protocol	--	--
Concussion Knowledge	Concussion Knowledge	Concussion Care Survey	--	--

Statistical Analyses

The following section will review and describe the statistical analyses used for Phase I and Phase II of research.

Phase I: Return to Learn Assessment Protocol

To analyze these data for the first research question, measures of central tendency and chi-square were utilized. The chi-square analysis was utilized in order to determine whether the Medical, Academic, and Policy Accessibility scores within the RTL Assessment protocol differed significantly from one another. In order to utilize a chi-square test, it was assumed that these data are nominal (i.e. categorical) and that were at least two or more independent, categorical groups within the data set. Lastly, measures of central tendency were utilized in order to determine levels of comprehensiveness of the evaluated protocols.

Phase II: Concussion Care Survey

To analyze these data for the second research question, measures of central tendency and a *t*-test were utilized. The *t*-test was utilized in order to determine if there was a significant

difference in teacher knowledge between schools with and without formalized RTL policies (Gall, Gall, & Borg, 2003). This statistical procedure aimed to address whether the survey answers vary significantly between teachers with and without formalized RTL policies. In order to conduct a *t*-test, it was assumed that these data are interval and that the dependent variables are normally distributed. It is also assumed that there is homogeneity of variance within each group of participants. (Borg, Borg, & Gall, 2003). Lastly, measures of central tendency were utilized in order to evaluate the mean scores obtained on the Concussion Care survey in order to establish indicators of overall concussion knowledge.

Research Questions and Hypotheses

The following section will review the research questions and hypotheses for Phase I and Phase II of this project.

Phase I: Return to Learn Assessment Protocol

What is the comprehensiveness of Return to Learn (RTL) policies within Connecticut Public Schools as measured by the policy accessibility, academic, and medical components of the Return to Learn Assessment protocol? This research question aimed to examine the comprehensiveness of RTL policies within Connecticut Public Schools. This question was designed to determine how well the policies can support students academically and medically following a concussive injury as measured by the Return to Learn Assessment Protocol. It was hypothesized that the RTL plans would vary significantly; some districts would have plans that were well established in targeting the predetermined essential areas, while others may be limited in their scope. Given this perceived discrepancy, it was hypothesized that as a sum, Connecticut's RTL plans, were underdeveloped and need to be improved in order to best serve the students of Connecticut.

In addition to the aforementioned hypothesis, a secondary hypothesis was that school districts will have greater medical comprehensiveness within their plans as compared to academic comprehensiveness. School districts appear to have a stronger understanding of medical supports for students following an injury; this may be associated with the Connecticut Public Act 14-66 (2014), which mandates Return to Play guidelines within Connecticut Public Schools. Thompson and colleagues (2016) suggest that 87.5% of laws hold schools responsible for establishing an RTL management plan (p.4). At this time, there is no data available regarding the extent to which RTL laws have been implemented at the district or school level.

Phase II: Concussion Care Survey

Does the presence of a Return to Learn (RTL) policy effect general concussion knowledge as measured by the Concussion Care Survey? This research question assessed whether having a Return to Learn (RTL) plan effects classroom teacher's general concussion knowledge as measured by the Concussion Care survey. The survey was generated utilizing materials and publications from formalized RTL training programs (Brain STEPS, REAP, Concussion CORPS). This research question was aimed at identifying if there is difference in concussion knowledge and concussion intervention between Connecticut Public School teachers who have formal RTL plans within their schools as compared to those without active policies. Specific attention was paid to two primary areas: school-based concussion management and general concussion knowledge. It was hypothesized that districts with formal RTL polices would have a greater knowledge and understanding of concussions as compared to those districts without a formalized plan.

Table 2

Research Questions, Hypotheses, Variables, Statistical Analyses, and Statistical Assumptions

Research Questions	Hypotheses	Variables	Statistic	Assumptions
1. What is the comprehensiveness of Return to Learn (RTL) policies within Connecticut Public Schools as measured by the accessibility, academic, and medical components of the Return to Learn Assessment protocol?	1)Results will vary between districts. 2)Better medical comprehensive-ness versus other domain areas.	Medical Comprehensiveness, Academic Comprehensiveness, Policy Accessibility	Central Tendency, Chi-Square	1) Nominal Data 2) Two or more independent or categorical groups
2. Does the presence of a Return to Learn (RTL) policy effect general concussion knowledge as measured by the Concussion Care Survey?	Presence of an RTL policy will increase teacher knowledge.	Concussion Knowledge	Central Tendency, *T*-test	1) Interval or ratio scale 2) Normally distributed populations 3) Score variances are equal 4)Adequate sample size 5)Homogen-eity of variance

Timeline

      Please see Table 3 for a description of the tasks associated with the current study. Also,

see the Appendix for a sample emails and passive consent documentation that will be presented

to the principals and teachers.

Table 3

Project Task Table

#	Name	Description	Begin	End	Person(s)
1	IRB Proposal and Approval	IRB Proposal submission and approval	8/17	8/17	Researcher and Dissertation Chair
2	Construct Survey and RTL Protocol	Finalize Survey, add to Qualtrics, Finalize Protocol	8/17	8/17	Researcher and Dissertation Chair
3	Present Prospectus	Review Research prospectus with dissertation committee	9/17	9/17	Researcher and Dissertation Committee
4	Defend Chapters 1-3	Present Chapters 1-3 to dissertation committee	6/18	5/18	Researcher
6	Data Collection	Distribute Survey and Code Protocols	9/18	9/18	Researcher
7	Statistical Analysis	Statistical analysis of data	11/18	11/18	Researcher
8	Report Preparation	Interpret analysis results	11/18	11/18	Researcher and Dissertation Chair
9	Report Review	Review and refine report	12/18	12/18	Researcher
10	Report Presentation	Present final report to dissertation committee	4/19	4/19	Researcher and Dissertation Committee

Threats to Validity

The purpose of this study was to determine the comprehensives of RTL policies within Connecticut public schools (Phase I). In addition, this study also sought to determine if classroom teachers who work in schools with RTL policies have greater concussion knowledge and concussion intervention knowledge (Phase II). Internal validity is the degree to which you can determine a cause and effect relationship between variables (APA, 2018). One potential threat to internal validity for this study included instrumentation and scoring of the RTL assessment protocols. Although the protocols and procedures for scoring were strategically designed to promote ease of use, understanding and strong validity, the possibility of human error exists. Construct validity was considered a threat to external validity for this project. In the development of the grading protocol, three essential themes were identified as overarching areas of focus: Academic, Medical, and Accessibility. As a result, each protocol was given an overall score as well as sub-scores for the aforementioned constructs. For the purpose of this project, construct validity refers to the whether the developed protocol adequately measured the RTL plans under each of the essential themes

External validity is the degree to which the results of the study can be generalized to other situations or groups of people. For the purpose of this project, one potential threat to external validity was the use of a small sample (Gliem & Gliem, 2003). By limiting this study to the state of Connecticut, an accessible sample was utilized, this may make it difficult to generalize the findings to a larger population and impact the study's overall generalizability. Second, each researcher affects the settings in a different way which may impact the research. Third, the identified definition of terms may vary between populations. Therefore, explanations of terms may vary between groups. Lastly, extraneous variables are variables that may impact

the independent variable and therefore the results of the study (APA, 2018). For the purpose of this project, potential extraneous variables that may limit the results of this study were fidelity and population validity.

Threats to Reliability

Reliability is the extent to which other researchers can arrive at similar findings if they studied the same information using the same procedures (Gall, Gall, & Borg, 2003). With respect to this study, the following threats to internal validity were considered. First, the categories identified within the RTL protocol may not have adequate evidence; therefore, interpretation of the findings may vary. Second, the evaluation of the policies themselves was left to interpretation of one researcher which may impact the final results. Third, the selection and identification of RTL policies is left to the researcher and may impact the identified procedures and ease of replication. Fourth, the coders analyzing the policies may generate different findings. This area of concern will aim to be addressed by using a test-retest procedure with multiple coders for a sample of policies that were reviewed. Lastly, these data that was collected will be affected by the situational context and delineation of the researcher. Specifically, the grouping criteria for districts with and without identified RTL policies may not account for individual teachers within either group who have expertise in pediatric concussion intervention supports.

Summary

This chapter outlined the methodology for the study. The research design, sample, instruments, procedures, and statistical analyses were discussed. Each statistical analysis was discussed in relation to the proposed research questions.

CHAPTER FOUR

RESULTS

Overview

During Phase I of research, Connecticut public schools RTL concussion policies were

evaluated using the Return to Learn Assessment tool. An overall score and three subdomain

scores (Policy Accessibility, Medical Features, and Academic Features) were derived for each

policy. A secondary purpose of this study was to examine the impact of RTL policies on the

general concussion knowledge of Connecticut's classroom teachers. During Phase II of research,

data were obtained in order to explore possible differences in teacher knowledge in school

districts with and without formalized RTL policies. This chapter will review these data collected

from the Return to Learn Assessment protocol (Phase I) and Concussion Care Survey (Phase II)

as they pertain to each of the research hypotheses.

Sample Characteristics

The following section will describe and review the sample characteristics for Phase I

and Phase II of this project.

