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An Exploration of the Knowledge, Skills, and Attitudes of Ontario Elementary School Teachers Regarding Concussion within the School Environment

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Abstract

For young people, concussion can be a significant injury impacting all aspects of life including attendance and participation at school. As of January 30, 2015, the Ontario Ministry of Education expected that all school boards have in place a fully implemented concussion policy. The purpose of this study was to explore teacher’s current knowledge, skills, and attitudes of concussion, in comparison with the knowledge expected of them by the Ministry of Education. Results suggest that teachers, regardless of the current level of implementation of policy, have a basic understanding of what concussion is, what some of the signs and symptoms are, and an awareness of the importance of concussion prevention. Results identified three additional important themes present in the school context: (1) a balancing act; (2) slipping through the cracks; and (3) policy, just words on paper. These results will be discussed, implications provided and future areas for research recommended.

Keywords

Concussion, school, children, adolescent, teacher, elementary school teacher, Ontario elementary school, concussion knowledge, concussion attitude, concussion prevention, concussion school policy, return-to-learn
Important abbreviation for the reader

Throughout this document reference is made to a concussion package safety guideline prepared by the Ontario Physical and Health Education Association in 2014. After the first appearance it is referred to thereafter as Ophea (2014). The complete reference to this important document is found in the reference section.
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“You are braver than you believe, stronger than you seem, smarter than you think and loved more than you know” – A.A. Milne

This has been a long process, and I believe that I have grown as much personally as I have academically. Brevity has never been my strong suit, and this was far from an exception to that rule. In the end, I do believe, that I am walking away from this process a stronger person, both physically and mentally. From the beginning this was a bumpy road with a steep learning curve, and I brought a lot of people along for the ride.

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Chapter 1

1 Introduction

A concussion is a form of mild traumatic brain injury (mTBI) that results from a blow to the head, or an impact to the body, with an impulsive force transmitted to the head (McCrory et al., 2013). For young people, it can be a significant injury that impacts all aspects of a child or adolescent’s life, including home, school, and recreation. A child may sustain a concussion as a result of an accident, fall, or collision (with another child or an inanimate object) while on the playground or sports field, or during another activity.

A concussion may cause signs and symptoms that affect a person’s physical function (e.g., headache or dizziness), emotional/behavioural status (e.g., depression or irritability), cognitive function (e.g., difficulty remembering or concentrating), or sleep (e.g., drowsiness or difficulty falling asleep; McCrory et al., 2013; Ophea, 2014). The signs and symptoms of concussion differ between individuals and may not appear at the time of initial impact. Symptoms can last for hours, days, weeks, or even months following the initial injury (Faure, 2010). Concussion symptoms generally resolve within 7-10 days after the injury has been sustained (DeMatteo et al., 2015), however, each concussion is a unique and unpredictable event that manifests differently among individuals. When a child sustains an injury where concussion may be the outcome, the child should stop participating in the precipitating activity immediately, should not be left alone, and should seek medical attention as soon as possible, ideally on the same day as the injury (Ontario Neurotrauma Foundation, 2014). A qualified health professional
should evaluate a suspected concussion as soon as possible, following the injury, in order to prevent further injury or exacerbation of symptoms (McCrory et al., 2013). Although the majority of concussed individuals make a full recovery, some may experience significant and persistent cognitive symptoms which can have a negative impact on the child’s ability to return-to-learn or return-to-play (Duff & Stuck, 2014; Popoli, Burns, Meehan, & Reisner, 2014).

Concussion has become a more prominent public health concern, due to both the frequency of occurrence and the potential for catastrophic injury (Caine, Purcell, & Maffulli, 2014; Choe, Babikian, DiFiori, Hovda, & Giza, 2012; Covassin, Elbin, & Sarmiento, 2012; Lewington, 2014). The Centre for Disease Control and Prevention (2014), reports that emergency department visits during the last decade have increased by 60% for sports- and recreation-related TBIs (including concussion), among children and adolescents. Within the United States, 1.7 million TBIs occur annually, with the majority of these being classified as minor (or concussion; Echlin et al., 2014). The highest rates of emergency department visits for sports-related concussion occur among youth aged 10 to 14 years (Glang, Koester, Beaver, Clay, & McLaughlin, 2010). According to a survey completed by Statistics Canada, in 2009, an estimated 4.27 million Canadians aged 12 years or older sustained an injury that was severe enough to impact their level of usual activity (Billette & Janz, 2011). This survey revealed that 98,440 people had sustained a head injury, with 27,720 of these individuals falling within the adolescent age category (Billette & Janz, 2011). An analysis of the Hospital Morbidity Database (HMDB) during 2010-2011 found that 2,766 concussion-related injuries resulted in hospitalization (Carey...
& Morrish, 2013). It is fair to assume that since the majority of concussion-related injuries do not result in hospital admission, these data represent only the most severe injuries. Statistics obtained from the National Ambulatory Care Reporting System (NACRS) database reveal that 14,406 concussion-related injuries were treated in Ontario emergency departments, with the highest percentage of reported concussions occurring among individuals aged 10 to 19 years of age (Carey & Morrish, 2013). For these adolescents, 55% of concussion admissions were related to being struck by or against objects, including sports equipment and falling objects (Carey & Morrish, 2013). This same data showed that 3,575 elementary aged students (5 to 14 years of age) visited emergency departments in Ontario for concussion-related injuries.

It is important to note that “not all concussions are sports-related, and not all students with concussions are athletes” (Heyer, Weber, Rose, Perkins, & Schmittauer, 2014, p. 5). It is likely that some elementary school-age concussions occur within the school environment because children spend approximately 1,100 cumulative intended instruction hours per year in the classroom (Statistics Canada, 2014). If a concussion were to occur in this environment, the onus of responsibility for the recognition of signs and symptoms would be placed on the injured child and the most responsible adult (who is often the teacher, during the daytime school hours). Teachers may be present at the time of injury and/or will be involved in the reintegration of the student into the classroom upon his/her return-to-learn post-concussion; therefore, they possess a unique and pivotal role in the recognition, prevention, and management of concussion. Teachers cannot, and are not expected to, diagnose a concussion, however, they can provide assistance to help ensure a
successful recovery and reduce the likelihood of a devastating (or catastrophic) event. A recent document issued by the Ontario Physical and Health Education Association (Ophea) endorsed the importance of “administrators, educators (including occasional teachers), school staff, students, parents and school volunteers” (Ophea, 2014, p. 2) as partners in the prevention, identification, and management of students with concussion.

In March 2014, the Ontario Ministry of Education issued Policy/Program Memorandum (PPM) No. 158 that outlines the Ministry’s expectations regarding the components of a school board’s policy on concussion (Ontario Ministry of Education, 2014). As of January 30, 2015, there is an expectation that all school boards within Ontario will have in place a fully implemented program that includes ongoing training plans for teachers, staff, and volunteers to educate them on concussion.

1.1 Statement of the problem

Given the expectation of the Ontario Ministry of Education regarding concussion knowledge by Ministry of Education employees, it is apparent that administrators and educators need to be aware of, and recognize, the signs and symptoms of concussion in order to properly manage students within the school environment. Recognition of concussion, and the subsequent reporting of a potential concussion, can be overlooked due to misconceptions (Faure, 2010) or a lack of knowledge and understanding of the causes and the subtle signs and symptoms that may be present.

There is relatively recent evidence that lack of knowledge regarding concussion is an issue within the Ontario education system. On January 5, 2013, a report was submitted to
the Recognition and Awareness Working Group in summary of the Ontario School-Based Personnel Concussion Knowledge Project (Parsons & Mohan, 2013). This project was initiated with the objectives of: identifying and reviewing existing concussion recognition and management tools; providing suggestions for uptake of appropriate approaches for school coaches, teachers, nurses, trainers, and athletic therapists, and; assessing the level of awareness and utilization of existing tools in the before-mentioned population. Eighty-three school boards in Ontario were contacted to participate in this survey regarding concussion guidelines, policies, and procedures. With a 53% overall response rate to the survey, more than half of the participating school boards (68%) reported that they did not have concussion guidelines, policies or procedures in place. Of those school boards who reported existing guidelines, policies, or procedures, the Ophea (2014) guidelines (Ontario Physical Education Safety Guidelines – Concussion Package) was mentioned by 43% of the respondents as well as additional curriculum, health and safety committees, safe school PD day, concussion programs, and first aid training. An additional survey was disseminated to Ontario teachers via the Ontario Teachers’ Federation and the Ontario English Catholic Teachers’ Association with a zero response rate to the request to participate in the project (Parsons & Mohan, 2013).

The December 2014 issue of ‘Professionally Speaking’, the magazine of the Ontario College of Teachers, features an article that references prominent concussion expert, Dr. Paul Echlin. In his words, “this is no longer a sport problem or a doctor’s problem; this is a public health problem…it is not just about the children who play hockey; it is about who gets injured on the playground” (Lewington, 2014, p. 36). The article within the
Ontario College of Teachers’ magazine proceeds to ascertain that the increased responsibilities associated with concussion awareness and prevention is a new phenomenon for schools (Lewington, 2014). Although the responsibility, or the recognition and acknowledgement of responsibility, may be deemed as a new phenomenon, the incidence of concussion within the school environment is not a new concern. The Ontario School Boards’ Insurance Exchange (OSBIE) reports that “of the 84,706 incident reports submitted in 2011 by member school boards, 634 were labelled as concussions or possible concussions” (Ontario School Boards’ Insurance Exchange, 2011, p. 7). Of these reported incidents, 59% of incidents reported by schools in 2011 were sports-related concussions (Ontario School Boards’ Insurance Exchange, 2011).

1.2 Purpose of the study
The purpose of this research was to explore the meaning of concussion as understood by teachers within the elementary school environment. As front line professionals, responsible for the health and safety of children and adolescents during the school day, teachers possess a unique and pivotal role in the prevention, recognition, and management of concussion. A sound foundational knowledge of concussion can empower teachers to provide confident and efficient concussion care within the school environment. Teachers should possess an awareness of the physical, emotional/behavioural, cognitive, and somatic manifestations of concussion in order to ensure appropriate management of students within the school environment. An exploration of attitudes toward concussion, particularly toward the implementation of an Ontario Ministry-mandated policy, can provide valuable insight into the strengths and
limitations of the available resources and may increase consistency and support between school boards. This study aims to explore, using qualitative descriptive methodology, the knowledge, skills, and attitudes of Ontario elementary school teachers regarding the prevention, recognition, and management of concussion within the school environment.

1.3 Research questions

This research endeavoured to answer the following questions:

1) What do Ontario elementary school teachers know about concussion?

2) What attitudes do Ontario elementary school teachers possess about concussion?

3) How does the knowledge of Ontario elementary school teachers compare to the knowledge that is presented within the Ministry-mandated policy regarding concussion?

4) How does the Ministry-mandated policy on concussion impact the knowledge and attitudes of Ontario elementary school teachers regarding concussion?

1.4 Significance of study

Concussion literature is expanding, but there appears to be a gap in the current research literature regarding the perceptions of Ontario elementary school teachers. Children and adolescents attend school for a large portion of the day and the onus of responsibility for safety is placed on the most responsible adult, often a teacher. The results of this study will hold significance and relevance for teachers, as well as parents, coaches, students,
and school board administrators. Knowledge generated from this research study can be utilized to inform current or developing opportunities for the training of parents, teachers, coaches, and students regarding concussion, in order to ensure a safer school environment for all individuals.
Chapter 2

2 Literature Review

A concussion is a significant injury that can impact individuals of all ages. A concussion can occur as a result of a direct blow to the head, face, or neck, or by a blow to the body that transmits an impulsive force to the head (DeMatteo et al., 2015; McCrory et al., 2013). Children and adolescents are at a high risk for concussion, and concussion is one of the most commonly reported injuries among children and adolescents who participate in sport and recreational activities (Browne & Lam, 2006). As a result of the high population of individuals at risk of injury and the increased frequency of incidence, the awareness, prevention, and management of concussion has become a public health concern (Barlow et al., 2010; Carl & Kinsella, 2014; Covassin et al., 2012; Giza, 2014; Hajek et al., 2011). The increased incidence of reporting has resulted in an increase in research that describes the impact and potential catastrophic consequences of concussion.

The science of concussion research is rapidly evolving. Advances in knowledge and awareness regarding the impact of concussion on school-aged children and adolescents present interesting challenges for individuals charged with the responsibility of providing clinical, as well as educational (including teachers), service to children who may be at risk of, or who have sustained, a concussion. This chapter will provide a review of concussion literature, with consideration to the role of the educator in the management (including prevention and identification) of concussion within the school environment.
2.1 Concussion legislation

Increased awareness of the incidence of concussion, as well as the need for increased recognition and reporting of potential concussion has resulted in an increase in government interest in concussion. Despite the increased awareness, there is currently no specific concussion legislation within Canada. An initial attempt to approach the Ontario legislature regarding concussion was made in March 2012, when amendments to the Education Act (Bill 39) were introduced. These amendments were proposed as part of a provincial concussion strategy that was aimed at protecting students, who are involved in school sports, from the potentially serious effects of concussion (Parsons & Mohan, 2013). Bill 39 proposed to create new obligations for Ontario school boards to develop policies and guidelines (including prevention, identification, and management) regarding head injuries and concussion (Bill 39, Education Amendment Act [Concussions], 2012). This amendment, if passed, would grant authority to the Minister of Education to mandate the establishment and implementation of individual school board policies regarding head injuries and concussion. Although “these amendments were never brought into force as they were tabled before the legislature was prorogued” (MacDonald & Katzman, 2013, p. 18), the concern surrounding the management of concussion within the school environment has since been addressed by the Ontario Ministry of Education.