Phase I: Return to Learn Assessment Protocol

A systematic analysis of Connecticut Public schools was conducted in order to determine

the presence or absences of a RTL concussion policy. The steps taken to establish the inclusion

criteria, exclusion criteria, and data coding are available in Chapter 3. There is a total of 163

public school districts within the state of Connecticut. Of the 163 school districts, a total of 14

districts are considered regional or magnet agencies. Regional and magnet schools were

excluded from the sample as they educate students from a variety of originating school districts

which precluded the ability to the determine the presence or absences of RTL due to

convergence of school district policies. As a result, a total of 149 school districts were identified

for inclusion in the sample. Out of the 149 school districts that were included in the sample, 24

school districts (16%) were identified to have a RTL policy, or a policy that contained academic

intervention information. In comparison, 125 school districts (84%) were not found to have a

RTL policy, or a concussion policy that contained academic intervention information.

Phase II: Concussion Care Survey

The Concussion Care Survey was distributed via email to 149 public school districts in

the state of Connecticut. The sample utilized for Phase I of research was also utilize for the

Phase II. There were 220 total survey responses. However, 18 responses were identified as

incomplete due to one or more missing items.   The 18 incomplete response were removed from

the data set which resulted in a total of 202 survey responses that were included in the analyzed

sample. Of the 202 responses, 119 were from districts that were not identified to have a RTL

policy and 83 were from school districts with an identified RTL policy or a concussion policy

that included academic intervention information. Of the 202 respondents, 78 respondents

worked at an elementary or middle school and 124 respondents worked at a high school. In

addition, 98 respondents indicated that they had previous training on concussion management

while 104 respondents indicated that they had not.

Table 4

Phase II: Sample Characteristics

Sample Characteristics	Frequency	Percentage of Total Sample
Responses from Teachers with RTL	83	41.09%
Responses from Teachers without RTL	119	58.91%
Primary School Teachers	78	38.61%
Secondary School Teachers	124	61.38%
Teachers with Concussion Training	98	48.51%
Teachers without Concussion Training	104	51.48%

Data Screening

The following sections will describe the data screening process for Phase I and Phase II of research for this project.

Phase I: Return to Learn Assessment Protocol

Prior to analyzing the data collected via the Return to Learn Assessment tool, these data were screened for missing items, accurate entry into SPSS, and for the underlying assumptions of the analyses used to address the first hypothesis. All underlying assumptions were met. In addition, a secondary and tertiary coder were utilized to establish inter-rater reliability. These data were exported directly from Microsoft Excel to SPSS, and they were coded once in SPSS. Descriptive statistics, frequencies and chi-square analyses were calculated to address the first research question.

Phase II: Concussion Care Survey

Prior to analyzing these data collected through the Qualtrics online survey, data were screened for missing items, accurate entry into SPSS, and for the underlying assumptions of the analyses used to address the second hypothesis. Data were exported directly from Qualtrics to SPSS, and they were coded once in SPSS. Once imported into SPSS, these data were checked in order to ensure they met the underlying assumptions required for the proposed analysis. Skew and kurtosis data are depicted in Table 9 to inspect normality. All skew and kurtosis scores fell within the moderate range, apart from the skew for School Districts without RTL which was within the approximately symmetric range. In order to conduct a *t*-test, it was confirmed that the sample had include two independent groups, normally distributed populations and a continuous dependent variable.

Table 5

Concussion Care Survey Descriptive Summary

Scale	*M*	*SD*	Range	Skew	Kurtosis
Concussion Care Survey Total Score	23.17	1.21	19-26	-.149	.040
School Districts with RTL	23.34	1.28	19-26	-.519	.634
School Districts without RTL	23.05	1.14	21-26	.125	-.258

Instrumentation

The following sections will describe the instrumentation used for Phase I and Phase II of research for this project.

Phase I: Inter Class Correlation Analysis

An interclass correlation analysis is a measure of reliability of an instrument that has more than one rater. For the purpose of this analysis, two secondary coders were utilized in order to cross examine the utility and reliability of the Return to Learn Assessment Tool. The primary researcher coded all of the policies included within the analysis while the secondary and tertiary coders each reviewed a quarter of the sample. The secondary and tertiary coders are educational professionals who work in secondary schools. Both individuals have master's degrees and were provided with a training on how to use the RTL Assessment Protocol prior to coding. The results of the intraclass correlation analysis indicated strong reliability r (23,736) = .895, $p < .01$. Overall, the instrument demonstrated agreement between raters and; therefore, strong reliability as measured by the intraclass correlation coefficient. According to Koo and Li (2016), intraclass correlation values of less than .5 are indicative of poor reliability, values

between .5 and .75 indicate moderate reliability and values between .75 and .9 indicate good

reliability, and values of greater than .9 indicate excellent reliability.

Phase II: Concussion Care Survey Reliability Analysis

The reliability of the Concussion Care Survey was examined using Kuder-Richardson

20 coefficient. Kuder-Richardson 20 is a measure of internal consistency, or the extent to which

participants consistently responded to similar items (Gliem & Gliem, 2003). This measure

determines whether scale items consistently measure the same construct. Internal consistency

for the survey items on the Concussion Care Survey was .537. Kuder-Richardson 20 can range

from 0 to 1, the closer the coefficient is to 1 the more reliable the instrument. According to

Gliem and Gliem (2003), a Kuder-Richardson 20 coefficient of greater than .7 is acceptable,

while a coefficient of less than .6 is questionable and less than .5 is poor.

Phase I: Data Analysis and Hypotheses Results

Research Question 1. What is the difference between the Policy Accessibility, Medical

and Academic features of Return to Learn (RTL) policies within Connecticut Public Schools as

measured by the Return to Learn Assessment protocol? It was hypothesized that the RTL plans

would vary significantly; some districts would have plans that were comprehensive and met

criteria of the predetermined essential areas, while others may be limited in their scope. Given

this expected variability, it was further hypothesized that the majority of Connecticut's RTL

plans would be underdeveloped, with a significant proportion of the ratings being represented at

the lower level of comprehensiveness. In addition to the aforementioned hypothesis, a secondary

hypothesis suggested that school districts would have greater medical comprehensiveness within

their plans as compared to academic comprehensiveness. Measures of central tendency and chi-

squared test were deemed sufficient for analyzing these data.

Results from the crosstabulation analysis suggested that the evaluated indices varied in their levels of comprehensiveness. These data indicated that within the Policy Accessibility Index, 33% of questions were answered with a Low rating, 37% of questions were answered with a Moderate rating and 30% of questions were answered with a High rating. These data suggest that there were no significant differences noted between ratings within the Policy Accessibility domain across reviewed policies. A greater preponderance of ratings of low were given for the Medical comprehensiveness domain, with 38% of policies receiving a low rating, by comparison to the moderate ratings (29%) or high ratings (34%). However, as anticipated, differences in the level of comprehensiveness was most apparent in the Academic domain where 56% of RTL policies received low ratings, 21% received a moderate rating, and 23% of received a high rating. When comparing the ratings between indices, the expectation would be that the ratings would be equal (i.e. 33% per rating level). However, the derived results were not equal, which confirms the hypothesis that the indices vary significantly in their levels of comprehensiveness. As a result of these findings, chi-square tests of independence were used to detect statistically significant differences. Table 6 depicts the results of the crosstabulation analysis.

Table 6

Return to Learn Assessment Protocol Crosstabulation Summary

Scale	Low Rating	Moderate Rating	High Rating
Policy Accessibility Index	33.33%	36.67%	30.00%
Medical Index	37.84%	28.47%	33.69%
Academic Index	55.99%	21.09%	22.92%

RTL Assessment Protocol Test of Independence Analyses

A chi-square test of independence was performed to examine the relation between the ratings on the RTL Assessment Protocol for overall policy accessibility, medical comprehensiveness, and academic comprehensiveness domains. The null hypothesis was that the ratings would be evenly distributed across the low, moderate, and high ratings. Thus, the chi-square test provides a measure of association which examines the pattern of responses in the data set to a pattern that would be expected if the variables were truly independent of one another. Using a 3 x 3 chi-square test, it was assessed whether the observed cell counts were significantly different from the expected cell counts (Gall, Gall, & Borg, 2003). The alpha level for the omnibus test was set at .05. The relation between these variables was significant, X^2 (4, N= 792) = 33.18, p = .001. Therefore, the null hypothesis was rejected.

Post-hoc testing was used to explore potential differences between the observed and expected frequencies. A residual analysis was used to identify the specific cells making the greatest contribution to the chi-square test result. Using adjusted residuals, probability values were calculated for each cell in order to test for significant differences (Sharpe, 2015). A Bonferroni adjustment was made to the alpha level in order to control for Type I error. Given that the omnibus analysis includes nine cells, the p value was adjusted to 0.0055.

Inspection of the probability values indicate that there were significant differences in the frequency of low ratings in all of the domains measured by the RTL Assessment protocol (see Table 7). However, only the Academic Comprehensiveness domain received more ratings of low than would be expected. The other two domains received fewer ratings than would be expected at the low comprehensiveness range. Significant differences were also noted in the number of moderate and high comprehensive ratings in the academic domain, with fewer ratings

being observed than expected. Taken together, these findings provide partial support for the proposed hypothesis. While it was anticipated that school districts would have RTL policies would demonstrate limited comprehensiveness in all of the domains assessed this was not the case. Rather, these findings suggest that the policies were limited in their level of comprehensiveness in only the academic content area.

Table 7

Return to Learn Assessment Protocol 3X3 Chi-Square Test of Independence Summary

Scale		Low Rating	Moderate Rating	High Rating
Policy Accessibility Index	Observed	40	44	36
	Expected	55.2	31.4	33.5
	Column %	33.3%	36.7%	30.0%
	Adj. Residual	-3.0	2.9	0.6
	Probability Value	0.002*	0.004*	0.578
Medical Index	Observed	109	82	97
	Expected	132.4	75.3	80.4
	Column %	37.8%	28.5%	33.7%
	Adj. Residual	-3.5	1.1	2.7
	Probability Value	0.000*	0.258	0.006
Academic Index	Observed	215	81	88
	Expected	176.5	100.4	107.2
	Column %	56.0%	21.1%	22.9%
	Adj. Residual	5.5	-3.1	-3.0
	Probability Value	0.000*	0.002*	0.002*

Note. * indicates significance at the adjusted alpha level of 0.0055

Phase II: Data Analysis and Hypothesis Results

Research Question 2. Does the presence of a Return to Learn (RTL) policy effect general concussion knowledge of classroom teachers as measured by the Concussion Care Survey? It was hypothesized that districts with formal RTL polices would have a greater concussion knowledge as compared to those districts without a formalized plan. A survey was developed for

the purpose of this study in order to assess concussion knowledge. A sample of teachers from schools with and without RTL polices were asked to participate in this phase of the study. Group differences in concussion knowledge were assessed by using an independent sample t-test. Preliminary analyses suggest that all underlying assumptions were met. The 83 participants in districts with RTL policies ($M = 23.34$, $SD = 1.28$) and the 119 participants in districts without RTL policies ($M = 23.06$, $SD = 1.15$) did not demonstrate a difference in concussion knowledge, $t(200) = -1.602$, $p = 1.07$. The null hypothesis could not be rejected.

In view of these findings, a post hoc analysis was conducted in order to gain further insight into how both groups responded to the Concussion Care survey. Item analyses were conducted to examine the participants' responses to the individual survey items in order to assess the quality of the items and the survey as a whole (Lord, 1952). Item difficulty and item discrimination statistics were used to assess the item difficulty and ability of items to differentiate among participants. When conducting an item difficulty analysis, an item difficulty index is computed based upon the percentage of participants who answered an item correctly. The index, or p value, ranges from 0 to 1.0, with higher values indicating easier questions. For instance, when the p value is equal to 1.0 the item was answered correctly by all participants. Generally, it is recommended that multiple-choice items with moderate difficulty levels of .70 be retained (Lord, 1952). The p values for the content items on the Concussion Care survey are provided in Table 8.

An item discrimination analysis was used to ascertain how the survey items differentiated among participants on the basis of how well they know the content being assessed. An item discrimination index is computed by examining the performance of the top quartile (27%) of respondents compared to the bottom quartile (27%) of respondents. The item discrimination

index, or D, ranges from -1.0 to +1.0. For example, if all participants in the top quartile answered an item correctly, the D value is equal to +1.0. In comparison, if none of the respondents in the upper quartile answered an item correctly and all respondents in the lower quartile answered an item correctly, D would equal -1.0. It is recommended items with a discrimination index of .35 or higher are considered acceptable (University of Washington, Office of Educational Assessment, 2018). The item discrimination index (D) values for the content items on the Concussion Care survey are provided in Table 8.

Table 8

Concussion Care Survey Item Analysis

Survey Item	*p* value	D
8	.96	.09
9	.96	.13
10	.56	.36*
11	.49	.42*
12	1	0
13	1	0
14	.97	.05
15	.99	.04
16	.93	.13
17	.99	0
18	.91	.18
19	.98	.05
20	.99	.02
21	.69*	.44*
22	.56*	.47*
23	1	0
24	.03	-.05
25	1	0
26	1	0
27	1	0
28	1	.02
29	.99	.02
30	.97	.05
31	.29	.24
32	.99	.04
33	1	0
34	.87	.18
35.1	.92	.13
35.2	.96	.07
35.3	1	0
35.4	.98	.04
35.5	.87	.11
35.6	.97	0
35.7	.86	.09
35.8	1	0
35.9	1	0
35.10	.72*	.13
35.11	.99	.18
35.12	.97	.04

Note. * indicates items that performed adequately based upon reported guidelines

Summary

This chapter summarized the descriptive data and statistical analyses conducted in Phase I and Phase II of the current study. The analyses used to test the research questions and hypotheses were discussed. Of the 149 school districts included in the sample, 24 school districts were found to have RTL policies. In Phase I, chi-square analysis indicated that RTL policies were differed significantly in Policy Accessibility, Medical, and Academic features assessed by the RTL Assessment Protocol. Post-hoc analyses failed to reject the null hypothesis for the first hypothesis. Contrary to what was predicated, the ratings for each of the domains did not uniformly suggest that the RTL policies were underdeveloped in all domains. Conversely, these rating suggest that only the academic domain was underdeveloped. The second hypothesis was supported, however. When the medical and academic domains were compared, the academic domain was rated to be less comprehensive. In Phase II, a total of 202 participants completed the Concussion Care Survey. Preliminary analyses determined that the performance of teachers with RTL policies was not statistically different from teachers without RTL policies. However, post-hoc analyses suggest that the quality of the survey items may have contributed to these findings. A detailed discussion of these findings is provided in Chapter 5.

CHAPTER FIVE

DISCUSSION

Introduction

The purpose of this study was to examine the frequency and comprehensiveness of Return to Learn (RTL) policies within Connecticut Public Schools. A secondary purpose of this study was to evaluate the effect of these policies on teachers' knowledge about the impact concussion shave on students' learning. The study was conducted in two phases. During Phase I of this study, Connecticut public school RTL policies were reviewed for their level of comprehensiveness. The policies were systematically identified and reviewed using the Return to Learn Assessment protocol (see Appendix A). Using the protocol, policies were evaluated based upon features that addressed policy accessibility, medical intervention, and academic intervention of concussions. These ratings were then used to produce three domain scores in the areas of Policy Accessibility, Medical comprehensiveness, and Academic comprehensiveness. An overall comprehensiveness score totaling the Medical and Academic Index sub scores was also derived. During Phase II of research, the potential impact of having a policy on concussion knowledge was then explored by surveying teachers in school districts with and without RTL policies. This chapter will discuss the results that were presented in Chapter 4. The results will be discussed in relation to the preliminary research questions. In addition, this chapter will also aim to address the status of RTL initiatives for students within Connecticut. Finally, the limitations of the study will be outlined and suggestions for future research will be explored.

Phase I: Data Analysis and Hypothesis Results

Research Question 1. What is the difference between the Policy Accessibility, Medical and Academic features of Return to Learn (RTL) policies within Connecticut Public Schools as measured by the Return to Learn Assessment protocol? It was hypothesized that the RTL plans would vary significantly; some districts would have plans that were comprehensive and met criteria of the predetermined essential areas, while others may be limited in their scope. Given this expected variability, it was further hypothesized that as a sum, Connecticut's RTL plans would be underdeveloped with a significant proportion of the ratings being represented at the lower level of comprehensiveness. In addition to the aforementioned hypothesis, a secondary hypothesis also suggested that school districts would have greater medical comprehensiveness within their plans as compared to academic comprehensiveness. Measures of central tendency and chi-squared were deemed sufficient for analyzing these data.

Results from the crosstabulation analysis suggested that the evaluated indices varied in their levels of comprehensiveness. These data indicate that within the Policy Accessibility Index, 33% of questions were answered with a Low rating, 37% of questions were answered with a Moderate rating and 30% of questions were answered with a High rating. These data suggest that there were no significant differences noted between ratings within the Policy Accessibility domain across reviewed policies. A greater preponderance of ratings of low were given for the Medical comprehensiveness domain, with 38% of policies receiving a low rating, by comparison to the moderate ratings (29%) or high ratings (34%). However, as anticipated, differences in the level of comprehensiveness was most apparent in the Academic domain where 56% of RTL policies received low ratings, 21% received a moderate rating, and 23% of received a high rating. When comparing the ratings between indices, the expectation would be that the

ratings would be equal (i.e. 33% per rating level). However, the derived results were not equal, which confirms the hypothesis that the indices vary significantly in their levels of comprehensiveness. As a result of these findings, chi-square tests of independence were used to detect statistically significant differences.

A chi-square test of independence was performed to examine the relation between the ratings on RTL Assessment Protocol for overall policy accessibility, medical comprehensiveness, and academic comprehensiveness domains. The null hypothesis was that the ratings would be evenly distributed across the low, moderate, and high ratings. Thus, the chi-square test provides a measure of association which examines the pattern of responses in the data set to a pattern that would be expected if the variables were truly independent of one another. Using a 3 x 3 chi-square test, it was assessed whether the observed cell counts were significantly different from the expected cell counts (Gall, Gall & Borg, 2003). The alpha level for the omnibus test was set at .05. The relation between these variables was significant, X^2 (4, N= 792) = 33.18, p = .001. Therefore, the null hypothesis was rejected.