In March 2014, the Ontario Ministry of Education issued Policy/Program Memorandum (PPM) No. 158 that outlines the Ministry’s expectations regarding the components of a school board’s policy on concussion (Ontario Ministry of Education, 2014). As of January 30, 2015, there is an expectation that all school boards within Ontario will have
in place a fully implemented program that includes ongoing training plans for teachers, staff, and volunteers to educate them on concussion. Although each school board will have the opportunity to create their own policy and procedure regarding concussion, “each school board’s policy is expected to contain, at a minimum, the following components: development of awareness; prevention; identification; management procedures for a diagnosed concussion, and; training” (Ontario Ministry of Education, 2014, p. 3). Adhering to a consensus definition of concussion within individual school board policies and procedures may assist to dispel misconceptions and misinterpretations, as well as create an atmosphere of awareness that can assist in the prevention, identification, and management of concussion within the school environment.

To assist in the development of individual school board policies (and potentially allow for consistency between school boards), the Ontario Physical and Health Education Association (Ophea), a not-for-profit organization that was established in 1921 to provide health and learning materials for children and youth in Ontario, developed a concussion protocol. This concussion protocol was created in “partnership with the Ministry of Education, the ThinkFirst Concussion Education and Awareness Committee, and the Recognition and Awareness Working Group of the Mild Traumatic Brain Injury/Concussion Strategy” (Ontario Ministry of Education, 2014, p. 2) and is recognized by the Ministry of Education as the minimum standard for school board policy development. Recognizing the required areas of education (as outlined in the PPM No. 158) regarding concussion, the Ophea (2014) concussion protocol includes the following components: definition; development of awareness; prevention; identification, and;
management. The concussion protocol further endorses a collaborative effort, stressing the importance of “administrators, educators (including occasional teachers), school staff, parents, and school volunteers” (Ophea, 2014, p. 2) as partners in the prevention, identification, and management of students with concussion.

2.2 Understanding concussion

At the time of concussive injury, there is a sudden shifting or shaking of the brain, within the skull. Rotational acceleration or deceleration produces a force that results in a shearing strain on the neural elements, causing axonal injury, cell death, or intracranial hemorrhage. Immediately following a biomechanical injury to the brain, an alteration to normal brain functioning, termed ‘neurometabolic cascade’, occurs (Giza & Hovda, 2001; King, Brughelli, Hume, & Gissane, 2014). This ‘neurometabolic cascade’ results in an increased concentration of the excitatory neurotransmitter glutamate, as well as an ionic flux of calcium and sodium, which results in cellular changes (Giza & Hovda, 2001). The rapid firing of neurotransmitters, in an unhealthy cascade, as a response to the depolarization of brain cells, results in the death of certain receptors with links to cognitive function (e.g., memory and learning; McBride, 2012). In an attempt to re-establish homeostasis, membrane ionic pumps work overtime in order to meet the energy demands (Giza & DiFiori, 2011). Adenosine triphosphate (ATP) is required as an energy source to restore homeostasis, and the increased work of the ionic pumps results in an increase in cerebral glucose metabolism (Giza & DiFiori, 2011; Giza & Hovda, 2001). The imbalance in the energy supply and demand at the cellular level is related to the mitochondrial dysfunction that is occurring (King et al., 2014), and the
‘hypermetabolism’ that occurs during the increased workings of the sodium-potassium pump takes place in a setting of decreased cerebral blood flow (Giza & Hovda, 2001). The process of regaining equilibrium takes time (McBride, 2012). The signs and symptoms that arise from a concussive injury are a direct manifestation of this metabolic cascade and any additional effort places increased demands on the recovering system (Sady, Vaughan, & Gioia, 2012).

The impaired energy balance and ongoing mitochondrial dysfunction, coupled with the decreased cerebral blood flow, increases the brain’s vulnerability to a second injury (Giza & Hovda, 2001; King et al., 2014). An understanding of the pathophysiology of concussion increases the awareness of the potential catastrophic consequence of continued activity or premature return-to-sport and return-to-learn activities that could place the concussed individual in danger of additional (or secondary) brain injury. The severity of injury can be minimized, early after initial impact, by limiting both physical and cognitive exertion (Grady, 2010).

2.3 Defining concussion

The term ‘concussion’ is often used interchangeably with the term ‘mild traumatic brain injury (mTBI)’, as both represent the less severe end of the traumatic brain injury (TBI) spectrum (DeMatteo et al., 2015; King et al., 2014; McCrory et al., 2013). Concussion is a brain injury (McCrory et al., 2013) that falls below the mild classification within the full spectrum of TBI. The intention of the word ‘mild’ is to frame the severity of the initial injury (Grady, 2010; Kimbler, Murphy, & Dhandapani, 2011), not to modulate or
downplay the severity of the injury or diminish the impact of concussion on the brain. An operational definition provided by the World Health Organization Task Force on Mild Traumatic Brain Injury, describes mTBI as a brain injury which results from external forces to the head with at least one or more of the following: confusion or disorientation; loss of consciousness (less than 30 minutes); post-traumatic amnesia (less than 24 hours), and; a Glasgow Coma Scale score of 13-15 at 30 minutes post-injury (Bergman et al., 2013). Although once considered as a hallmark feature of concussion most concussions do not result in a loss of consciousness (LOC), or they may result only in a transient (lasting seconds) LOC (DeMatteo et al., 2015). Further compounding the confusion between terms is the fact that although a concussion is a brain injury with similar acute clinical symptoms to a TBI, concussion represents a functional rather than a structural injury, and abnormalities will not appear on standard neuroimaging (Colvin et al., 2013; Kimbler et al., 2011; McCrory et al., 2013); therefore, seeking confirmation of injury via CT scan is not possible with concussion. DeMatteo et al (2010) report that children with a Glasgow Coma Scale score of 13-15 and those who experienced a LOC while still demonstrating a normal result on a CT scan were given a diagnosis of ‘concussion’ versus ‘brain injury’.

The use of the term ‘concussion’ may connote a less severe injury, as compared to mTBI (Halstead & Walter, 2010), implying a decreased sense of concern for significant long-term effects (Dematteo et al., 2010; Grace, 2013), or a less severe diagnosis (Dematteo et al., 2010). In a study of parents of paediatric patients, Gordon, Dooley, Fitzpatrick, Wren, and Wood (2010) explored the differences between the diagnostic terms ‘concussion’,
'minor traumatic brain injury', and ‘mild traumatic brain injury’ to determine parental value of equivalence or non-equivalence. Of those surveyed, 50.9% viewed ‘concussion’ and ‘mild traumatic brain injury’ as equivalent. It is interesting to note that for those parents who viewed these terms as non-equivalent, there was a response rate of 39.7% who viewed the diagnosis of ‘concussion’ as considerably better than ‘minor traumatic brain injury’ or ‘mild traumatic brain injury’. Dematteo et al. (2010) found that the diagnosis of concussion was found to result in an earlier discharge from hospital (if hospitalization occurred) and a subsequent earlier return to school. These results coincide with the overlaps that occur within the literature, demonstrating misconceptions regarding the meanings (or perceived implication and severity) of these diagnostic terms. Halstead and Walter (2010) surmised that “a clear definition of concussion requires consensus among researchers, clinicians, and patients, each of whom require a different construct for understanding the injury” (p. 598).

In 2001, the first of four International symposia on concussion in sport was held in Vienna, Austria. It was at this first meeting that a consensus was met regarding a working definition of sport-related concussion. This definition has undergone revisions at subsequent symposia which were held in 2004 (Prague, Czech Republic), 2008 (Zurich, Switzerland), and most recently in 2012 (Zurich, Switzerland; Halstead & Walter, 2010). The definition outlined by McCrory et al. (2013) has evolved from the four International symposia.
“Concussion is a brain injury and is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces. Several common features that incorporate clinical, pathologic and biomechanical injury constructs that may be utilized in defining the nature of a concussive head injury include:

1. Concussion may be caused either by a direct blow to the head, face, 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 disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.

Concussion results in a graded set of clinical symptoms that may or may not typically follow a sequential course. However, it is important to note that in some cases symptoms may be prolonged” (McCrory et al., 2013, pp. 251–252).

For the purpose of this research study, the term ‘concussion’ will be used as defined and distinguished from the term ‘mTBI’ using the definition that is adopted and endorsed by the Ontario Physical Education Safety Guidelines – Concussion Package, created by Ophea (2014) to assist school boards in creating their own concussion policy and procedures. The Ontario Physical Education Safety Guidelines – Concussion Package, referenced in the Ministry of Education’s Policy/Program Memorandum No. 158, refers
to a concussion as “a brain injury that causes changes in how the brain functions” (Ophea, 2014, p. 2). The Ophea (2014) definition further acknowledges that a concussion can be caused by “either a direct blow to the head, face or neck, or a blow to the body” (p. 2), bringing attention to the injuries that occur within the school environment that may not be construed as a head injury but cause a jolt to the body and a resultant rapid movement of the brain.

### 2.4 Concussion diagnosis

A concussion is a functional brain injury that does not result in structural changes, therefore, it cannot normally be seen on routine neuroimaging tests (e.g., X-rays, CT scans, or MRIs) (Karlin, 2011; Ophea, 2014; Purcell, 2014). The determination of the occurrence of concussion is most commonly based on a situational judgment call that considers the incident and the signs and symptoms that an individual is exhibiting.

Although the structural injury associated with concussion is not visible to conventional medical imaging, recent advances in magnetic resonance imaging have made it possible to detect the subtle damage that is caused by this mild form of brain injury (Chamard et al., 2012). Concussion has been shown to result in neurometabolic changes in the brain that are detectable through the use of magnetic resonance spectroscopy (Chamard et al., 2012), and microstructural white-matter alterations that are detectable using diffusion tensor imaging MRI (Koerte et al., 2012; Sasaki et al., 2014) and free-water analysis (Pasternak et al., 2014). Regardless of these advances in the imaging of concussion, the gold standard for concussion diagnosis continues to be clinical testing (i.e.,
neurological/behavioural examination), and requires careful attention to changes in
individual function.

### 2.5 Recognizing and identifying concussion

Within the school environment, teachers play a pivotal role in the identification of a
potential concussion. It is important to recognize, and emphasize, that “concussion is a
clinical diagnosis made by a medical doctor or nurse practitioner” (Ophea, 2014, p. 3).
The implementation of a concussion policy does not seek to implicate administrators and
educators in the diagnostic process, or place the onus of responsibility for diagnosis of
concussion in the hands of the school authorities. A lack of knowledge or understanding
of the causes of concussion and concussive signs and symptoms can contribute to the
underreporting of concussion in the youth population (Albrecht, Lindback, & Strand,
2013; Caine et al., 2014). The recognition, and subsequent diagnosis, of concussion is
based on the appearance of (objective) signs and self-reporting of (subjective) symptoms
(Snyder, Bauer, & Health IMPACTS for Florida Network, 2014). It is important to
acknowledge that these signs and symptoms may be subtle and easily overlooked, or
disregarded, by the child, coach, teacher, parent, or even health care providers (Purcell,
2014).

When a child sustains a potential concussion, the child should stop participating in the
precipitating activity immediately, should not be left alone, and should seek medical
attention as soon as possible, ideally on the same day as the injury (Caine et al., 2014;
McCrory et al., 2013; Ontario Neurotrauma Foundation, 2014). A qualified health
professional should evaluate a suspected concussion as soon as possible, following the injury, in order to prevent further injury or exacerbation of symptoms (McCrory et al., 2013). Recognition is an important step in the identification process and requires knowledge, skills, and awareness in order to ensure that potential concussion is reported in a timely manner (in order to allow for appropriate medical attention). Ophea’s (2014) concussion protocol provides Ontario elementary school teachers with a flow chart (“steps and responsibilities in suspected and diagnosed concussions”; Ophea, 2014, p. 19) that provides direction to individuals within the school environment at the time of injury. A sample tool to identify a suspected concussion is provided in Appendix C-1: Chart 1, within the Ophea (2014) protocol that provides a listing of possible signs and symptoms, a quick memory function assessment, and specific instructions to assist the school personnel in the management of a suspected concussion (including removal from play, need to contact parent/guardian, and continued monitoring).

According to the Canadian Medical Association, children and youth may not be cognitively mature enough to recognize or properly describe the signs and symptoms that they are experiencing (Echlin et al., 2014). Adults, including coaches, trainers, and parents, may fail to recognize and ultimately report concussions due to a lack of knowledge regarding the signs and symptoms of concussion (Echlin, 2010). The implementation of concussion awareness programs for athletes, coaches, and parents has resulted in an increased confidence in both recognition and reporting (Chrisman, Schiff, Chung, Herring, & Rivara, 2014; Echlin et al., 2014; Echlin, 2010; Echlin et al., 2010; Finch, McCrory, Ewing, & Sullivan, 2013; Frémont, Bradley, Tator, Skinner, & Fischer,
2014; Rivara et al., 2014; Sye, Sullivan, & McCrory, 2006). Despite the increased awareness of the impact of concussion, including the long term consequences of mismanagement or misdiagnosis, Echlin et al. (2014) report that there is still some resistance within these populations to recognize and report. Failure to recognize and report concussion was previously postulated to be a result of a lack of knowledge among athletes, coaches, trainers, and parents regarding the signs and symptoms of concussion (Echlin et al., 2010), as well as the individual athlete’s own fear of removal from play in this competitive society of sport (Echlin, 2010).

Gourley, Valovich McLeod, and Bay (2010) surveyed youth athletes and their parents and found that there was a knowledge deficit regarding symptom recognition within this population. Although moderately aware of the signs and symptoms of concussion, there was little knowledge regarding proper concussion management. Valovich McLeod et al. (2007) had previously reported that more than 60% of youth sports coaches were able to correctly identify symptoms of concussion (including headache, confusion, loss of memory, dizziness and loss of consciousness).