In addition to the chi-square analysis, post-hoc testing was used to explore potential differences between the observed and expected frequencies. A residual analysis was used to identify the specific cells making the greatest contribution to the chi-square test result. Using adjusted residuals, probability values were calculated for each cell in order to test for significant differences (Sharpe, 2015). A Bonferroni adjustment was made to the alpha level in order to control for Type I error. Given that the omnibus analysis includes nine cells, the p value was adjusted to 0.0055.

Inspection of the probability values indicate that there were significant differences in the frequency of low ratings in all of the domains measured by the RTL Assessment protocol (see

Table 8). However, only the Academic Comprehensiveness domain received more ratings of low than would be expected. The other two domains received fewer ratings than would be expected at the low comprehensiveness range. Significant differences were also noted in the number of moderate and high comprehensive ratings in the academic domain, with fewer ratings being observed than expected. Taken together, these findings provide partial support for the proposed hypothesis. While it was anticipated that school districts would have RTL policies would demonstrate limited comprehensiveness in all of the domains assessed this was not the case. Rather, these findings suggest that the policies were limited in their level of comprehensiveness in only the academic content area.

The findings from the preliminary and post hoc analyses would suggest that the RTL policies within Connecticut Public Schools are less developed in their ability to support students academically in their transition back to school as compared to the reviewed medical procedures within the analyzed policies. These findings may be associated with the current legislature within Connecticut that mandates that all school districts have policies in place to support athletes in their transition back to athletic competition following a concussive injury. Return to Play (RTP) policies may better equip school districts to support students medically following a concussive injury as the primary objective of RTP is to ensure student's physical safety in their return to athletic competition. It is plausible to assume that legal mandates have had a strong influence on the presence of medical intervention for students following a concussion; however, it remains troubling that evidence continues to suggest that implementing RTL interventions is of equally critical importance. Thompson and colleagues (2016) relays that, "RTL intervention is often neglected at the school level." (p. 2). This sentiment appears to parallel the findings

derived from the current analysis; comprehensive academic intervention as measured by the reviewed policies appears to be extremely limited within Connecticut Public Schools.

The findings derived in this study appear to align with national trends. As of 2018, only eight states within the United States have RTL policies that are required by state law. In contrast, all 50 states within the United States have adopted policies that require that RTP procedures are addressed in school districts' policies. This disparity is likely contributing to the lack of educational supports offered to students in schools following a concussion. Similarly, Heyer and colleagues (2015) examined the national presence of academically-focused concussion plans through a survey to school principals; their research found that plans with specific academic accommodations and guidelines were present in less than 25% of surveyed schools. Presently, only 16% of Connecticut Public Schools have formal systems in place in order to support students following a concussion. Even more staggering is that of the 24 Connecticut school districts that were found to have RTL policies, most policies were underdeveloped in their academic comprehensiveness as measured by the RTL Assessment Tool. These data support that there is a lack of strategic intervention in place for supporting students academically following a concussive injury. Furthermore, these data also support that of the school districts that were identified to have RTL policies, their intervention efforts require significant improvement in order to ensure that student needs are adequately being met.

Within the United States, there has been a significant political shift towards providing comprehensive medical intervention for children who have sustained a concussion. These interventions have become legally mandated and commonplace at the state and local level across our nation. Thompson and colleagues (2016) state, "propelled by burgeoning public concern, research in the area of pediatric concussion management has increased significantly in the last

decade. Despite promising advances in concussion education, identification, assessment, and treatment, the social and legal changes associated with this shift have been narrowly focused, revolving around the issue of safe return to physical activity, colloquially known as "Return-to-Play" (p. 2). Given the emphasis that has been placed on medical intervention, it is not surprising that the results of the current analysis suggest a significant prioritization towards medical intervention and concurrent underdevelopment of academic policy. The need for comprehensive medical intervention stems largely from the short and long-term catastrophic impact that concussions can have on the developing brain.

The stark disparity that exists between RTL and RTP guidelines and intervention; and most notably, between medical and academic intervention for students who have sustained a concussive injury is now of critical importance. Purcell, Davis, and Gioia (2018) relay, "schools should have a concussion policy, which includes concussion education for teachers, staff, students and parents; define individuals within the school to direct the provision of individualized student supports; and includes a mechanism to implement and monitor appropriate academic accommodations to students recovering from concussion" (p. 2). In addition, it is also imperative that students should not return to athletic completion until they have successfully returned to school. In order to ensure safety, students must be at their academic baseline prior to athletic competition. Therefore, as educational institutions it is incumbent upon schools to ensure that educational outcomes are prioritized.

Phase II: Data Analysis and Hypothesis Results

Research Question 2. Does the presence of a Return to Learn (RTL) policy effect general concussion knowledge of classroom teachers as measured by the Concussion Care Survey? It was hypothesized that districts with formal RTL polices would have a greater concussion

knowledge as compared to those districts without a formalized plan. A survey was developed for the purpose of this study in order to assess concussion knowledge. A sample of teachers from schools with and without RTL polices were asked to participate in this phase of the study. Group differences in concussion knowledge were assessed by using an independent sample t-test was utilized. The 83 participants in districts with RTL policies ($M = 23.34$, $SD = 1.28$) and the 119 participants in districts without RTL policies ($M = 23.06$, $SD = 1.15$) did not demonstrate a difference in concussion knowledge, $t(200) = -1.602$, p = 1.07. The null hypothesis could not be rejected.

A post hoc analysis was conducted in order to gain further insight into how both groups responded to the Concussion Care survey. Item analyses were conducted to examine the participants responses to the individual survey items in order to assess the quality of the items and the survey as a whole (Lord, 1952). Item difficulty and item discrimination statistics were used to assess the item difficulty and ability of items to differentiate among participants. When conducting an item difficulty analysis, an item difficulty index is computed based upon the percentage of respondents who answered an item correctly. The index, or p value, ranges from 0 to 1.0, with higher values indicating easier questions for instance, when the p value is equal to 1.0 the item was answered correctly by all participants. Generally, it is recommended that multiple-choice items with moderate difficulty levels of .70 be retained (Lord, 1952). The p values for the content items on the Concussion Care survey are provided in Table 8.

An item discrimination analysis was also used to ascertain how the survey items differentiated among participants on the basis of how well they know the content being assessed. An item discrimination index is computed by examining the performance of the top quartile (27 percent) of respondents compared to the bottom quartile (27 percent) of respondents. The item

discrimination index, or D, ranges from -1.0 to +1.0. For example, if all individuals in the top quartile answered an item correctly, the D value is equal to +1.0. In comparison, if none of the respondents in the upper quartile answered an item correctly and all respondents in the lower quartile answered an item correctly, D would equal -1.0. It is recommended items with a discrimination index of .35 or higher are considered acceptable (University of Washington, Office of Educational Assessment, 2018). The item discrimination index (D) values for the content items on the Concussion Care survey are provided in Table 8.

Additional research regarding the impact of RTL policies on teachers' level of concussion knowledge is warranted in order to determine whether the presence of an RTL policy has a positive impact on teachers' ability to provide classroom level intervention to students who have sustained a concussion within the academic setting. The items utilized for the Concussion Care survey were strategically designed from resources, publications and literature regrading best practice in concussion intervention. A systematic synthesis of information was collected from the Centers for Disease Control, BrainSteps, Rocky Mountain REAP and OCAMP. These institutions and resources are currently regarding as frontrunners within the field of concussion management. However, it appears as if the critical facts and intervention strategies conveyed by the aforementioned institutions did not offer survey questions that discriminated well enough within the reviewed sample. However, it is important to highlight that current literature supports that as a whole, teachers do not have a sufficient knowledge base in order to support students in their return to the learning environment following a concussion (Graff & Caperell, 2016). Therefore, additional research must be conducted on developing instruments that an adequately measure teacher concussion knowledge.

This information will provide invaluable information regarding the foundation classroom teachers have to provide concussion intervention to their students.

Implications

The primary purpose of this study was to evaluate the comprehensiveness of RTL policies within Connecticut public schools. A secondary purpose of this study was to determine if the presence of an RTL policy has an impact on teacher concussion knowledge. Results from this study revealed that the analyzed RTL policies had greater medical comprehensiveness as compared to academic comprehensiveness. It is also important to note that of the 149 analyzed school districts, only 24 were identified to have a RTL policy. This information suggests that nearly 84% of school districts within Connecticut do not have policies in place to support students academically following a head injury. Connecticut's statistics regarding the presences of academic supports for students following a concussion appears to be on trend with national figures.

Given that Traumatic Brain Injury (TBI) is the leading cause of disability and death in children and adolescents in the United States (Centers for Disease Control, 2018), the lack of appropriate supports for students in schools is of critical importance. There is extensive evidence to suggest that students who do not receive appropriate accommodations following a concussion will take significantly longer for their symptoms to resolve and are at greater risk for an array of physical, emotional and learning difficulties. Brown and colleagues (2014) assessed the impact of cognitive rest on recovery following a concussive injury in children. Those who engaged in full cognitive activity took approximately 100 days to recover in comparison to 20 to 50 days for those who engaged in modified activity. With this information, school districts may want to develop or enhance develop policies and procedures in order to ensure that students receive the necessary supports within the school setting following a concussion. Without

appropriate supports, sustained symptom exacerbation can result in prolonged recovery times. However, if managed strategically, more than 80 percent of concussions resolve successfully within the first three weeks post injury (Manzanero et al., 2017).