## 2.6 Signs and symptoms of concussion

The recognition (and subsequent diagnosis) of concussion is dependent upon identification of signs and symptoms; therefore, it is essential that individuals within frontline positions possess the knowledge and skills to recognize, identify, and report potential concussive injuries in a timely manner. The signs and symptoms of concussion differ between individuals and may not appear at the time of initial impact. Concussive
signs and symptoms present as a constellation of physical, cognitive, emotional, and sleep related difficulties (Gioia, 2012; Halstead & Walter, 2010; McCrory et al., 2013; Ophea, 2014). Signs and symptoms of concussion can be subtle and may be easily overlooked (Caine et al., 2014; Choe et al., 2012; Eisenberg, Meehan, & Mannix, 2014; Faure, 2010). These manifestations may develop within minutes to hours, but sometimes do not appear until days following the injury (Purcell, 2014). Due to the potential for evolution or progression of signs and symptoms over time, it is imperative that after the initial injury takes place that the child be carefully observed and not left alone (Patel, Shivdasani, & Baker, 2005). The majority of concussion symptoms resolve within 7-10 days after the injury has been sustained (Caine et al., 2014; DeMatteo et al., 2015; McCrory et al., 2013; Ophea, 2014); however, each concussion is a unique and unpredictable event which manifests differently among individuals. As this research study sought to understand concussion within the school environment, it is interesting to note that research has demonstrated that young children may take longer to recover (Caine et al., 2014; Carl & Kinsella, 2014; Choe et al., 2012; Parsons & Mohan, 2013).

Ophea (2014) provides a detailed list of signs and symptoms within the aforementioned categories, as they are outlined in the Ontario Physical Education Safety Guidelines – Concussion Package. A similar summary of concussive signs and symptoms (in children) was included in the new Guidelines for Diagnosing and Managing Pediatric Concussion that was created by the Ontario Neurotrauma Foundation (2014); however, in this summary, the signs and symptoms are divided into: thinking problems; child’s complaint, and; other problems. For this research project, the Ophea (2014) information is referenced
as this resource is widely disseminated to the Ontario elementary school teachers who are participants within this study, and the Ophea (2014) information is considered to be the minimum standard for the development of school board concussion policy.

2.6.1 Physical signs and symptoms

Physical signs and symptoms of concussion may or may not be present at the time of injury. Physical signs and symptoms may include, but are not limited to: headache (Arbogast et al., 2013; Bergman et al., 2013; Blume & Hawash, 2012; Caine et al., 2014; Carl & Kinsella, 2014; Choe et al., 2012; Covassin et al., 2012; Davis & Purcell, 2014; Eisenberg et al., 2014; Faure, 2010; Grace, 2013; Grady, 2010; Grubenhoff, Kirkwood, Deakyne, & Wathen, 2011; Hajek et al., 2011; Halstead & Walter, 2010; Sandel, Lovell, Kegel, Collins, & Kontos, 2012); nausea and/or vomiting (Blume & Hawash, 2012; Caine et al., 2014; Faure, 2010; Grace, 2013; Grubenhoff et al., 2011; Halstead & Walter, 2010); fatigue or feeling tired (Arbogast et al., 2013; Bergman et al., 2013; Blume & Hawash, 2012; Eisenberg et al., 2014; Faure, 2010; Grace, 2013; Hajek et al., 2011; Halstead & Walter, 2010; Lustria, Smith, & Hinnant, 2011); poor coordination or balance (Choe et al., 2012; Davis & Purcell, 2014; Faure, 2010; Grace, 2013; Halstead & Walter, 2010); changes in vision (e.g., photophobia) or hearing (e.g., phonophobia) (Arbogast et al., 2013; Carl & Kinsella, 2014; Choe et al., 2012; Davis & Purcell, 2014; Eisenberg et al., 2014; Faure, 2010), and; dizziness (Blume & Hawash, 2012; Caine et al., 2014; Carl & Kinsella, 2014; Choe et al., 2012; Davis & Purcell, 2014; Eisenberg et al., 2014; Faure, 2010; Hajek et al., 2011; King et al., 2014; Sandel et al., 2012). Most concussions do not
cause a loss of consciousness (LOC) or may result only in a transient (lasting only seconds) LOC (Coghlin, Howitt, & Myles, 2009; DeMatteo et al., 2015).

2.6.2 Cognitive signs and symptoms

Cognitive signs and symptoms may include difficulty concentrating (e.g., easily distracted) or memory impairment (Arbogast et al., 2013; Bergman et al., 2013; Caine et al., 2014; Carl & Kinsella, 2014; Choe et al., 2012; Coghlin et al., 2009; Davis & Purcell, 2014; Eisenberg et al., 2014; Faure, 2010; Sandel et al., 2012); confusion (Caine et al., 2014; Carl & Kinsella, 2014; Choe et al., 2012; Davis & Purcell, 2014; Eisenberg et al., 2014; Faure, 2010); dazed or in a fog (Arbogast et al., 2013; Coghlin et al., 2009; Sandel et al., 2012), and; slower reaction time (e.g., slowed down, trouble following directions) (Bergman et al., 2013; Blume & Hawash, 2012; Carl & Kinsella, 2014; Choe et al., 2012; Davis & Purcell, 2014; Eisenberg et al., 2014; Faure, 2010).

2.6.3 Emotional and behavioural signs and symptoms

The emotional and behavioural signs and symptoms associated with concussion include irritability (Bergman et al., 2013; Blume & Hawash, 2012; Choe et al., 2012; Coghlin et al., 2009; Faure, 2010; Grace, 2013; Hajek et al., 2011; Halstead & Walter, 2010); anxiety and nervousness (Blume & Hawash, 2012; Davis & Purcell, 2014; Eisenberg et al., 2014; Faure, 2010); sadness (Blume & Hawash, 2012; Eisenberg et al., 2014; Faure, 2010; Grace, 2013; Halstead & Walter, 2010); and emotional lability including strange or inappropriate emotions or appearing more emotional than usual (Grace, 2013; Halstead & Walter, 2010).
2.6.4 Sleep disturbance

Sleep symptoms (beyond the expression of fatigue previously outlined within the physical symptoms) may include sleeping more or less than usual or insomnia (Bergman et al., 2013; Blume & Hawash, 2012; Carl & Kinsella, 2014; Coghlin et al., 2009; Eisenberg et al., 2014; Faure, 2010; Hajek et al., 2011).

2.6.5 A child’s concussion experience

Bergman et al. (2013) report that the majority of knowledge pertaining to symptoms is obtained from self-reported experiences after the injury. The experience of a symptom is subjective and is also dependent upon the individual’s awareness, honesty, and overall willingness to report accurate information (King et al., 2014). Children and youth may not be cognitively mature enough to recognize or describe the signs and symptoms that they are experiencing (Echlin et al., 2014) and the words that children use to describe their concussion symptoms may differ from adults (in part due to their limited communication skills and a lack of cognitive maturity) (Purcell, 2014). Children also have a limited sense of time (e.g., determining the difference between what occurred yesterday in comparison to events from a previous day), as well as difficulty deciphering symptom severity (Sady et al., 2012). This may impede their ability to recognize and report a potential concussion and subsequently requires that adults (including parents, coaches, teachers, and health care professionals) become knowledgeable and attune to the signs and symptoms of concussion in order to ensure that they act appropriately (Grady, 2010). Simple vocabulary may be more effective in obtaining an accurate response from a child who has suffered a potential concussion (Giza, 2014).
Children and adolescents have an increased susceptibility to concussion (Heyer et al., 2014; Sady et al., 2012). The young brain is more vulnerable to concussive impact due to the plasticity and growth which occurs during this developmental period (Keightley et al., 2014). Children have a greater head-to-toe ratio, as well as weaker neck muscles and undeveloped (thinner) cranial bones (Cook, Schweer, Shebesta, Hartjes, & Falcone, 2006; McCrory, Collie, Anderson, & Davis, 2004). The large subarachnoid space allows the brain to move more freely within the skull, increasing the opportunity for a jolting, twisting, and jarring movement upon impact (Cook et al., 2006). The biomechanical force required to produce clinical signs and symptoms within a child is two to three fold greater when compared to an adult (McCrory et al., 2004; Patel et al., 2005). It is reasonable to assume that if a child or adolescent is demonstrating clinical symptoms, he/she has sustained a far greater force upon impact compared to an adult demonstrating the same post-concussive symptoms (McCrory et al., 2004).

Studies have demonstrated that young athletes require a longer recovery period when compared to college or professional athletes, with this recovery period often extending 7 to 10 days longer than their older counterparts (Davis & Purcell, 2014; Halstead & Walter, 2010). On occasion, symptoms are not recognized until the child returns to school and engages in cognitive activities (e.g., school work that requires attention and memory) (Grady, 2010) making concussion of concern to education professionals. A healthy and functioning brain is essential for learning, performing daily activities, and for the successful development of the child or adolescent. The ability to manage day to day activities of childhood and adolescence (e.g., acquiring new knowledge and managing
school work) may be impaired by the common cognitive sequelae of concussive injuries (e.g., slower processing of information, decreased attention, and impaired memory) (McCrory et al., 2004; Purcell, 2014). Although the majority of concussed individuals make a full recovery, some may experience significant and persistent cognitive symptoms which can have a negative impact on the child’s ability to return-to-learn or return-to-play (Duff & Stuck, 2014; Popoli et al., 2014).

The majority of head injuries that are sustained by children are mild to moderate. The child may not receive medical treatment (as the mild, often hidden, nature of the symptoms go unrecognized), and may return to the school environment with no physically identifiable disability (unlike a fractured limb or a laceration, which leave noticeable visible markers of injury). This lack of physical sign of injury may disguise the needs of the returning student and may also result in a premature return-to-learn or return-to-play.

### 2.7 Managing concussion

Management of concussion in the paediatric population generally adheres to the adult guidelines that were outlined within the 2012 ‘Consensus Statement on Concussion in Sport’ (Caine et al., 2014; McCrory et al., 2013). Recommendations for evaluation and management outlined in the consensus statement were indicated for children and adolescents down to the age of 13 (McCrory et al., 2013). For children under the age of 13 years, concussive symptoms are reported differently and age-appropriate symptom checklists are required. A parent is often required to provide additional insight into the
signs and symptoms demonstrated (McCrory et al., 2013). For elementary school teachers, the Ontario Physical Education Safety Guidelines – Concussion Package has outlined a sample tool (“sample tool to identify a suspected concussion”; Ophea, 2014, Appendix C-1, p. 21) that can be utilized as a guide to assist teachers in the identification of a suspected concussion. This sample tool, within Appendix C-1 of the Ophea (2014) concussion package includes a detailed list of the signs and symptoms of suspected concussion, as well as a brief memory function assessment including questions that are similar to the questions within the Sports Concussion Assessment Tool (SCAT3) modified to the school environment. SCAT3 was produced at the Fourth Concussion in Sport Conference as a detailed tool for assessment of concussion (King et al., 2014). A school based policy with supporting documentation does not replace the need for medical assessment, nor does it place the onus of diagnosis on the administrator or educator. The tools provided within the Ophea (2014) document create a guide to allow administrators and educators to properly recognize concussive injuries within the school environment in order to ensure timely identification and management.

A child who has sustained a potential concussion should stop participating in the precipitating activity immediately. Unanimous consensus was met at the fourth annual Concussion in Sport conference to support the recommendation that an injured player should not return-to-play on the day of concussive injury (McCrory et al., 2013). When acute symptoms have resolved, it is recommended that a gradual return to activity begin. The majority of acute symptoms will resolve spontaneously within the first several days post-injury (McCrory et al., 2013), however, “persistent symptoms are generally reported
in 10-15% of concussions” (McCrory et al., 2013, p. 253). Awareness and knowledge of how to properly manage a diagnosed concussion is critical for a student’s recovery and administrators and educators play a pivotal role in helping to prevent students from premature return-to-play and return-to-learn activities (Ophea, 2014).

2.7.1 Physical and cognitive rest

Cognitive and physical rest are considered to be the cornerstones of concussion management (Barlow et al., 2010; Blume & Hawash, 2012; Caine et al., 2014; Davis & Purcell, 2014; McCrory et al., 2013; Purcell, 2014). The concept of rest within the management of concussion was previously primarily associated with physical rest, or abstaining from physical activity or sports. The concept of cognitive rest in the management of sport-related concussion was first introduced during the Second International Conference on Concussion in Sport, held in 2004 and reinforced at the Third Conference in 2008 with a focus on the management of paediatric sport-related concussion (Arbogast et al., 2013).

Post-concussion, physical rest may involve restrictions on participation in sports, sport training, and physical education classes. Physical rest also refers to leisure activities including skateboarding, bike riding, and roller blading (Davis & Purcell, 2014; Halstead & Walter, 2010; Purcell, 2014). It is recommended that the concussed individual abstain from physical activities until asymptomatic and then proceed through a medically supervised graduated exertion protocol (Davis & Purcell, 2014; Halstead & Walter, 2010; McCrory et al., 2013; Purcell, 2014).
A less clearly defined, but equally important, aspect of concussion management is cognitive rest. Cognitive rest involves limiting those activities that require concentration and attention that have the potential of exacerbating symptoms. These activities can include, but are not limited to, watching television, playing electronic/video games, texting, using a computer, and reading (Davis & Purcell, 2014; Halstead & Walter, 2010; Halstead et al., 2013; Purcell, 2014). A child may experience an exacerbation of symptoms during the first few days following a concussion as a result of mental exertion (Gioia, 2012). For some individuals, cognitive rest may entail absence from school or modifications to school work (e.g., assignments and tests) for a period of time in order to allow symptoms to decrease (Caine et al., 2014; McCrory et al., 2013).

Eisenberg et al. (2014) surveyed 197 individuals (11 to 22 years of age) who had presented to an emergency department with an acute concussion. One week after their injury, 57% of participants reported at least moderately limiting cognitive activity. For those who had returned to school 18% reported poorer school performance, whereas 48.2% reported no decline in school work. Return to physical activity was less prevalent with 63.8% reporting no athletic activity and only 8.2% returning to full athletic activity.

Arbogast et al. (2013) found that there was a significant difference in the amount of disseminated information regarding physical and cognitive rest, with a significant gap in the cognitive rest message. The participants within this study were paediatric primary care providers (attending physicians, nurse practitioners, and physician assistants) from a Children’s Hospital of Philadelphia Care Network. Although two-thirds of the
participants in the study were aware of the concept of cognitive rest, only 2% were able to articulate a mechanism for clinical implementation.

2.7.2 Return-to-learn and return-to-play

Children and adolescents spend a significant amount of their time in the classroom. School is an environment for education and for socialization; therefore, a full return-to-learn within the school environment is a priority following a concussion (Davis & Purcell, 2014). “There is no preset formula for developing strategies to assist a student with a concussion to return to learning activities since the recovery process will vary for each student” (Ontario Ministry of Education, 2014, p. 3; Ophea, 2014, p. 10). The development of an individualized return-to-learn/return to physical activity plan is a collaborative approach which should include the student, his/her parents/guardians, school staff (including teachers), and the health care provider (Ophea, 2014).

Individualized return-to-learn and return to physical activity (return-to-play) plans follow a step-wise progression (with each step requiring a minimum of 24 hours, based on the severity of the concussion and the needs of the individual). The steps within these plans are not days and an individual can progress to the next step only when symptoms begin to improve or when the concussed student becomes asymptomatic (Ophea, 2014).

McCrory et al. (2013) outline a graduated return-to-play within the most recent consensus statement on concussion in sport. The return-to-play protocol after a concussion follows a stepwise process: no activity; light aerobic exercise; sport-specific exercise; non-contact training drills; full-contact practice; return-to-play. Each step takes a minimum of 24
hours, and the individual is to proceed through each level of this protocol if asymptomatic at the current level. If the individual becomes symptomatic (e.g., headache, dizziness) during any of the steps, the individual should drop back to the previous level for at least 24 hours and/or until asymptomatic.

The Ophea (2014) guidelines specify the need for a student with a diagnosed concussion to “follow a medically supervised, individualized and gradual return-to-learn/return to physical activity plan” (p. 10), and states that “a student with a diagnosed concussion must be symptom free prior to returning to regular learning activities” (p. 10). The Ophea (2014) document describes the steps involved in the gradual return-to-learn/return to physical activity plan and provides a description of the expectations of each of the collaborative team members (including a checklist for concussion signs and symptoms, protocols for return-to-learn and return to physical activity, and the potential cognitive difficulties that children may experience as a result of concussion). These guidelines serve as a reference for Ontario elementary school teachers and provide communication and teaching strategies to assist in the management of concussion within the school environment. It is an expectation of each individual school board that these mechanisms be in place to assist the administrator, educator, parent, and student to safely and appropriately reintegrate into the school environment following a concussive injury.

### 2.8 Summary

A concussion is a brain injury that impacts all aspects of an individual’s life. A concussion can occur from a blow to the head, face or neck, or a blow to the body that
transmits a force to the head (DeMatteo et al., 2015; McCrory et al., 2013). A concussion can impact an individual’s physical function, cognitive function, behavioural or emotional status, and sleep patterns. An individual does not need to lose consciousness in order to have suffered a concussion. It may be difficult for a child to express how they are feeling after a concussion and the signs and symptoms may not be as obvious in younger children. There is a significant gap in the available literature regarding the knowledge, skills, and attitudes of Ontario elementary school teachers. Research regarding the knowledge of concussion within the school environment to date has focused on the high school population with no indication of the present state of knowledge among educators within the elementary school environment. As of January 30, 2015, all school boards within Ontario were to have in place a fully implemented program that includes ongoing training plans for teachers, staff, and volunteers to educate them on concussion (Ontario Ministry of Education, 2014). The present study is the first study to explore the knowledge, skills, and attitudes of Ontario elementary school teachers, holding significant importance in light of the new Ministry-mandated policy implemented within the province of Ontario.
Chapter 3

3 Method

The goal of qualitative research is to “arrive at an understanding of a particular phenomenon from the perspective of those experiencing it” (Vaismoradi, Turunen, & Bondas, 2013, p. 398). This research study utilized qualitative description to provide insight into the knowledge, skills, and attitudes of Ontario elementary school teachers in the management of concussion within the school environment. This chapter will provide a discussion of the methodological choices made throughout the research project including: a description of the research purpose; a description of the paradigm and theoretical framework, and; a description of the research design and analysis.

3.1 Purpose of the study

As previously stated, the purpose of this research study was to investigate the knowledge, skills, and attitudes of Ontario elementary school teachers regarding the prevention, recognition, and management of concussion within the school environment.

3.2 Theoretical position

The theoretical position of the researcher can impact the interpretation of the data (Patton, 2002), and the researcher’s own perspectives can influence and transform the data (Elo et al., 2014; Sandelowski, 2010). Theoretical underpinnings are expressed in the manner through which the researcher approaches the data (Sandelowski, 2010) and although qualitative description aims to produce a comprehensive description of the everyday life experiences of the participants, this does not occur without researcher interpretation.
(Creswell, 2007; Sandelowski, 2000). Sandelowski (2010) further states that the straight reiteration of raw data without acknowledgement of the researcher role in analysis and interpretation is unethical, as “data never speak for themselves” (p. 79). It is important for researchers to identify themselves to ensure quality and trustworthiness (Elo et al., 2014; Sandelowski, 2010).

A paradigm is a worldview, a framework of beliefs, values, and methods that provide the rationale for why we are doing this and how we are doing this. The paradigm is made up of philosophy, ontology, epistemology, and methodology. This research project was approached from a post-positivist lens. My personal, academic background naturally pulls me toward a scientific, or positivist paradigm. The positivist lens can be viewed as one which “seeks causes, favors deterministic explanations, and emphasizes generality and universality” (Charmaz, 2006, p. 126). Knowledge is sought as a mechanism to describe a phenomenon that is experienced through observation and measurement and there is an assumption of a universal truth that can be represented. This truth cannot only be obtained but it can also be verified. A positivist sets aside their biases and beliefs in order to view the world as it really is (Ravenek & Laliberte Rudman, 2013). Post-positivists adhere to the objectivist epistemology, recognizing that true knowledge exists outside of the researcher’s values and beliefs (Ravenek & Laliberte Rudman, 2013) and that all data and knowledge are socially constructed. The post-positivist does not set aside biases and beliefs, but acknowledges that individuals are influenced by the world experiences within a shared reality.
3.2.1 Personal connection to the research topic

The post-positivist paradigm acknowledges that individuals are influenced by world experiences. As a researcher, it is important for me to acknowledge the personal experiences that can influence this research project. As a nurse, I am influenced by the belief that individuals within the school environment require adequate health teaching to allow for early identification of health concerns and potential risks to ensure that the school environment is a safe atmosphere for learning and personal growth. As a nurse, I questioned the requirement and obligation for Ontario elementary school teachers to assume a frontline health care position without adequate training and support to ensure appropriate knowledge and ability to respond to potential emergent situations. As a parent of children within the school environment, I am influenced by the expectation that my own children will be cared for and will remain safe when they are outside of my care for the majority of their daytime hours, in the school environment. I am under the impression, as a parent, that the individuals within the school environment possess the knowledge, skills, and attitudes to respond to situations that could impact the health and safety of my children.

It is also important to acknowledge that during the process of this research project, two of my children sustained concussions in the school environment. Both of these incidents occurred in the playground, under the supervision of a parent volunteer and a teacher. It was difficult to set aside my researcher hat while also wearing my parental hat, as I was aware of the required obligation of the school to not only respond to the situation, but also notify us of the incident. As parents, we were not contacted, despite our children’s ability
to self-advocate, and despite the apparent injury and demonstration of signs and symptoms for potential concussion. Further investigation (via conversations with the involved teachers, parent volunteers, and principal) into our personal experience revealed that our school had received concussion training, but that the amount of training that the teachers at our school had received in 2015 was minimal in the Spring and self-directed (via internet) in the Fall.

3.3 Research design

This research study sought to explore teachers’ knowledge and skills related to the provincial policy mandated of school boards and to develop an understanding of their knowledge, skills, and attitudes related to the management of concussion within the school environment.

Qualitative description is useful when little is known, or yet explored, about the phenomenon in question (Sullivan-Bolyai, Bova, & Harper, 2005). A review of the literature indicated that there was a gap in the literature regarding the knowledge, skills, and attitudes of Ontario elementary school teachers in the management of concussion within the school environment. A qualitative descriptive method would assist with producing a comprehensive summary of participant experience using language that is easily understood and agreed upon by the reader to be a true representation of the participant point of view (Sandelowski, 2000, 2010). Qualitative description does not postulate to generate new truth, but instead, intends to describe and understand the truth that exists within the participant experience. The method of data collection, and the
method of data analysis, impacts the data, as does the researcher’s own perspectives (Sandelowski, 2010). This qualitative descriptive research project employed qualitative content analysis techniques that will be discussed in detail later in this chapter.

3.3.1 Ethical considerations

Ethics approval (NMREB File Number: 106243) was obtained from the University of Western Ontario’s Health Sciences Ethics Review Board (Appendix A), prior to the commencement of this study. Maintenance of confidentiality was important throughout the research process and written informed consent was obtained from each participant prior to starting the face-to-face interviews.

3.3.2 Sampling and participants

3.3.2.1 Sample

Eight participants were recruited for this research project. The Ontario Ministry of Education reports that as of 2013-2014, there were 3,980 elementary schools in Ontario. These elementary schools are administered by one of 72 district school boards. The eight participants were employed, as elementary school teachers, by school boards (representing four different school boards) within Central and Southwestern Ontario. The school boards are not named within the research study and specific school boards were not targeted. The Ministry of Education has mandated a concussion policy that applies to “administrators, educators, school staff, students, parents, and school volunteers” (Ontario Ministry of Education, 2014, p. 3). The aim of this research study was to elicit the insight of Ontario elementary school teachers, and the decision to include only
teachers within this study was deliberate in order to avoid any confounding variables such as differences in expectations, training, responsibility, or experience, which could be influenced by position, among the participants.

3.3.2.2 Sampling strategy and size

To recruit participants for this study, purposeful sampling techniques, which are consistent with the aims of qualitative research, were employed (Patton, 2002). The participants of the study shared the characteristic of being an elementary school teacher within a school board in Central or Southwestern Ontario.

Sandelowski (1995) presented criteria for sample size, acknowledging that the total number of participants within a qualitative study is fewer than the number required within a quantitative study. When approaching sampling decisions, it is important for the researcher to ensure that there are enough interview opportunities with participants to elicit sufficient data to understand the phenomenon, without creating an excess of data so as to reduce the possibility of an in-depth analysis. This research study engaged in an iterative process of data collection, therefore, a sampling decision was not made at the onset of the study. There was intent to continue with data collection until the emergent data dictated that theoretical saturation had occurred. Theoretical saturation requires that sufficient data be obtained to sufficiently explore the phenomenon and occurs when no additional data emerges to further develop the properties of a category (Glaser & Strauss, 1967). “By definition, saturated data ensure replication in categories, which in turn verifies and ensures comprehension and completeness” (Elo et al., 2014, p. 5).
3.3.2.3 Recruitment of participants

Strategies for participant recruitment included: (1) personal invitation to participate in the research study by the research team (excluding the student researcher); (2) request to teachers who were known to the research team to pass the recruitment handout (Appendix B) to other teachers; (3) a similar recruitment advertisement positioned in public places where teachers may frequent (libraries, community centres); (4) recruitment information included in Western University’s Faculty of Health Sciences/Health & Rehabilitation Sciences and Faculty of Education weekly email announcements and/or newsletters.

Teachers interested in participating in the research study contacted the student researcher directly via email contact. After initial email contact was made to indicate participant interest, it was determined as to whether or not the interested participant met the inclusion criteria before the letter of information and consent was sent via email prior to scheduling an interview location and time.

To be included in this study, participants needed to meet the following inclusion criteria:

(a) currently employed (full-time, part-time, or casual/on-call) within an Ontario school board, as an elementary school teacher (kindergarten to grade eight),

(b) proficiency in English language (oral, written, and read) as all face-to-face interviews were conducted in English,

(c) willingness to be audio-recorded,

(d) willingness and ability to participate.
Proof of employment status was not requested, nor was it required, to determine eligibility for participation. Assessment of prior work experience within other educational facilities (high school, college, or university was not determined and was, therefore, not considered to be criteria for inclusion or exclusion. Participants’ prior concussion knowledge, or experience, was not assessed prior to the interview.

Participants who were personal friends or family members of the student researcher were excluded from participating in the research study. Participants were informed that participation was voluntary and that they would not be compensated for their participation in the study.

3.4 Data collection

Two forms of data collection occurred: (1) data collected from publically available information on concussion recognition, prevention, and management, specific to the Ontario elementary school environment; and (2) data collected from teachers. Data collection, in qualitative descriptive studies, is most commonly achieved through interviews, observations, and documents (Sandelowski, 2000). The main method of data collection with participants (teachers) in this study was semi-structured interviews that were conducted face-to-face by the student researcher, audio-recorded, and transcribed verbatim.

3.4.1 Concussion documents

Publicly available information on concussion recognition, prevention, and management, specific to the Ontario elementary school environment was evaluated, to provide the
researcher with a broader understanding of the expected knowledge regarding concussion within the context of the school environment, as well as the anticipated or required skills of the school professional (see Literature Review Chapter 2). These documents were accessed via the Ministry of Education and Ophea, as there is an expectation by the Ministry of Education that all school boards within Ontario develop and maintain a policy on concussion (Ontario Ministry of Education, 2014).