In order to promote efficient and effective healing, the school team, medical team, and child's family must work cohesively and collaboratively behalf of the injured child. Halestead and colleagues (2013) suggest that all three teams must be actively involved in managing a concussion. Further, all schools must recognize the importance of a team approach for supporting students following a concussion in order to ensure smooth reentry to school. In order to adopt a comprehensive RTL policy, the establishment of team-based procedures is essential. In order to ensure well-managed care for injured students, collaboration between the student, family, healthcare professionals, and school staff is paramount. Halestead and colleagues (2013) suggest, "a comprehensive team approach to care may help reduce mistakes in management, which could potentially risk re-injury during the healing phase, lengthen recovery, or result in untoward long-term outcomes" (p. 956).

In order to develop a policy that is adequate in meting student needs, state level organizations and school districts may elect to consult policies that are currently referenced as best practice including BrainSteps of Pennsylvania and Colorado, Rocky Mountain REAP of Colorado and OCAMP of Oregon (Brainsteps, 2018; CBIRT, 2018; REAP, 2011). Similarly, the RTL Assessment Protocol, developed for the purpose of this study, can also be utilized as an educational tool to develop a comprehensive RTL policy. School districts will want to ensure that an adopted RTL policy incorporates the necessary components in order to provide comprehensive concussion intervention. Policies must include key accessibility features such as contact information and statement of purpose in addition to well developed and systematic

supports for students both medically and academically. Medical and academic intervention must have concurrent progress monitoring and scaffolded levels of support in order to account for students who may require more intensive intervention due to a complex or prolonged injury.

Within all states within the United States, school districts are mandated to have policies that govern RTP procedures for student athletes. State level organizations may want to consider including RTL procedures within their state level RTP mandates in an effort to promote uniformity and cohesion for academically rooted supports for students following a head injury. It is evident that many students who return to school with a concussion do not participate in school-based sports programs. Therefore, these students would not be identified or supported via the school's RTP policy. This staggering limitation leaves many students who have sustained head injuries left to navigate their re-entry to school and manage their symptoms without any support. As an alternative to state level policy, school districts may want to consider adopting a district-wide RTL policy that operates in conjunction with their RTP policy in order to provide concurrent comprehensive medical and academic supports to all students who return to school following a concussion. Based on the review conducted for this project, there are a small number school districts within the state of Connecticut who currently have policies that provide high level of medical and academic intervention to students upon their return school. Collaboration amongst local school districts may provide an opportunity for schools within Connecticut to develop RTL polices.

In addition to policy implementation at the state or school district level, school districts must also ensure that all school staff are properly trained in identifying and supporting students following a head injury. Specifically, school districts will want to ensure that classroom teachers have adequate knowledge of how to support students in their classrooms who have sustained a

concussion. Dreer and colleagues (2016) utilized a cross-sectional survey to assess teacher knowledge related to supporting students following a concussion. Their results suggest that 82% of teachers felt the need for additional concussion education in order to effectively support their students. Teachers must understand how to identify potential sources of symptom exacerbation as well as provide instructional and environmental interventions that can aid in student recovery and learning. Modest adjustments to the learning environment will afford students the opportunity to learn and recover in school following a concussion (Halestead et al., 2013).

Recommendations for Future Research

The results from this project found that RTL plans identified within Connecticut public schools are underdeveloped and require additional academic comprehensiveness in order to supports students in their transition back to the learning environment following a concussion. It was also determined that as a whole, RTL policies within Connecticut public schools are not adequate in meeting the needs of students who have sustained a concussion. This project also attempted to identify a relationship between teacher concussion knowledge and the presence of an RTL policy. However, limitations with the instrument impacted the obtained results and it was unclear whether RTL policies have a direct and substantial relationship to teacher concussion knowledge and intervention efforts.

It is recommended that future research seek to construct an instrument that comprehensively evaluates teacher concussion knowledge. Such an instrument could provide valuable information regarding the impact of RTL policies on teacher's ability to support students within the school setting following a concussion. In addition, it may also be of merit to determine whether teacher concussion knowledge has a positive impact on student recovery. It could be presumed that students who are supported by teachers who have targeted knowledge

regarding concussion intervention would have more positive outcomes. This would align with Brown and colleagues (2014) research regarding modified cognitive rest. However, research regarding the direct impact of RTL supports on student recovery has yet to occur.

Similarly, it may also be of merit to examine long-term outcomes of students who have sustained a concussion in states that have RTL legislature as opposed to states without policies that require school districts to provide strategic academic supports to students following a concussion. Factors such as recovery time, academic performance and presenting symptomology could be strong indicators to advocate for the importance of RTL on a national platform.

It may also be beneficial for RTL interventions to be examined for effectiveness in order to ensure that the policies and procedures that are established within state and local organizations are adequately meeting student needs. It is evident that there are broad sweeping deficits in teacher knowledge and teacher intervention knowledge for classroom-based concussion supports (Graff & Caperell, 2016). However, investigation into classroom-based concussion management, specifically which intervention efforts are most beneficial to student recovery, will ultimately aid in developing comprehensive RTL policies that are targeted in their scope and effective in supporting student needs. With this research, teachers can then be systematically trained in order to ensure that their intervention efforts to support students will result in optimal healing.

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Limitations

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The limitations of the present study will be discussed below regarding the possible threats to internal and external validity. Internal validity is the degree to which you can determine a cause and effect relationship between variables (APA, 2018). One potential threat to internal

validity for Phase I of this study included instrumentation and scoring of the RTL assessment protocols. Although the protocols and procedures for scoring were strategically designed to promote ease of use, understanding and strong validity, the possibility of human error exists. When inter-rater reliability was evaluated, it was determined that the RTL Assessment Protocol had high levels of internal consistency. However, this instrument is novel and therefore, instrumentation should remain a strong consideration. During Phase I of research, Construct validity was also considered a potential threat to external validity. In the development of the grading protocol, three essential themes were identified as overarching areas of focus: Academic, Medical and Policy Accessibility. Each protocol was given an overall score as well as sub-scores for the aforementioned constructs. For the purpose of this project, construct validity referred to the whether the developed protocol adequately measured the RTL plans under each of the essential themes. This area of validity should be strongly considered in order to ensure that the essential themes, which are referenced within the research as critical components for RTL success, were appropriately measured using the developed assessment tool.

In addition to threats present for Phase I of research and the RTL assessment protocol, it is also important to note that there were limitations present within Phase II of research and the Concussion Care Survey. The primary threat to internal validity within Phase II of research was due to limitations with the survey design. It was determined that the questions on the survey were either too difficult or too easy for the participants' sampled which prevented the instrument from adequately discriminating between individual's concussion knowledge. It is recommended that the survey be reconstructed in order to ensure that it is able to discriminate between individuals with and without concussion knowledge.

External validity is the degree to which the results of the study can be generalized to other situations or groups of people. For the purpose of Phase I of this project, a potential threat to external validity was the use of a small sample (Gliem & Gliem, 2003). For the purpose of this project, an accessible sample was utilized. By limiting this study to the State of Connecticut the derived results may not generalize to a larger population. In addition, each researcher, regardless of the project, affects the settings in a different way. For the purpose of this study, the perspective and historical experiences of the primary researcher may have impacted the research. It is also important to consider that the identified definition of terms may vary between populations. Therefore, explanations of terms that were identified for the purpose of this project may not be synonymous to definitions utilized in other research and also may vary between groups. Lastly, extraneous variables are variables that may impact the independent variable and therefore the results of the study (APA, 2018). For the purpose of this project, two potential extraneous variables that may have limited the results of this study were fidelity and population validity.

In addition to threats present for Phase I of research and the RTL assessment protocol, it is also important to note that there were limitations present within Phase II of research and the Concussion Care Survey. The primary threat to external validity within Phase II of was a small sample. In addition to concerns regarding the survey design, a small sample may limit generalizability of the findings.

Conclusions

The purpose of this study was to examine the comprehensiveness' of Return to Learn policies within Connecticut Public Schools. A secondary purpose of this study was to evaluate group differences in concussion knowledge between classroom teachers in schools with and

without RTL policies. Results from this study suggest that within public schools in the State of Connecticut, RTL policies are uncommon. Similarly, of the identified policies, there is a significant difference in comprehensiveness between academic and medical intervention offered to students following a concussion. This disparity is of critical importance given the research that highlights the need for students to be supported in the learning environment in order to ensure efficient and effective healing following a head injury.

In addition to unveiling underdeveloped policies and procedures to support students academically following a concussion, this project also attempted to ascertain whether teacher concussion knowledge is impacted by the presence or absences of an RTL policy. The results from the present analysis regarding teacher knowledge are unclear. However, additional research regarding teacher education for concussion intervention is imperative. Research suggests that with modest classroom supports, students can effectively heal from a concussion within a short time. Teachers must be equipped to support students in their transition back to the learning environment in order to ensure that their recovery does not become compromised by symptom exacerbation.

Results from this study as well as recent research (Thompson et al., 2017) indicate that most states within the United States have limited academic resources available to students following a concussion. These limitations place state and local school districts in a challenging position of supporting students in their classrooms. Students who sustain a concussion require appropriate academic and medical intervention upon their return to school. Without such supports, their trajectory for recovery is uncertain. Therefore, continued research, advocacy and policy development is needed in order to convey the importance of RTL policies and procedures at the national, state and local level. Given the staggering statistic that mild traumatic brain

injury is the leading source of injury within the school aged population, it seems unfathomable that effective and comprehensives system continue to be lacking to protect students. Additional research is vital to altering the current scope of supports available to students following a concussion.