The interview guide (Appendix C) used for this study was developed after careful evaluation of the Ophea (2014) elementary curricular concussion protocol as this document represents the minimum standard of knowledge expected by the Ontario Ministry of Education. This concussion protocol was developed in response to the PPM No. 158 issued by the Ministry of Education in March 2014 with the expectation for implementation of the development and maintenance of a policy on concussion. Within PPM No. 158, the specific expectations of the Ministry regarding the components of a board’s policy were outlined: “strategies to develop awareness of the seriousness of concussions; strategies for the prevention and identification of concussions; management procedures for diagnosed concussions; and training for board and school staff” (Ontario Ministry of Education, 2014, p. 1). Within PPM No. 158, the Ophea (2014) protocol is referenced as a tool to assist individual school boards in the development of concussion policies. The questions established for the interview guide were developed with consideration of the Ministry requirements and referenced the expectations of knowledge and skills presented within the concussion protocol.
3.4.2 Interviews

Semi-structured interviews were used as the primary means of data collection with the teacher participants. An interview guide (Appendix C) was developed in advance and was used for all interviews. The interview guide used in qualitative description is slightly more structured than in other qualitative methods, but still undergoes modification and transformation throughout the research process (Neergaard, Olesen, Andersen, & Sondergaard, 2009). The use of an interview guide structures the course of the interview (Brinkmann & Kvale, 2015), but does not limit the nature of the interview process.

Understanding that the questions asked could influence interpretation, the interview guide focused on eliciting data that was related to the Ministry-mandated concussion policy. The interview guide included open-ended questions that aimed to explore the teacher experience of concussion within the school environment. Particularly, questions addressed their knowledge, skills, and attitudes with reference to the requirements of the provincial policy on concussion within the school environment. The Ministry issued PPM No. 158 provided direction for the components of school board policy that includes: definition; development of awareness; prevention; identification, and; management (Ontario Ministry of Education, 2014). Data pertaining to these components was extracted from these recommendations to provide the framework for the development of the questions to ensure representation of the expected knowledge and skills of teachers. Open-ended questions pertaining to teacher experience with concussion within the school environment (including any potential or perceived challenges experienced by the teacher or students) and their acquisition of knowledge was included within the interview guide.
to provide a description of concussion within the school environment. The open-ended
nature of the questions allows for the researcher to elicit responses that facilitate
expression of individual experience.

Demographic information was obtained from the participants at the beginning of each
interview. After the first interview, it was determined that the addition of a question
pertaining to past personal experience with concussion would be of interest to the
research study as the first participant indicated that her prior personal experience with
concussion impacted not only her knowledge of concussion, but also her attitude toward
the management of concussion within the school environment. Although an interview
guide was used for all participants, some variation to the order of the interview questions
occurred between participants, dependent upon the needs of the participant and at the
researcher’s discretion, to ensure that the interview allowed for true expression of
experience. Probes used by the student researcher during the interview process were
open-ended and specific to the individual participant’s comments.

Interviewing for this study occurred between May 2015 and August 2015. The student
researcher conducted all interviews. Each individual interview was pre-arranged by the
student researcher and was scheduled at a time and location of convenience for the
participant. One face-to-face interview was conducted with each participant and the
interview duration ranged from 25-50 minutes in length.

The scheduled interview was the first and only time that the student researcher met face-
to-face with each participant. To allow for the development of rapport, the student
researcher introduced herself and engaged in a brief conversation, off record, prior to reviewing the Letter of Information and obtaining consent to begin the interview. After obtaining signed, informed consent, the participant was advised at the onset of the interview that they could refuse to answer any of the questions during the interview and that they could terminate the interview at any time. With permission from each participant, the interviews were audio-recorded using a digital recorder (ZOOM H4nS Handy Recorder).

3.4.2.1 Transcription

The audio-recordings of the interviews were transcribed verbatim by a professional transcription service and the resultant transcriptions were uploaded to the password-protected network drive of Western University. Upon receipt of the transcribed interviews, the student researcher compared the audio-recorded interview against the written transcription to ensure accuracy of information. To maintain confidentiality and anonymity, all potential identifiers were removed prior to data analysis. Identity was protected by using a numerical code. During the transcription process, the unique numeric identifier was paired with the data and no personal identification information was placed on the written transcripts of the interviews in order to ensure confidentiality.

3.5 Data analysis

The goal of qualitative description is to provide “a comprehensive summary of events in the everyday terms of those events” (Sandelowski, 2000, p. 336). A researcher engaging in qualitative description remains true to the facts elicited from the participants allowing
for “findings closer to the data as given, or data-near” (Sandelowski, 2010, p. 78). Elo and Kyngäs (2008) encourage the researcher to “become immersed in the data” (p. 109) in order to gain “a sense of the whole” (Elo & Kyngäs, 2008, p. 109; Vais moradi et al., 2013, p. 402). Qualitative descriptive studies typically employ the strategy of content analysis or thematic analysis for the treatment of data (Sandelowski, 2010). This research study sought to explore teachers’ knowledge, skills, and attitudes related to the provincial policy mandated of the school boards and to develop an understanding of their knowledge, skills, and attitudes related to the management of concussion within the school environment. Qualitative content analysis facilitated this exploration.

3.5.1 Qualitative content analysis

Qualitative content analysis offers an objective strategy to describe and quantify data (Cho & Lee, 2014; Elo et al., 2014; Elo & Kyngäs, 2008) that can be approached in an inductive and/or deductive manner (Cho & Lee, 2014; Vais moradi et al., 2013). A deductive approach is helpful when prior knowledge or theory exists and this approach can assist in the testing of existing theory or retesting existing data (Braun & Clarke, 2006; Cho & Lee, 2014; Elo & Kyngäs, 2008). The deductive approach begins with preconceived codes, or categories, which are derived from the pre-existing theory, research, or literature (Cho & Lee, 2014). An inductive approach to analysis is useful when knowledge about the research phenomenon is limited (Elo & Kyngäs, 2008). Braun and Clarke (2006) further describe the inductive approach as categorizing data “without trying to fit it into a pre-existing coding frame” (p. 83). Codes, categories, or themes are derived from the data (Cho & Lee, 2014; Elo & Kyngäs, 2008), and the researcher is
advised to remain close to the data that is collected (Sandelowski, 2000). Inductive and
deductive analysis, according to Elo and Kyngäs (2008), follow “three main phases:
preparation, organizing and reporting” (p. 109). Despite the apparent structure for
analysis, “there are no systematic rules” (Elo & Kyngäs, 2008, p. 109). Cho and Lee
(2014) cite the steps outlined by Mayring (2000) for inductive and deductive category
development and summarize that “the process of data analysis includes the following core
steps: selecting the unit of analysis, creating categories, and establishing themes” (p. 10).
Data analysis, in the current study, followed the three main stages outlined by Elo and
Kyngäs (2008) and employed both a deductive and an inductive approach to analysis.

3.5.1.1 Preparation phase

In both deductive and inductive content analysis, the preparation phase begins with the
recommend the use of whole interviews as the unit of analysis, particularly when they are
“large enough to be considered a whole and small enough to be possible to keep in mind
as a context for the meaning unit, during the analysis process” (p. 106). It is important for
the researcher to select a meaning unit that is not too broad and not too narrow. The
meaning unit can be as small as a letter or as large as portions of a page (several
paragraphs). The selection and description of an appropriate meaning unit assist the
reader in the evaluation of trustworthiness (Elo et al., 2014). The smallest meaning unit in
this research study was a sentence and the largest meaning unit was a paragraph.
During the preparation phase of data analysis, the researcher determines the type of content to be analyzed, manifest or latent. Manifest content is a description of the content, or “the visible, obvious components” (Graneheim & Lundman, 2004, p. 106), whereas latent content refers to the “interpretation of the underlying meaning of the text” (Graneheim & Lundman, 2004, p. 106). The aim or goal of the preparation phase “is to become immersed in the data” (Elo & Kyngäs, 2008, p. 109) as a means of becoming familiar with the data and gaining “a sense of the whole” (Vaismoradi et al., 2013, p. 402).

Two forms of data collection occurred within this research study: (1) data collected from the Ministry of Education (2014) PPM No. 158 and the Ophea (2014) elementary curricular concussion protocol; and (2) data collected from the teachers. The unit of analysis that was selected during the preparation phase included the whole interview transcript from the semi-structured interviews with the teacher participants. The data that was collected from the concussion documents was used to inform the interview guide and served as a framework for the development of the codes and categories. The student researcher listened to each audio-recording of a participant’s interview twice, and the written transcripts were read through initially without any attempt to code the data in order to allow for full immersion in the data.

### 3.5.1.2 Deductive content analysis

When deductive analysis is chosen by the researcher, “the next step is to develop a categorization matrix” (Elo & Kyngäs, 2008, p. 111). Given that the Ministry of
Education has issued a policy to indicate that “strategies to develop awareness of the seriousness of concussions: strategies for the prevention and identification of concussions; and training for board and school staff” (Ontario Ministry of Education, 2014, p. 1) should occur, this research study sought to understand the current level of knowledge, skills, and attitudes about this policy within the elementary school system. A deductive approach was employed using the Ophea (2014) document as a framework for the development of codes and categories. Deductive content analysis can use a structured or unconstrained matrix of analysis, based on existing literature or knowledge (Elo & Kyngäs, 2008). A structured matrix of analysis allows the researcher to choose to use only the data that fits within the categories or, allow the data that does not fit the framework to create their own concepts based on principles of inductive content analysis.

For this research study, categories were derived from the Ophea (2014) elementary curricular concussion protocol. Seven main categories were determined: definition; diagnosis; awareness; prevention; identification; signs and symptoms, and; management. The seven categories reference the requirements of the provincial policy (Ontario Ministry of Education, 2014). Codes within the categories were also pre-established based on the information within the Ophea (2014) concussion protocol and highlighted the required knowledge and skills, as well as the Ministry expectations of the policy.

A second reading of the written transcripts was completed and the interview transcripts were coded line-by-line using the pre-established categories and codes. All data was color-coded for categories and the codes were inserted within type-written transcript. The seven categories were not revised as this deductive data analysis sought to understand the
participant’s knowledge and skills regarding the experience of concussion within the school environment in relation to the expectations of the Ministry of Education (2014).

3.5.1.3 Inductive content analysis

When inductive content analysis is chosen, “the next step [after the preparation phase] is to organize the qualitative data” (Elo & Kyngäš, 2008, p. 109). The organizing phase of inductive content analysis involves “open coding, creating categories and abstraction” (Elo & Kyngäš, 2008, p. 109). The current research project employed a deductive approach to content analysis prior to engaging in an inductive approach, therefore, the written interview transcripts were previously read through and the audio-recordings were listened to twice as a mechanism of gaining “a sense of the whole” as recommended by both Elo and Kyngäš (2008) and Vaismoradi et al. (2013). Open coding involves reading through the written transcripts while making notes and headings within the document. These notes and headings are collected, and categories are generated, during the organization phase (Elo & Kyngäš, 2008). Categories are grouped together, through interpretation, to determine which categories relate or “belong”. This process of grouping categories under “higher order headings” (Elo & Kyngäš, 2008, p. 109) continues until no further abstraction can occur while remaining true to the goal with qualitative description of remaining data-near. “Successful content analysis requires that the researcher can analyse and simplify the data and form categories that reflect the subject of study in a reliable manner” (Elo & Kyngäš, 2008, p. 112). The abstraction process allowed for the identification of main categories.
3.5.1.4 Reporting phase

The reporting phase, in both inductive and deductive approaches, involves the description of the content of the categories that describe the phenomenon. Findings should be presented in an understandable and meaningful way for the reader, often integrating the use of quotations directly from the data (Elo et al., 2014). A detailed description of the research findings will be provided in Chapter 4.

3.6 Trustworthiness

Trustworthiness, in a qualitative study, includes the concepts of credibility, dependability, conformability, and transferability (Cho & Lee, 2014; Elo et al., 2014; Vaismoradi et al., 2013). “The aim of trustworthiness in a qualitative inquiry is to support the argument that the inquiry’s findings are ‘worth paying attention to’” (Elo et al., 2014, p. 2). The concepts of credibility, transferability, conformability and dependability will be discussed with recognition of the adherence to these concepts within this research study. These elements of trustworthiness have been woven into the discussions above but will be highlighted below for further clarification.

3.6.1 Credibility

Cho and Lee (2014) describe credibility as the truth value. Elo et al. (2014) describe the need for participants to be “identified and described accurately” (p. 2), further expanding the notion of a truth value. Credibility is demonstrated throughout the research process in the decisions made by the researcher. During the preparation phase of the analysis process, credibility is demonstrated through the fit of the data with the purpose of the
research (Elo et al., 2014). The present research study sought to elicit an understanding of the teachers’ experience of concussion within the school environment therefore, data was collected from teachers using semi-structured interviews. Prior to the commencement of each interview, the student researcher obtained informed consent from each participant and encouraged participants to speak openly and honestly during the semi-structured interview. Elo et al. (2014), encourage that a researcher be self-aware during data collection to protect against manipulation or leading of the participant if using a semi-structured data collection method. Review of the audio-recordings of the interviews and review of the written transcripts after each interview allowed the student researcher the opportunity to reflect on the questions asked to ensure that the questions remain open enough to elicit responses that are not too broad so as to lose sight of the research focus, but also not too structured so as to manipulate or shape the response.

During the organization phase of content analysis returning to the data as a whole ensures that analysis remains as a true representation of the participant experience. Throughout the analysis process, the transcripts were read and reread to ensure representation of data. Conversations with my supervisor did provide the opportunity for reflection regarding credibility in relation to the interviewing process and the analysis process through the request of feedback related to the questions that were included in the interview guide and the use of prompts to ensure the recommendation of self-awareness surrounding potential manipulation of data. Data abstraction in this research study lead to categories and themes that cover the data, remaining data-near, and the use of quotations throughout the findings will ensure that the participants are described accurately.
3.6.2 Transferability

Transferability refers to the extent to which the findings of the study can be extrapolated or transferred to other settings or groups (Elo et al., 2014). It is the responsibility of the researcher to clearly describe the context and the participants, as well as the processes engaged in for data collection and analysis (Graneheim & Lundman, 2004). Transferability is determined by the reader, therefore, to assist the reader in the determination of transferability a clear outline of the research process is provided, including a description of participant selection and sampling, data collection processes and data analysis processes.

3.6.3 Conformability

“Conformability refers to objectivity and implies that the data accurately represents the information that the participants provided and interpretations of those data are not invented by the inquirer” (Elo et al., 2014, p. 6). The interview guide was developed with the assistance of the principal researcher (my supervisor) and was discussed with the research team as a whole following the data collection from the concussion documents to obtain verification and consensus on the data. The student researcher conducted the deductive content analysis independently using the pre-established code book; however, the code book also was subjected to discussion with the research team prior to engaging in data analysis.

It was determined that both the student researcher and the principal researcher (my supervisor) would conduct the inductive analysis. This decision was made with
conformability in mind, but also sensitive to the fact that there would be some variation that would occur within the coding process. The transcripts were independently coded by the student researcher and the principal researcher (my supervisor), and afterwards a comparison was made between the codes to determine similarities and discrepancies before the main categories were agreed upon. Graneheim and Lundman (2004) discuss the use of dialogue with co-researchers throughout the research process as “not merely to verify the data are labeled and sorted in exactly the same way, but to determine whether or not various researchers and experts would agree with the way those data were labeled and sorted” (p. 110).

The use of member checking was addressed by Graneheim and Lundman (2004) yet, Elo et al. (2014) argue that “study participants do not always understand their own actions and motives, whereas researchers have more capacity and academic obligation to apply critical understanding to accounts” (p. 6). Member checking was considered, however, the participants in the present study were not contacted to confirm the findings.

3.6.4 Dependability

“Dependability refers to the stability of data over time and under different conditions” (Elo et al., 2014, p. 2). Evidence should be presented in a way that would allow for repetition of the study with similar results. The primary supervisor and advisory committee ensured by repeated dependability audits that collection of data, interpretation and reporting of results were conducted and reported to produce dependable study results.
3.7 Summary

The overarching purpose of this research study was to explore how concussion knowledge and awareness impacts the skills and attitudes of Ontario elementary school teachers within the school environment in order to support or augment the information that is disseminated to school professionals regarding concussion. Increased knowledge and awareness of concussion increases the likelihood that Ontario elementary school teachers will possess the skills to positively respond to potential concussive injuries within the school environment through increased ability to recognize, prevent, and manage potential concussive injuries.
Chapter 4

4 Results

The purpose of this chapter is to present the findings of this qualitative descriptive study. Qualitative content analysis was conducted, using both a deductive and an inductive approach to data analysis. Interview data was evaluated with eye to explore the knowledge, skills, and attitudes of Ontario elementary school teachers regarding concussion within the school environment.

4.1 Participants

A total of eight teachers were interviewed. The sample was deliberately constructed to include only currently practicing teachers (excluding administrators, educational consultants, etc.) in order to avoid any confounding factors such as differences in expectations, training, responsibility, or experience that could be influenced by position. Participant gender was not used as an inclusion/exclusion criterion, but the eight participants for this study were all female teachers with different levels of teaching experience. All eight participants work within the elementary school environment (across four different school boards) and have been employed as an elementary school teacher throughout their teaching career. Table 1 provides a summary of the demographic data for the eight participants.
Table 1. Participant Demographics

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Years Teaching</th>
<th>Rural/Urban School</th>
<th>CPR</th>
<th>First Aid</th>
<th>Coaching Experience</th>
<th>Personal Concussion Experience</th>
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<td>No</td>
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<tr>
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<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

4.2 Deductive content analysis

For this research study, the Ophea (2014) elementary curricular concussion protocol was used to generate codes and categories for the deductive content analysis. Seven main categories were determined: (1) definition; (2) diagnosis; (3) awareness; (4) prevention; (5) identification; (6) signs and symptoms, and (7) management. These will be discussed in more detail after a discussion about general overall knowledge of the existence of the 2015 concussion policy.

4.2.1 Knowledge of the 2015 concussion policy

Interviewing for this study occurred between May 2015 and August 2015. Six of the eight participants (75%) were not aware that the Ministry of Education had issued PPM No. 158 regarding the components of a school board’s policy on concussion or that the
concussion policy was to be in effect as of January 30, 2015. The two participants who were aware of the Ministry of Education recommendation for concussion policy had not personally read the policy for their individual school, and only one of these two participants had received any verbal or written information regarding the policy. One of these participants, who had not received any training or information directly as an elementary school teacher, was aware of the policy because a close family member is employed as an elementary school principal. The other participant stated that she had received information from a co-worker at her school after this co-worker had attended a training seminar (hosted by the school board to provide concussion training to selected participants from each school) outside of the school and returned to inform the remainder of the staff during a staff meeting:

“We had a staff member go to the training, and then, she came back and like had a staff meeting, or something. We reviewed what she had learned, and what we should be looking for, and how we should deal with it” (Participant number 7).

The six participants who were unaware of the policy expressed surprise and disappointment regarding their lack of knowledge and training. One of the participants is the health and safety representative for the teaching staff at her school and was unaware of the new policy and another teacher, who coaches a competitive sports team at the school, was “shocked” that she had not received training or information to disseminate to students and parents regarding concussion. It is quite possible that a job action that was in place for Ontario elementary school teachers during the months preceding the interview
period could have played a role in the dissemination (or lack thereof) of the new concussion policy.

4.2.2 Concussion definition
As part of the semi-structured interview, all participants were asked to define concussion, in their own words. Within the Ophea (2014) document, a concussion is defined as “a brain injury that causes changes in the way in which the brain functions leading to symptoms that can be physical (e.g., headache, dizziness), cognitive (e.g., difficulty in concentrating or remembering), emotional/behavioural (e.g., depression, irritability), and/or related to sleep (e.g., drowsiness, difficulty in falling asleep)” (p. 2). All eight participants, within this research study, equated concussion as a form of “head injury”, however, only five of the participants specifically referred to a concussion as a “brain injury”. The four participants who had acknowledged a past personal experience with concussion identified that concussion was a form of brain injury and each emphasized the severity or seriousness of the injury. Select participant quotations providing examples of concussion definition can be found in Table 2.

Table 2. Participant definition of concussion

“I would say it’s a traumatic brain injury” (Participant 1)

“It can cause damage to your brain and some chemical changes to your brain” (Participant 1)

“...sort of a rattling of the brain...like the jelly like part of the brain against your
skull” (Participant 2)

“I think in my own words I would describe it as a broken brain.” (Participant 8)

“So the same way that people have broken arms, broken legs, and that can heal quickly or it can have a lifelong impact. I think you’ve broken your brain in some aspect”

(Participant 8)

The mechanism of injury is included in the concussion definition within the Ophea (2014) document, and specifies that a concussion “may be caused by a direct blow to the head, face or neck, or a blow to the body that transmits a force to the head that causes the brain to move rapidly within the skull” (Ophea, 2014, p. 2). Participants were asked to describe how a concussion could occur. All eight participants described an injury to the head as a causative factor, with two of the participants specifically referencing injuries that occur to the neck and face. Only one participant (with previous personal experience with concussion) described potential for concussion injury after bodily contact or jolt to the body. The participants used specific words to describe the mechanism of injury including “hit”, “blow”, “bump”, “jolt”, “bang”, “struck”, “collide”, and “contact”. Two of the participants (with previous personal experience with concussion) indicated that the brain would “move back and forth” and one (with previous personal experience with concussion) described the head being “whipped back”. There was consensus that a concussion involved a “hit” or a “blow” to the head, however, there appeared to be minimal knowledge or understanding that concussion could result from an injury that
caused a jolt to the body. It is interesting to note that the four participants with personal concussion experience provided a more dramatic description of the forceful nature of concussion on the brain: “a jolt”, “shake”, “jiggle”, or “rattle”. Table 3 provides sample statements from participants who were asked to describe the cause of a concussion in order to provide an understanding of the mechanism of injury.

Table 3. Participant description of mechanism of injury (of concussion)

“...it’s caused by a blow to the head or a jolt to the head, or the face, or the neck”
(Participant 1)

“...a blow to the body if it causes your brain to move back and forth really quickly”
(Participant 2)

“It’s not just all about the top of the head or the side, the back of the head. It’s about underneath as well” (Participant 2)

“Well, I just see it as contact. Contact to the head, a forceful contact” (Participant 5)

“...you hit something, your head whips back” (Participant 7)

“It can be any blow to the head or force, so if you’re on a roller coaster and you accelerate quickly and your neck moves back and forth – so it’s basically if your brain has shifted within all those fluids inside your skull” (Participant 8)

“Anytime where the brain moves within your head” (Participant 8)
Participant number 3 described a situation where a child was struck by a ball in the school yard:

“I believe it was their trunk area. And so it was enough force to knock them down, but I don’t think their head made contact with the pavement”. (Participant 3)

The participant acknowledged that an injury had occurred, however, she did not view this as a potential cause for concern:

“I was ready to pick her up and get her back on her feet. And the first aid person who didn’t know the student but knew his first aid said ‘wait-wait-wait I [want to] ask a few more questions first’”. (Participant 3)

Participants described incidents of “falling” as potential situations where a concussion could occur, however, they did not connect the bodily force of the fall to the potential for concussion, instead stating that the fall could result in a child hitting their head and causing a head injury. When asked to describe situations within the school environment where children may be injured, all but one participant, who had witnessed concussive injuries, described incidents that involved obvious head trauma or injury, with a lack of recognition of the potential injuries that occur from force to the body. Participants recognized that many activities that occur within the school environment have the potential to cause physical injuries; however, they appeared to not make the association between potential concussive injury and “accidents” when asked about how a concussion could occur. Recognition of the “accident” and the impact of student “play” was discussed when questions were directed at prevention of concussion within the school
environment. Participants provided examples of falling, being hit, playing sports, or using play equipment as potential incidents that could cause a child to receive a head injury, and subsequently increase the risk for potential concussion. Table 4 provides a summary of the participant response to the specific information regarding concussion definition that is presented in the Ophea (2014) document.

Table 4. Participant knowledge of the Ophea (2014) concussion definition

<table>
<thead>
<tr>
<th>Concussion definition according to the Ophea (2014) document and participant response count for each component of the definition</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain injury</td>
<td>5</td>
</tr>
<tr>
<td>Direct blow to the head, face, or neck</td>
<td>7</td>
</tr>
<tr>
<td>Blow to the body</td>
<td>1</td>
</tr>
<tr>
<td>Force to the head</td>
<td>5</td>
</tr>
<tr>
<td>Can occur without loss of consciousness</td>
<td>3</td>
</tr>
</tbody>
</table>

4.2.3 Concussion diagnosis

Three of the teacher participants specifically acknowledged that a concussion was a medical diagnosis and recognized that their role was to identify or recognize a potential concussion, not to provide a medical diagnosis. There was consensus that a parent, or guardian, should be notified if an injury occurs, particularly if there is a head injury. Five of the eight participants specifically mentioned the need for a child with a suspected concussion to be examined by a doctor, or to be taken to the hospital, after the injury has
occurred, with four participants specifically discussing the need for medical clearance before returning to school.

Table 5. Participant description of the role of the teacher in concussion diagnosis

“My job is just to identify when I think it might be a concussion, not to identify if it is or isn’t” (Participant 1)

“I don’t think we’re experts” (Participant 2)

“We’re not doctors” (Participant 2)

“I always err on the side of caution, but like recognizing this is a concussion, or like making that judgment call, and having that judgment call supported…so I always am like, ‘Do I call? Do I not call?’ But I just think it would be better to have them checked out than not…” (Participant 7)

4.2.4 Awareness

The development of awareness of concussion encompasses the recognition of an in-depth definition, recognition of the severity of concussion, and understanding of signs and symptoms. Table 6 summarizes the expressed awareness of participants regarding the in-depth definition, signs and symptoms, and severity of concussion. The definition of concussion was determined to be a significant category (and was discussed above), as were the signs and symptoms of concussion (and will be discussed below). Severity of concussion was mentioned only by those participants with personal concussion
experience, and was raised by participants when providing information regarding concussion experience within the school environment.

Table 6. Participant knowledge of the Ophea (2014) components of concussion awareness

<table>
<thead>
<tr>
<th>Concussion awareness according to the Ophea (2014) document and participant response count for each component of awareness</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness that there is an in-depth definition</td>
<td>5</td>
</tr>
<tr>
<td>Awareness that concussion is a serious issue</td>
<td>6</td>
</tr>
<tr>
<td>Awareness of signs and symptoms</td>
<td>8</td>
</tr>
</tbody>
</table>

All of the participants were aware that there are different signs and symptoms of concussion, but some participants possessed a deeper understanding of the signs and symptoms as well as a wider range of signs and symptoms. For the purpose of this category, participant knowledge and awareness of outward signs and symptoms was quantified. A discussion of signs and symptoms will be addressed, in depth, later in this chapter, providing a detailed description of the signs and symptoms that the Ophea (2014) document recommends that school professionals need to be aware of when identifying potential concussions within the school environment. Six of the eight participants, including four with stated personal concussion experience and two with no prior personal concussion experience, expressed an understanding that concussion is a serious issue.
The intent of the Ministry-mandated policy is to increase awareness regarding concussion and the need for school professionals to identify potential concussion within the school environment (Ontario Ministry of Education, 2014). One of the participants linked knowledge and awareness, indicating that knowledge impacts awareness and together an increased knowledge and awareness can improve the ability (or skill) of the individual to identify a potential concussion:

“I think the more you read and the more knowledgeable you are on it, the better you’re able to maybe identify if it’s a possible concussion and the better you are able to support kids who do either have a concussion or could have a concussion” (Participant 1).