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RTL Assessment Protocol

Section I: Universal Concussion Protocol Features

Concussion Management Protocol: Policy Accessibility		
Feature	**Possible Data Sources**	**Scoring Criteria**
1.1 Rational and Purpose of Protocol: Protocol includes information regarding why the plan is in place. The protocol also includes information regarding the use of the plan within the school setting and what the plan is intended to do (e.g. support students and schools in managing concussive injuries).	☐ Frequency of concussive injuries ☐ Signs & symptoms ☐ Definition of concussion ☐ Cognitive, emotional & physical implications ☐ Plan explicitly states that it is intended to support students and schools in managing concussive injuries. ☐ Plan indicates that it can support students in the following areas: academically, physically & emotionally.	0 = rationale or purpose does not exist within the protocol 1= Rationale or purpose exist but does not include both aforementioned features. 2= rationale and purpose exist with a thorough review of information including specific implications for students (academically, physically & emotionally).
1.2 Accessibility of Protocol: Protocol is easy to access for staff, students and parents. Protocol must be displayed prominently on website e.g. Home Page or Nurse's page; in addition to Student Handbook; also, necessary forms should be posted (ACE form, RTS form, permission to exchange information, Instructions for Home Care)	☐ School Policy Guide ☐ Student Handbook ☐ School Website ☐ Nurses Page	0= protocol is not developed or is not accessible to students, staff or parents. 1= protocol is developed and only available in one of the indicated areas (policy guide, handbook, website) 2= protocol is developed and accessible in two or more identified locations.

Concussion Management Protocol: Policy Accessibility		
1.3 Staff Training: All school staff have been comprehensively trained on concussion education.	☐ Professional development has been provided to all staff regarding concussions and the impact the injury can have on students. This information is included in the protocol. ☐ Staff has been trained on general concussion recognition and response. ☐ Staff has been trained on academic adjustments (ex. Brainsteps webinar) ☐ Nurses have been trained to ensure appropriate clinical skills (ex. one hour with medical advisor or consultant) ☐ Students have been trained utilizing an age appropriate curriculum (ex. Think First)	0= staff has not been trained on concussions in students 1= some of the staff (only a select team, certain teachers, nurse etc.) has been trained in concussions in students 2= all staff, including office staff, have had a formal training on how to support students and the school-based protocol for return to learn management.
1.4 Additional Resources: Concussion education resources are made available via the school website, student handbook or school policy guide. This information is intended to provide supplementary education regarding concussion signs, symptoms and supports.	☐ CDC resources ☐ HeadsUp ☐ Flow Charts ☐ Community Resources	0= additional resources are not made available 1= additional resources are made available upon request and/or they are not found with the return to learn/play policies. 2= at least one or more additional resource(s) is available and easy to access and comprehensive

Concussion Management Protocol: Policy Accessibility		
1.5 Contact Information: The protocol includes information regarding whom within the school to contact if a child has sustained a concussive injury.	☐ Name, phone number, email address, responsible department, etc.	0= no contact information is available 1= contact information does not include a specific contact person's name and title. It may include a general school number or email address. 2= contact information includes a specific individual with name and title responsible for concussion management with appropriate contact (phone, email) information listed.

Scoring Criteria: 0= not implemented, 1= partially implemented, 2=fully implemented

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Section II: Medical Concussion Protocol Features

Concussion Management Protocol: Medical		
Feature	**Possible Data Source**	**Scoring Criteria**
2.1 Immediate Removal from Activity: The protocol indicates that a student who sustains a concussive injury must be immediately removed from the participating activity.	☐ The child is immediately removed from physical education, recess activities, sports, etc. ☐ Child is provided with appropriate medical treatment	0= the plan does not indicate immediate removal from activity and/or does not include a medical component 1= n/a 2= The plan explicitly states that the child is removed from all activities immediately following a suspected injury
2.2 Emergency Treatment: The child is immediately transported to the emergency department if deemed necessary.	☐ Symptoms requiring immediate medical care: progressive signs or symptoms, deterioration of neurological functioning, loss of consciousness, decreased consciousness, decreased or irregular respirations, associated injuries, mental status change, seizures.	0= the plan does not include information regarding critical symptoms or emergency care 1= the plan includes either emergency care information or symptoms of concern, it does not include both features. 2= the plan indicates both emergency care information and symptoms of critical concern

Concussion Management Protocol: Medical		
2.3 Asymptomatic Students: follow up medical treatment and evaluation.	☐ Regardless of presenting symptoms, students suspected of sustaining a concussion are provided with medical care from the emergency department or their primary care physician	0= the plan does not address asymptomatic students 1= the plan does not explicitly state the necessity of medical treatment for asymptomatic students 2= the plan clearly defines the need for asymptomatic students to seek medical care
2.4 Referral to School Nurse: the school nurse is notified of the injury	☐ If the injury occurs during regular school hours, the nurse is informed immediately. ☐ If the injury occurs after regular school hours, a family member, coach, student or school staff will notify the nurse as soon as possible. ☐ The student is not permitted to return to school until the school nurse is notified.	0= the plan does not specify notifying the school nurse 1= The plan includes either immediate nurse notification or nurse notification prior to return to school 2= The plan includes both immediate notification of the school nurse and nurse notification prior to return to school
2.5 Nurses Assessment: the school nurse will conduct a thorough (see adjacent column for specific requirements) evaluation of the student and provide findings to the student's guardians and physician.	☐ The school nurse will: obtain injury details. ☐ Establish preliminary and emergent modifications/accommodations ☐ Provide family with a medical referral ☐ Nurses assessment must include a documented symptom score, convergence assessment, assessment of tandem balance, the utilization of the King Devick test, and documentation of any observable symptoms.	0= nurse roles and expectations are not included in the plan 1= the nurses role is not comprehensive. Specifically, the nurse's participation does not include any of the following: a documented symptom score, convergence assessment, assessment of tandem balance, the utilization of the King Devick test, and documentation of any observable symptoms. 2= a comprehensive nurses assessment is included as a critical component of the plan. The plan must include injury details, preliminary academic supports, medical referrals if requested and standardized assessment procedures.

Concussion Management Protocol: Medical		
2.6 Parental Notification: the student's parents/guardians will be notified immediately, and appropriate referral information is provided.	☐ The school nurse will notify the students' parents/guardians immediately. This will occur regardless of whether the injury occurred in or outside of school (this may occur as a result of a faxed doctors note, email, etc.) ☐ If the injury occurred at school or if needed, a medical referral will be made ☐ If the injury occurred at school, appropriate injury information will be communicated (symptoms, injury details, etc.). ☐ The nurse will call the parents and discuss the parental role, request appropriate forms be downloaded from the website and turned in before the student returns to school. ☐ The nurse should also provide a general overview of the school's plan for academic adjustments after the student returns.	0= parental notification is not included in the plan 1= medical referrals are not included as key aspects of parental notification 2= parental notification and medical referrals are clearly described in the plan
2.7 Nurse Notifies Concussion Management Team: all assigned team members will be notified of the concussive injury.	☐ The school nurse will promptly notify the school-based Concussion Management Team (CMT) of a student's injury. ☐ The school nurse will provide preliminary recommendations to the CMT following a conversation with the student's physician. ☐ The nurse serves as a member of the CMT as the medical/symptom monitor. ☐ Nurse makes immediate contact to the Academic Monitor of the CMT.	0= the school does not have an established Concussion Management Team (CMT) 1= preliminary recommendations are not included with initial referral to CMT or nurse is not delineated to communicate injury to CMT. 2= established CMT exists and protocol is in place to make the team aware of the injury as soon as possible. The nurse communicates initial academic recommendations within this contact.

Concussion Management Protocol: Medical		
2.8 Collaboration with Treating Physician: the nurse will work collaboratively with the child's physician to ensure proper injury management.	☐ The school nurse contacts the child's physician to communicate injury relevant information. ☐ The school nurse will provide ongoing updates to the medical provider regarding the students' progress at school. ☐ The school nurse will provide the physician with the initial ACE screening and ongoing (weekly) data collection (convergence, balance, King Devick, signs/symptoms & academic performance) ☐ The school nurse will obtain the ACE and RTS forms from the treating physician. ☐ The school nurse will obtain a release to exchange information with the physician	0= collaboration between school and physician is not included within the plan 1= recurring collaboration is not indicated within the plan 2= a clearly defined collaborative and ongoing partnership between the school nurse and treating physician is indicated within the plan.