Table 7 provides a sample of participant quotations regarding the awareness of concussion.

Table 7. Participant description of concussion awareness

“"I’m not sure everyone understands the seriousness of it. I mean having seen my [family member] go through what he went through, that makes you think about it in a different way because it is very serious” (Participant 1)

“"There is a range of concussions. The mild concussion where a student is tired and experiences some headaches…severe concussion where they need to be in the dark. They can’t do anything. No reading. No watching screens” (Participant 2)
“I’m not sure if everyone has an awareness that it could look a lot less serious than that and still be a concussion.” (Participant 1)

“It doesn’t always take a hard hit to cause a concussion...some of the kids that play contact sports on a regular basis...it’s a lot easier to get a concussion” (Participant 7)

4.2.5 Prevention

The Ophea (2014) concussion document discusses the need to implement strategies “for preventing and minimizing the risk of sustaining concussions (and other head injuries) in schools” (p. 3) and provides three levels of prevention strategies:

1) “Primary – information/actions that prevent concussions from happening (e.g., rules and regulations, minimizing slips and falls by checking that classroom floor and activity environments provide for safe traction and are obstacle free);

2) Secondary – expert management of a concussion that has occurred (e.g., identification, and management – return-to-learn and return to physical activity) that is designed to prevent the worsening of a concussion;

3) Tertiary – strategies help prevent long-term complications of a concussion (chronic encephalopathy) by advising the participant to permanently discontinue a physical activity/sport based on evidence-based guidelines”

(Ophea, 2014, p. 3).

Each of the participants identified primary strategies to prevent concussion, acknowledging the need to emphasize rules, and ensure that safety measures are present in the classroom, in the school yard, and particularly during sports activities. There
appeared to be a lack of consistent understanding of secondary prevention strategies expressed by participants, particularly a lack of stated understanding of the management of a concussion within the school environment upon a student’s return to school. Each participant provided a description of return-to-learn and return-to-play, but there was a lack of consistency within their responses to allow us to transfer this interpretation to other participants or populations. Return-to-learn was an area that each of the participants felt unsure about, and five of the participants stated that the return-to-learn protocol was determined by the doctor and the parents of the child, and the timeframe suggested for return-to-learn was different for each participant. Five participants provided data that supports the tertiary prevention strategies required in the management of concussion to prevent worsening of concussion. As one participant described, “further brain injury would not be good, not on my watch” (Participant number 1), indicating an awareness of the significant consequences of concussion.

4.2.6 Identification

Identification of possible concussion is not equivalent to the diagnosis of concussion. The Ophea (2014) concussion protocol mirrors the expectation of the Ministry of Education as outlined within PPM No. 158 (Ontario Ministry of Education, 2014) through the expectation that the identification component refer to “information on the safe removal of an injured student from activity, initial concussion-assessment strategies, and steps to take following an initial assessment” (Ophea, 2014, p. 4).
Participants were asked to describe the steps that they would take if they were present when a child suffered an injury that, in their opinion, could cause a concussion. Six of the eight participants recognized that the student should stop the activity immediately and that they should be removed from the precipitating activity when injury occurs. Of these six participants, four discussed taking (or sending) the injured child to the school office, after the injury takes place. All of the participants recognized the need to contact parents or guardians, with only one of the participants deferring the actual task of making the phone call to another staff member due to her own personal comfort level in managing emergency situations. Three of the participants discussed completing a quick assessment at the time of the injury but they did not reference a specific assessment tool, stating the need to “ask questions” or “look at their eyes”, though these participants were unsure as to what they were looking for or what to expect from their assessment of the child’s physical state.

A discussion of signs and symptoms that may be present will be provided in the next section. Identification includes an understanding that signs and symptoms can appear immediately or may take hours or days to emerge. Signs and symptoms may be different for everyone and the signs of concussion in younger children may not be as obvious (Davis & Purcell, 2014). As part of the initial concussion assessment strategy, there is an expectation that teachers will have an understanding of potential signs and symptoms, as well as the knowledge that not all signs and symptoms will be emergent at the time of injury. As illustrated in Table 8, there was a variable degree of knowledge regarding how/when signs or symptoms of concussion might emerge.
Table 8. Participant knowledge of the development of concussion signs and symptoms

“Sometimes the symptoms don’t appear right away. Sometimes they appear normal and then an hour later or even maybe the next day something’s not right” (Participant 1)

“So they’re walking and they’re talking, but then they’re starting not to feel well” (Participant 5)

“Sometimes articulating how they’re feeling...” (Participant 5)

4.2.7 Signs and symptoms

Participants were asked to describe some of the signs and symptoms that would indicate to them that a child may have sustained a concussion. Table 9 provides a summary of the signs and symptoms of concussion as outlined within the Ophea (2014) document and identifies the number of participants who demonstrated knowledge of each, respectively. Participant response has been quantified to allow for a demonstration of the knowledge base of the eight participants.

Table 9. Participant knowledge of the signs and symptoms of concussion

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Signs and Symptoms</td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td>1</td>
</tr>
<tr>
<td>Slurred speech</td>
<td>2</td>
</tr>
<tr>
<td>Slowed reaction time</td>
<td>1</td>
</tr>
<tr>
<td>Condition</td>
<td>Count</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Poor coordination or balance</td>
<td>1</td>
</tr>
<tr>
<td>Blank stare/Glassy-eyed/Dazed or vacant look</td>
<td>4</td>
</tr>
<tr>
<td>Decreased playing ability</td>
<td>0</td>
</tr>
<tr>
<td>Loss of consciousness or lack of responsiveness</td>
<td>3</td>
</tr>
<tr>
<td>Lying motionless on the ground or slow to get up</td>
<td>1</td>
</tr>
<tr>
<td>Amnesia/Memory loss/Forgetful/Lack of recall/Confused</td>
<td>3</td>
</tr>
<tr>
<td>Seizure/Convulsion</td>
<td>0</td>
</tr>
<tr>
<td>Grabbing or clutching of head</td>
<td>0</td>
</tr>
<tr>
<td>Headache</td>
<td>8</td>
</tr>
<tr>
<td>Pressure in head</td>
<td>0</td>
</tr>
<tr>
<td>Neck pain</td>
<td>1</td>
</tr>
<tr>
<td>Feeling off/Not right</td>
<td>4</td>
</tr>
</tbody>
</table>

**Cognitive Signs and Symptoms**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty concentrating</td>
<td>5</td>
</tr>
<tr>
<td>Easily distracted</td>
<td>1</td>
</tr>
<tr>
<td>General confusion</td>
<td>2</td>
</tr>
<tr>
<td>Cannot remember things that happened before and after injury</td>
<td>5</td>
</tr>
<tr>
<td>Does not know time, date, place, class, type of activity in which he/she was participating</td>
<td>5</td>
</tr>
<tr>
<td>Slowed reaction time</td>
<td>1</td>
</tr>
<tr>
<td>Slowed down, fatigue or low energy</td>
<td>2</td>
</tr>
<tr>
<td>Dazed or in a fog</td>
<td>0</td>
</tr>
</tbody>
</table>

**Emotional/Behavioural Signs and Symptoms**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irritable, sad, more emotional than usual</td>
<td>3</td>
</tr>
<tr>
<td>Nervous, anxious, depressed</td>
<td>2</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---</td>
</tr>
<tr>
<td>Strange or inappropriate emotions</td>
<td>0</td>
</tr>
</tbody>
</table>

**Sleep Disturbance Signs and Symptoms**

<table>
<thead>
<tr>
<th>Drowsiness/Drowsy/Sleepy</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insomnia/Can’t sleep/Trouble sleeping</td>
<td>1</td>
</tr>
<tr>
<td>Sleeping more/less than usual</td>
<td>1</td>
</tr>
<tr>
<td>Difficulty falling asleep</td>
<td>0</td>
</tr>
</tbody>
</table>

### 4.2.8 Management

Within the Ontario Ministry of Education PPM No. 158, a recommendation is made that a school board policy include information “on the development of an individualized and gradual return to learning and/or return to physical activity plan for every student with a diagnosed concussion” (p. 3). The 2014 Ophea elementary concussion protocol provides an overview of information to support the development of a return-to-learn plan for students with a diagnosed concussion. “Knowledge of how to properly manage a diagnosed concussion is critical in a student’s recovery and is essential in helping to prevent the student from returning to learning or physical activities too soon and risking further complications” (Ophea, 2014, p. 10).

During the interviews, participants were asked when they believe that a child is ready to return to school and were asked to describe their role in managing a child’s return-to-learn within the school environment. Five of the eight participants felt that a child’s return to school would be based on the severity or seriousness of the concussion. One of the participants specifically expressed that “it’s different for every concussion” and two of
the participants stated that they “didn’t know”. Only one of the participants discussed being symptom free prior to return to school, with the remainder of the participants assuming that students would be returning with the possibility of experiencing symptoms and the need for accommodations or modifications to the school environment. The timeframe for return to school varied between participants and participant responses are represented in Table 10.

Table 10. Return-to-Learn Timeframe

<table>
<thead>
<tr>
<th>When is a child ready to return to school after a concussion?</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>For some it may be months</td>
<td>2</td>
</tr>
<tr>
<td>Minimum of a week</td>
<td>2</td>
</tr>
<tr>
<td>Couple of days</td>
<td>4</td>
</tr>
<tr>
<td>At least 24 hours</td>
<td>2</td>
</tr>
<tr>
<td>Two weeks</td>
<td>1</td>
</tr>
<tr>
<td>It would be great for them to be symptom free</td>
<td>1</td>
</tr>
</tbody>
</table>

It is interesting to note that the participants who advocated for a longer time away from the school environment had personal concussion experience and the four participants who felt a student would be ready to return within the first day to a couple days following the concussive injury did not have personal experience with concussion. Two participants discussed a gradual return to the learning environment and three participants discussed modified programs that would allow for half days. Three of the participants discussed
doctor recommendations as a guide for determining the timeframe for recovery and four of the participants discussed the role of the parents in determining when the child is ready to return to school after a concussion has occurred. Although the Ministry of Education makes the recommendation within the PPM No. 158 for “an individualized and gradual return to learning and/or return to physical activity plan for every student with a diagnosed concussion” (Ontario Ministry of Education, 2014, p. 3), the eight participants felt uncomfortable and unsure as to how to initiate this learning plan. One participant expressed that she was not aware that there was a formal assessment or documentation for a child who is returning to the school environment post-concussion.

### 4.3 Inductive content analysis

Three main themes were derived from the interview data during the inductive content analysis: (1) the balancing act; (2) slipping through the cracks, and (3) policy, just words on paper.

#### 4.3.1 The balancing act

The teacher participants within this research project emphasized the difficulty of balancing post-concussive student needs within the school environment. There was an appreciation and awareness among all of the participants that the student returning to the classroom following a concussion would require some level of accommodation, whether it was through the modification of the physical environment, or alterations to the academic work provided. Participants expressed a sense of obligation to monitor the student when he/she returns to the classroom. There were frustrations implied
surrounding the limitations of the classroom environment and the need to continue to provide supervision and academics to the remainder of the students, while monitoring the student with the diagnosed concussion. Six of the participants discussed situations where students were returning to the school environment with a diagnosed concussion, often with active concussion symptoms, requiring physician-recommended modifications that were difficult to accommodate due to the physical limitations of the classroom or the physical nature of the school environment. Table 11 provides examples of the participant descriptions of the challenges faced when balancing the needs of the concussed child with the needs of the other students within the classroom.

Table 11. The balancing act

“You’ve got 20 kids in your class. There’s no dark spot for them. There’s nowhere to lie down. We don’t have nurse’s rooms anymore in our schools. We don’t have nurses. There’s only so much you can do.” (Participant 2)

“Just giving the situation the attention it deserves, while also teaching, while also watching the traffic around that student. Also watching that the other students are being attentive to what is being taught.” (Participant 3)

“Make sure I’m monitoring that closely while not just being that kid’s personal nursemaid…make sure that one day of school or one week of school, whatever it is that we’re watching closely, that it’s not just throwing away that week of learning for the class as a whole.” (Participant 3)
“There was actually absolutely nothing he could do. He was sent to school the very next day. I think by about half way through the day you could just see he didn’t feel well. He had a terrible headache; he was lying on his desk.” (Participant 2)

“I found that funny that the doctor would, no offense, but give me advice on how I should be running my classroom? Because the one child has the concussion. So no loud noises, no loud music, no lights…we did try to comply to that, for a few days…” (Participant 4)

“Noise level, sensitivity to noise, which is hard to control when you have like 30 students.” (Participant 7)

Participants discussed the challenges of the school environment for the concussed child, including the fluorescent lighting, noise level, and the number of children within the school. Balancing the individual care needs of the student, and the environmental modifications to accommodate the student, with the academic obligations was not addressed within the current 2014 concussion documentation and training package. Two of the teacher participants expressed the need to work as a team with school administration, students, and parents to develop a plan for return to the school environment.

Understanding the needs of the parents, and empathizing with the balancing act that the parents of the concussed child endure was also addressed by 5 of the participants. The need for parents to return to work was addressed by the participants when discussing return to the school environment before the child is ready, with the onus of responsibility
and monitoring of the concussion symptoms placed on the teacher. One of the participants described her experience with the parents of a child who returned to school the day after sustaining a concussion:

“I think that one thing you discover as a teacher is that in this busy world that we live in parents are often very busy. They don’t actually stop their world to take care of their kids properly. Parents sometimes send them back because they need to move on with their jobs and they have deadlines and places that they have to be. That’s kind of where you feel like school is a babysitting service” (Participant 2).