Concussion Management Protocol: Medical		
2.9 Return to Play Eligibility: medical clearance is mandatory for a child to return to physical activities.	☐ The school nurse will return students to contact activities only following written medical clearance from the child's physician. Medical Clearance is determined if the medical assessment (after the RTP protocol) is normal. The written statement of medical clearance should be routed to the school nurse who then confirms that the student is participating in full academics before they are allowed to participate in contact activities. ☐ Medical clearance is required for the child to return to intramural and interscholastic sport and recess activities. ☐ Medical authorization to initiate aerobics, gym/recess should be accompanied by a supervised RTP protocol. ☐ Medical assessment occurs after successful completion one RTP protocol. This must be conducted by an MD/PA/APRN or ATC in collaboration with the treating physician or with documented standing orders from the physician.	0= return to play decisions are not included within the plan and/or medical clearance from treating physician is not indicated 1= medical clearance is indicated and collaboration with athletic training staff is not indicated. 2= a collaborative process to determine return to play is established. This process is governed by a medical decision and includes concurrent clearance from the athletic trainer.
2.10 Concussion Management Team Clearance: The Concussion Management Team will review the child's academic and physical progress prior to return to play authorization.	☐ The school nurse will notify the CMT before processing a physician's authorization for return to all physical education, recess and intramural or interscholastic activities. ☐ Consistency between academic and athletic management of the student's care is required.	0= the school does not have an established CMT or the CMT does not play a role in return to play clearance decisions. 1= consistency between athletic and academic baseline is not indicated as a requirement for clearance 2= a collaborative partnership between the CMT and medical provider is deemed necessary for school clearance. The student must be at academic baseline prior to athletic clearance.

Concussion Management Protocol: Medical		
2.11 Nurses Supervision: the school nurse will seek supervisory supports if necessary.	☐ If the school nurse questions the child's readiness to return to activities he/she will seek supervisory supports as appropriate. ☐ Sources of support may include: health services supervisor, medical advisor, primary care physician, etc.	0= nurses supervision is not indicated within the plan 1= supervision is suggested however, explicit sources of support are not outlined within the plan 2= explicit resources are indicated for supervision within the plan
2.12 Medical Authority: school staff must adhere to the nurse's decision regarding student participation at all times.	☐ The school staff will never override the decision of the school nurse. ☐ Staff is not permitted to allow students to return to high-risk activities, sports or related events without medical approval. ☐ The ATC must work in collaboration with the School Nurse for decision-making purposes.	0= medical authority (return to activity clearance) is not addressed within the plan 1= the plan does not explicitly state that the nurse oversees all decision-making as it pertains to return to school based physical activities. 2= clear and descriptive information is included regarding the role of the school staff and school nurses in supporting student safety.

Scoring Criteria: 0= not implemented, 1= partially implemented, 2=fully implemented

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Section III: Academic Concussion Protocol Features

Concussion Management Protocol: Academic		
Feature	**Possible Data Source**	**Scoring Criteria**
3.1 Concussion Management Team (CMT): the protocol outlines the need for a CMT	☐ The CMT is an establish team created to support students following a concussive injury	0= the protocol does not indicate the need for a CMT 1= n/a 2= an established CMT is indicated within the plan

Concussion Management Protocol: Academic		
3.2 Composition of the Concussion Management Team: the CMT consists of essential team members.	☐ The CMT includes an administrator, school counselor or psychologist, classroom teacher, coach (when applicable), athletic trainer (when applicable) & school nurse.	0= the protocol does not indicate the need for a CMT 1= the CMT does not include all key team members 2= the protocol indicates the need for a CMT and includes all key team members
3.3 Student Re-Entry Plan: the protocol indicates the process for return to school following a concussive injury	☐ The plan indicates the need for school contact (nurse) following an injury that occurs outside of school ☐ The plan indicates that CMT will support the students' return to school with immediate accommodations and modifications that are recommended by the student's physician and school nurse. ☐ The Academic Monitor will be recommended by the Academic monitor with input from the child's school team.	0= the protocol does not include a re-entry plan 1= the protocol does not define the need for school notification prior to returning to class or does not designate who should be contacted regarding the student injury 2= the protocol necessitates school contact prior to student return and who should be contacted to establish a re-entry plan.
3.4 Physicians Assessment: the re-entry meeting includes a review of the physician's assessment.	☐ Students must return to school with a note from their physician indicating recommendations for cognitive, physical and emotional accommodations/modifications. e.g. ACE form and RTS form ☐ Recommendations may include participation in educational and physical activities in school including classes, academic work, physical education, extracurricular activities and sports. ☐ If the note is not present, the school nurse will obtain the recommendation from the physician ☐ Authorization for release of information is obtained between the CMT and physician	0= a physician's note is not required 1= the note is required as a mandatory component of re-entry; however, school-based collaboration with the physician is not indicated. 2= a physician's assessment is required and ongoing collaboration between medical providers and school is indicated

Concussion Management Protocol: Academic		
3.5 Dissemination of Information: physician and CMT recommendations are shared with school staff immediately	☐ Physician and CMT accommodations and modifications are shared with the child's school team immediately (group email is acceptable). ☐ This information must be communicated to all relevant school staff including elective teachers and within substitute plans.	0= a plan for the dissemination of information is not included within the protocol. 1= the dissemination of information is indicated but it does not reference immediate communication with the CMT. 2= the dissemination of information is indicated and the CMT is concurrently notified.
3.6 Academic Monitor: is a clearly defined member of the CMT	☐ The protocol indicates that an academic monitor is assigned at the initial re-entry meeting. ☐ The Academic Monitor oversees the implementation of accommodations/modifications ☐ The Academic monitor initially requests 50% work education from teach of the students teachers, no tests ,pre-printed teacher's notes, avoidance of noise/light triggers, and breaks as needed. ☐ The Academic Monitor requests a make up plan weekly in writing which specifies which work is excused, what is required and what ill not be graded. ☐ The Academic Monitor should collect these weekly plans from the teacher and coordinate with the physician and nurse prior to giving them to the student. The academic monitor should also document teacher observations of behavior/needs of the child within the classroom setting.	0= the protocol does not include an academic monitor 1= the role and responsibilities of the academic monitor is not defined within the plan 2= the presence of an academic monitor is indicated within the plan and the roles and responsibilities are outlined.

Concussion Management Protocol: Academic		
3.7 Accommodations and Modifications: are provided to students via the concussion management team and treating physician.	☐ Essential Themes of School Based supports include- modified attendance, reduction of audible and visual stimuli, reduced workload, breaks, delayed or alternative testing, limited physical exertion, social emotional supports. (see the following resources for examples: BrainSTEPS online webinars; CO DED online Brain Injury Manual and Matrix) ☐ Accommodations and modifications should be determined by the treating physician and CMT ☐ Supports should be reviewed weekly and a step-wise process for gradual re-integration to baseline functioning should be utilized	0= the protocol does not reference school-based accommodations and modifications 1= the protocol does not reference that accommodations and modifications can span academic, physical and emotional supports within the school setting 2= the protocol clearly defines the various accommodations and modifications that are available to students following an injury. The plan indicates that supports will be provided based on student need.
3.8 Academic Tracking: students academic achievement is monitored by the Academic Monitor	☐ The protocol indicates the use of a data collection system to be used by the academic monitor while the student is being supported by the CMT ☐ The data collection system monitors the student's achievement within the classroom following an injury ☐ This information is shared with the CMT	0= academic tracking of student performance is not indicated within the protocol 1= a standardized procedure for tracking academic information is not indicated 2= a standardized protocol is used to collect academic data (homework, tests, quizzes, class work, attendance, etc.) by the academic monitor.
3.9 Social-Emotional Tracking: students social-emotional functioning is monitored by the Academic Monitor. Prior difficulties with social-emotional functioning (i.e. anxiety, depression, school avoidance) will be reported to the CMT immediately.	☐ The protocol indicates the use of a data collection system to be used by the academic monitor while the student is being supported by the CMT ☐ The CMT collaborates with the student's family and discusses any historical social-emotional difficulties ☐ The data collection system monitors the student's emotionality within the school setting following an injury	0= social emotional functioning is not indicated within the protocol 1= social emotional functioning is indicated but there is not an explicit procedure for acquiring social-emotional data 2= historical and present social emotional functioning is referenced within the protocol and an explicit plan for monitoring is indicated

Concussion Management Protocol: Academic		
	☐ This information is shared with the CMT ☐ An increase in social-emotional difficulties will immediately be communicated to the treating physician	
3.10 Progress Monitoring: students academic and medical progress is assessed weekly by school nurse and Academic Monitor	☐ The student's status will be re-evaluated weekly by the school nurse and academic monitor ☐ The academic monitor will collect academic data ☐ The school nurse will collect information regarding the students presenting symptoms(school nurse collects signs/symptoms, convergence, balance, King Devick) ☐ Standardized forms and procedures are followed	0= progress monitoring is not indicated 1= the frequency or type of progress monitoring is not indicated 2= the frequency and type of progress monitoring is indicated by the academic monitor and school nurse.
3.11 Collaboration with Physician: weekly progress monitoring data (academic and medical) will be shared with treating physician	☐ Weekly academic and medical tracking information will be shared with the students treating physician ☐ The CMT and treating physician collaboratively agree to pace the child ahead.	0= collaboration between school and medical provider is not indicated or data collection is not indicated 1= the frequency of collaboration is not indicated, or the type of information shared is not clearly defined. 2= the frequency of collaboration is clearly indicated & the type of information shared is clearly defined.
3.12 Additional Supports: If the student requires support beyond three weeks, the school will notify the parent about the need for a specialized consultation	☐ If the student requires support beyond three weeks, the school will notify the parent about the need for a specialized consultation.	0= additional supports are not indicated 1= additional supports are referenced though not clearly defined 2= a clear action step for additional supports is indicated within the plan (i.e. referral to specialist).

Concussion Management Protocol: Academic		
3.13 Concussion Management Plan: a formalized plan will be developed if signs and symptoms exceed three weeks	☐ When the student requires educational supports beyond three weeks the CMT will convene to develop a concussion management plan to address appropriate services, educational supports, modifications. ☐ The Concussion Management Plan should not be developed without physician recommendations.	0= a concussion management plan (or alternatively titled support plan) is not referenced 1= the role of the plan and timing of implementation is not clearly defined within the protocol 2= a clearly defined concussion management plan is referenced within the protocol.
3.14 Progress Monitoring by the Concussion Management Team students' academic and medical progress continues to be assessed by designated team members.	☐ Once a concussion management plan is established, recurring and consistent monitoring will occur by the CMT ☐ Academic and medical and data will be tracked using standardized forms ☐ The students school team will also monitor the child's emotional state ☐ Collected information will be shared with the treating physician	0= progress monitoring of the concussion management plan is not indicated 1=the specific type of data being collecting is not indicated and/or frequency of data collection is not indicated 2= the type of data being collected, and frequency of collection is clearly indicated within the plan
3.15 Academic Clearance: once medical clearance has been obtained, all academic supports will be terminated	☐ All academic supports will be terminated once return to play eligibility has been granted ☐ Collaboration between the treating physician and CMT will occur in order to make this determination ☐ Return to Play will not be granted without medical clearance ☐ RTP protocol cannot be initiated until the student has returned to full academics	0= the termination of academic supports is not defined within the protocol 1= the plan does not reference the need for students to be at their academic baseline prior to athletic clearance. 2= clear and comprehensive information is provided regarding the termination of academic support services.

Concussion Management Protocol: Academic		
3.16 Extenuating Circumstances: If the student is unable to attend school or schooling is largely impacted by their injury, alternative supports will be discussed.	☐ In the event that a student is unable to attend school due to their injury, alternative instructional supports will be discussed and implemented. ☐ If symptoms are persistent or severe a 504 meeting will convene	0= extenuating circumstances are not addressed within the protocol 1= the protocol does not define what supports are available to students with severe head injuries 2= the plan clearly addresses supports that can be provided to students who have severe head injuries. The plan must state the role of a 504 or IE plan for supporting students with a concussion.

Scoring Criteria: 0= not implemented, 1= partially implemented, 2=fully implemented

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*Note. This is a self-made tool that was created by the researcher for the purpose of this project.

Appendix B

Email to Connecticut School Principals

Dear [Connecticut Public School Principal],

My name is Alyssa Beit Stern, I am a doctoral student at the Indiana University of Pennsylvania and a practicing Connecticut School Psychologist. For my dissertation research, I am examining Return to Learn Concussion Policies within the State of Connecticut. If you are currently utilizing a Return to Learn policy within your school or district, please let me know by responding to this email.

As a component of my research, I am hoping to gain insight as to the level of concussion knowledge and concussion intervention knowledge of our Connecticut Public School teachers. I would be extremely appreciative if you could please forward this email to classroom teachers within your school for them to complete the attached survey. The survey should take no more than 5 minutes and will provide valuable information about how we can best support our students. In addition, all individuals who complete the survey will be eligible to win one of four $20 Amazon gift cards!

By forwarding this email, you are agreeing to participate in this study. Please feel free to contact Dr. Mark McGowan or myself with any questions or concerns.

Thank you for your help and support!

Respectfully,

Alyssa Beit Stern, NCSP
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Faculty Advisor:
Dr. Mark McGowan, Ph.D., NCSP
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THIS PROJECT HAS BEEN APPROVED BY THE INDIANA UNIVERSITY OF PENNSYLVANIA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS (PHONE 724.357.7730).

Appendix C

Concussion Care Survey Informed Consent

Alyssa Beit Stern
Indiana University of Pennsylvania, Doctoral Candidate
Department of Educational and School Psychology
Contact Email: a.l.beit@iup.edu
Faculty Advisor: Dr. Mark McGowan, Ph.D., NCSP
Contact Email: mmcgowan@iup.edu

Concussion Care Survey
[Will be item #1 in Qualtrics Survey on IUP server]
Informed Consent

You are invited to take part in a research survey about concussion management in schools. Your participation will require approximately five minutes and is completed online at your computer or mobile device. There are no known risks or discomforts associated with this survey. For your participation you will be entered in a drawing to win one of four $20 Amazon gift card. In order to ensure anonymity, you will be asked to submit your contact information following completion of the Concussion survey. Taking part in this survey is completely voluntary. If you choose to withdraw and discontinue completion of the survey you can close your browser at any time. Your responses will be kept strictly anonymous, and digital data will be stored in secure computer files. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified. If you have questions or want a copy or summary of this study's results, you can contact the researcher or Dr. Mark McGowan, faculty advisor, using the contact information above. Please feel free to print a copy of this consent page to keep for your records.

THIS PROJECT HAS BEEN APPROVED BY THE INDIANA UNIVERSITY OF PENNSYLVANIA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS (PHONE 724.357.7730).

Clicking the "YES" button below indicates that you are 18 years of age or older and indicates your consent to participate in this survey.

Appendix D

Concussion Care Survey

Connecticut Public Schools

1. What grade level do you teach? (check all that apply)
   - ☐ Pre-K
   - ☐ K
   - ☐ 1
   - ☐ 2
   - ☐ 3
   - ☐ 4
   - ☐ 5
   - ☐ 6
   - ☐ 7
   - ☐ 8
   - ☐ 9
   - ☐ 10
   - ☐ 11
   - ☐ 12

2. Please enter your school district below:

   _____

3. Have you ever had training on how to support a student or athlete with a concussion?
   - ☐ Yes
   - ☐ No

4. Does your school have a Return to Learn Policy (a specific plan to support students in the classroom following a concussion)?
   - a. Yes
   - b. No
   - c. I don't know

5. I know who is responsible for implementing concussion supports for students at my school.
   - ☐ True
   - ☐ False

6. I know how to access my school's concussion support plan.
   - ☐ True
   - ☐ False

7. A concussion is a form of Traumatic Brain Injury (TBI).

☐ True
☐ False

8. Most individuals who sustain a concussion will lose consciousness.
    ☐ True
    ☐ False

9. Most children recover from concussions within 4 weeks.
    ☐ True
    ☐ False

10. Most of the time, children take longer than adults to recover from a concussion.
    ☐ True
    ☐ False

11. A concussion can impact a student's learning.
    ☐ True
    ☐ False

12. A concussion can impact a student's social-emotional functioning.
    ☐ True
    ☐ False

13. The traditional demands of school can increase a student's concussion symptoms and prolong their recovery.
    ☐ True
    ☐ False

14. A concussion impacts a student physically and cognitively.
    ☐ True
    ☐ False

15. Sleep Disturbance is a symptom of a concussion.
    ☐ True
    ☐ False

16. Students who sustain a concussion may experience cognitive symptoms.
    ☐ True
    ☐ False

17. Increased appetite is a common symptom of a concussion.
    ☐ True
    ☐ False

18. Somatic side effects such as headache and stomach ache are a symptom of a concussion.
    ☐ True

☐ False

19. Vestibular side effects such as dizziness and feeling off balance are a symptom of a concussion.
   ☐ True
   ☐ False

20. Suicidality can be a symptom of a concussion.
   ☐ True
   ☐ False

21. Decreased heart rate is a symptom of a concussion.
   ☐ True
   ☐ False

22. Students who sustain a concussion may experience mental fatigue.
   ☐ True
   ☐ False

23. Students who sustain a concussion may display an inability to read.
   ☐ True
   ☐ False

24. Students who sustain a concussion may have difficulty concentrating.
   ☐ True
   ☐ False

25. Students who sustain a concussion may have slowed processing speed.
   ☐ True
   ☐ False

26. Students who sustain a concussion may have difficulty with working memory.
   ☐ True
   ☐ False

27. Students who sustain a concussion may have difficulty with visual scanning.
   ☐ True
   ☐ False

28. Students who sustain a concussion may have difficulty converting new learning into memory.
   ☐ True
   ☐ False

29. Students who sustain a concussion may have emotional side effects.
   ☐ True

☐ False

30. Students who sustain a concussion may have difficulty with sitting in their seat.
    ☐ True
    ☐ False

31. After a student sustains a concussion, the school should monitor him or her in class to help guide further supports.
    ☐ True
    ☐ False

32. Teachers should know how to support a student who has sustained a concussion.
    ☐ True
    ☐ False

33. In Connecticut, a student who sustains a concussion can receive supports thorough a Section 504 Plan or Individualized Education Plan (IEP).
    ☐ True
    ☐ False

34. Which of the following accommodations should educators provide a student who has a concussive injury? Check all that apply:
    ☐ Changes to the classroom environment
    ☐ Increased homework to make up for missed classwork
    ☐ Instructional supports
    ☐ Extended time
    ☐ Work on the computer
    ☐ Written plan for make-up work
    ☐ Excused assignments
    ☐ Modified assignments
    ☐ Longer reading assignments
    ☐ Breaks from class
    ☐ Opportunities to engage in physical exercise
    ☐ Access to emotional supports

35. Thank you for completing this survey! Provide your email address below to be entered into a raffle to win an Amazon gift card:

    _____

*Note. This is a self-made tool that was created by the researcher for the purpose of this project.