Two of the participants used the term “babysitting” when describing the role of the teacher in a child’s return to the school environment before they are ready to participate in the school based activities that are expected of a student within the classroom. The term did not appear to be used in a derogatory sense, but it was a term familiar to them that expressed the need for close and careful monitoring of the child. Participants discussed a degree of frustration directed towards the management or monitoring of children who are not able to participate in the normal program within the school environment. Participants also expressed a difficulty balancing their obligation to monitor and protect the child, acting as an advocate for them to stay at home for their recovery, with expressed empathy towards the needs of the parents (to return to work).

“I think it needs to be a much slower reintegration, but I know that parents also, they need to move on with their life” (Participant 8).
Participants discussed the need to respect the decisions that parents make when sending their child back to the school following a concussion, even when the teacher does not feel that they are ready to return. Six of the participants discussed the impact of the parent’s attitude towards return to school and the expectations that parents have for the teacher to monitor and manage their child’s symptoms within the classroom, when the child’s recovery would be better within the home environment. Examples of the parental expectations are provided within Table 12.

Table 12. Balancing parental expectations

“I think the biggest challenge is hoping that parents do the right thing.” (Participant 2)

“When you do give parents feedback about their child not being ready or not being able to cope at school, they’ll say things like: ‘is there a quiet place they can go? Can they lie down on the carpet for a little while? Can they just sit in the dark?’ Really? It’s ridiculous” (Participant 2)

“Advocate to parents when we’re seeing that the students aren’t ready to be back at school…and the parents are looking at us like, well, that means I that I have to take time off work and how important is this really?” (Participant 8)

The previously stated desire for teachers and parents to work as a team was also articulated with frustration. Both participants who had advocated for a team approach when planning a return to the school environment, experienced disappointing situations where a child returned to school before he/she was physically ready to manage the
classroom environment. The teachers discussed concerns that the premature return had placed the child at risk and forced the teacher into the difficult position of balancing the recovery needs of the concussed child within the confines of a busy, highly stimulating classroom.

“It was just really sad to witness because you wanted to send him home and put him on the couch. In the end, sadly, you can’t really stop a parent from sending their child to school...that’s probably the most frustrating piece is that we depend on parents to be sending their kids to school healthy and ready to learn. They’re not” (Participant 2).

“I think I was a little bit frustrated that the parents hadn’t told me because I like to think that we work as a team in our classroom, with parents and teachers. And I know that they would expect me to inform them, which I always would, but it is helpful to know that information and it’s scary to think of what could have happened to that little guy if something else had of happened to him out on the playground, or in gym class, or even in class with screens and computers and everything” (Participant 1).

### 4.3.2 Slipping through the cracks

Identification of concussion, and the steps taken by the individuals who are present when a potential concussion may have occurred, is outlined within the current 2014 Ophea document and was previously addressed in the deductive section. The eight participants discussed concern surrounding a concussion that is missed, or not identified, within the
school environment or outside of the school environment. Four of the participants discussed the potential for misidentification when basing their assessment of an emergency situation on their past experience with that particular child. Allowing past expressions or behaviour of the child to guide their response to the immediate injury, was identified as a possible reason for misidentification of potential concussion. Five of the participants spoke of the busy atmosphere of the school and all of the participants discussed the volume of students within the school environment as a factor that would impede identification. Table 13 provides a summary of participant responses that represent the difficulty of misidentification based on the school environment.

**Table 13. Slipping through the cracks - the busy school environment**

“*Busy teacher having a bad day, like after the fifth injury that needs a Band-Aid. Maybe your awareness isn’t there, or maybe you’re thinking about your next lesson. Things can easily slip through the cracks when you have 300 students.*” (Participant 2)

“You get a lot of whining. You get a lot of Band-Aid needs, ice needs, lots of excuses. It’s actually determining when it is actually something serious and when is it not”

(Participant 2)

“*Biggest danger in the school environment is that it gets sloughed off as to ‘oh you’re fine’.*” (Participant 2)

“You get a lot of whining. I think that we just have to make sure that we’re not missing those small head injuries.” (Participant 2)
“Sometimes I think with concussion, the child hits their head, bounces back up and it seems everything’s okay. But you really don’t know.” (Participant 5)

“Knowing the kids...just brushing too close to a wall while walking can be reported as a severe injury.” (Participant 3)

Determining whether a situation could be more serious than it initially appears was a source of concern for seven of the participants, identifying the difficulty experienced by teachers who are faced with multiple complaints during the day. Three of the participants discussed difficulty, or lack of confidence, with the responsibility of making this decision or “judgment call”. Five of the participants discussed a barrier to identification of potential concussion as parental belief in teacher’s ability to accurately estimate the severity of the situation/injury.

One participant discussed a loss of communication between all of the individuals involved:

“If they don’t get identified, parents aren’t told. Kids aren’t telling parents at home. It’s losing the communication between the networking from teacher to principal to parent to doctor” (Participant 2).

This disruption in the chain of communication was further identified by four of the participants who discussed situations within the school environment where a student returned to the classroom with a concussion, without informing the teacher or the school of the injury, placing the onus for relaying the information on the student, or failing to
relay the severity of the situation altogether. Participant responses that demonstrate potential barriers for identification of concussion (occurring within and outside of the school environment) are listed within Table 14.

**Table 14. Slipping through the cracks - the unidentified concussion**

“*Some parents are like oh, they’re fine, like they fall all the time*” (Participant 7)

“I’ve had kids come and say, like my doctor says I have a concussion, I can’t participate in gym today. Or, other times, they’ll come in and they won’t say anything.” (Participant 6)

“*Just try to work as a team.*” (Participant 4)

“I feel like I would get more info from parents but, because they’re 13 or 14, I think there’s an understanding that oh, they’re old enough to explain to the teacher what happened.” (Participant 6)

“One parent said: okay, I’ll come pick them up. I said: and take them to the hospital? The parent said: oh no, I’m sure they don’t need that. I argued with the parent until they agreed that they would take them to the hospital.” (Participant 8)

**4.3.3 Policy, just words on paper**

Only two of the participants were aware of the Ontario Ministry of Education requirements for a concussion policy at the time interview. None of the participants had read their school board policy and none expressed awareness of the current 2014 Ophea
document. It is important to note that 7 of the participants had not received training regarding concussion. One of the two participants that had acknowledged awareness of the concussion policy had received a brief introduction to concussion knowledge from a co-worker who had attended a training session outside of the school and had returned to the school to provide information during a staff meeting. Participants were asked about the impact of a concussion policy on awareness and management of concussion within the school environment. The teacher participants expressed frustration with the amount of information that is disseminated to them and the expectation of knowledge and implementation without adequate training and reinforcement of the expected information. As only two of the participants had knowledge of the concussion policy, the participants discussed past experience with other policies and procedures within the school environment. Table 15 provides a summary of the teacher attitude toward the implementation of policy within the school environment.

Table 15. Policy implementation and knowledge expectation

“So I think what happens in the teaching profession a lot is there are lots of policies. There’s a policy for allergies, there’s a policy for this and this and this and sometimes, quite honestly, it’s overwhelming as a teacher how much is coming at you and it comes at you in a staff meeting for ten minutes and you’re expected to know it and implement it.”

(Participant 1)

“A policy can be great if everyone at the table has a great understanding of what to do and why they need to do it. But policy is just policy, if it’s just words on a page.”
“...I don’t know if they are supposed to train us, and kind of like trickle down? We don’t all tend to get the same information, or the same training.” (Participant 6)

“I think that unless a policy is very clear and has very clear steps of how the school board and the Ontario Health Plan, like OHIP is going to help, I don’t think it’s going to do very much, to be honest.” (Participant 8)

The participants expressed recognition of the benefits of the existence of a concussion policy, recognizing the importance of increased knowledge and awareness of the severity of concussion, but there was a query from three of the participants as to whether the implementation of a concussion policy would assist in the prevention or management of a diagnosed concussion. Participants expressed concern about the dissemination of the policy, citing the overload of information received on daily basis, and the volume of emails sent to teachers with both expected skills and potential policies. The concerns of the participants were followed by suggestions for better knowledge dissemination and ongoing support and training for policies that require teachers to manage situations such as allergies, anaphylaxis, and concussion. As previously stated, the participants indicated that the implementation of a concussion policy was important and would hopefully lead to an increased knowledge of concussion and awareness of the severity and importance of concussion management within the school environment. Two of the participants felt uncomfortable implementing some of the aspects of the policy (the identification and response to a potential concussion), based on their own level of comfort with providing
first aid and/or CPR support to students within the school environment. There was hesitation from these two participants regarding their skill to not only identify a potential concussion, but also to manage an identified concussion during the return-to-learn process. Three of the participants did not feel that the implementation of a concussion policy would assist in the management of concussion upon the child’s return to school, questioning the impact of additional paperwork on the acquisition of skill or confidence without additional training regarding concussion identification and management.

Participant number 8 made the recommendation that a transitional educational assistant (EA) be employed to provide assistance to students who are returning to the school environment, stating that without these additional support and services, the implementation of a concussion policy would not be able to provide much assistance to teachers or students. Participants indicated that they currently receive a high volume of paperwork and emails, equating the concussion policy to just another responsibility, or another accommodation, that needs to be managed on top of their teaching role. Participants questioned the availability of ongoing support for concussion within the school environment, with two of the participants providing the recommendation that annual training be offered regarding concussion, similar to the training that is mandated for the management of anaphylaxis. Sample participant responses regarding the dissemination of knowledge, including policies and procedures, is provided in Table 16.

Table 16. Dissemination of knowledge in the busy school environment

“With a lot of other policies it’s just something you’re expected to know because there’s
so much – when we have a meeting its one hour and we have school business to cover, we have academics to cover and then there’s usually all of these things thrown in. So it’s not because they want to throw them in, it’s because you have one hour.” (Participant 1)

“We get so many emails in a day that honestly, is it read carefully? And is there some thought behind what it says? I’m not sure that’s the case all the time.” (Participant 1)

“It’s just the reality of a school is it’s busy. It’s very busy and that’s not to sound like this is not important, it’s very important. But unless there’s further training and it’s brought to the forefront, it’s just another thing.” (Participant 1)

“…when I saw it I’m like, oh this is important. I didn’t do much with it. Like I didn’t print off my own and put it up.” (Participant 4)

“We have our personal email, and then we have a conference for our school, a conference for our – you know each department – or kind of what you teach. So there’s always stuff flying around. Some of it, you feel like is relevant, and some of it, you feel like is totally not.” (Participant 6)

“I think that in the grand scheme of things we get so much paperwork saying this is what you need to do now, and what about this.” (Participant 8)

4.4 Summary

In March 2014, the Ontario Ministry of Education issued PPM No. 158 mandating the development and implementation of a policy on concussion (Ontario Ministry of Education, 2014). There was an expectation that as of January 30, 2015 all school boards
within Ontario would have in place “strategies to develop awareness of the seriousness of concussions; strategies for the prevention and identification of concussions; management procedures for diagnosed concussions; and training for board and school staff” (Ontario Ministry of Education, 2014, p. 1). This qualitative descriptive study sought to investigate the knowledge, skills, and attitudes of Ontario elementary school teachers regarding the Ministry of Education’s mandated concussion policy within the school environment.

Semi-structured interviews were conducted with eight elementary school teachers. Only two of the eight participants had knowledge of the concussion policy, though neither participant had read the Ophea (2014) document and/or the school board policy at the time of the interviews. Despite a lack of knowledge of the concussion documents, the participants possessed relevant knowledge and understanding of aspects of the policy, with those participants who described previous personal experience with concussion demonstrating a different level of knowledge and an increased sense of responsibility to monitor and manage concussion within the school environment.

Participants expressed that the overall nature of the school environment was busy and overwhelming for the concussed child, and the classroom was not viewed as a suitable atmosphere for recovery. Parents were viewed as gatekeepers in the return-to-learn decision-making process and participants sought to work as a team to manage the recommended accommodations while advocating for the child’s needs and balancing their own responsibilities to the remainder of the students within their class. There was a sense of being overwhelmed by the amount of responsibility and the level of expected
knowledge for teachers, above and beyond their role as an educator. One of the participants summarized this frustration in her words:

“I find it’s a struggle for me sometimes to wear all the hats that I’m expected to wear and still do the hat that I was hired to wear” (Participant 3).

All of the teacher participants provided recommendations that could potentially ease the strains, or remedy the frustrations, that they expressed during their individual interviews, and all of the teacher participants sought to improve the environment for teachers, parents, and students through increased knowledge of concussion.
Chapter 5

5 Discussion

The purpose of this research study was to explore, using qualitative descriptive methodology, the knowledge, skills, and attitudes of Ontario elementary school teachers regarding concussion within the school environment. Concussion research is expanding, but there remains a significant gap within the current literature regarding concussion within the school environment. On March 19, 2014, the Ministry of Education issued PPM No. 158 outlining the Ministry’s expectations regarding the components of a school board’s policy on concussion (Ontario Ministry of Education, 2014). This memorandum was released on the heels of Bill 39, an Act to amend the Education Act with respect to concussion which was introduced in 2012 but never brought into force. PPM No. 158 recognized the importance of health and safety for all children and acknowledged the implications of concussion on the cognitive, physical, emotional, and social wellbeing of the student. Within the memorandum, there was an expectation that as of January 30, 2015, all school boards within Ontario would have in place a fully implemented program that includes ongoing training plans for teachers, school staff, and volunteers to educate them on concussion. Given the lack of research surrounding concussion within the school environment, and the release of a Ministry of Education memorandum mandating the implementation of a school board concussion policy, this study attempted to explore the meaning of concussion as understood by teachers within the elementary school environment.
5.1 Connecting to the literature

Children and adolescents spend a significant amount of their day within the school environment. Statistics obtained from the National Ambulatory Care Reporting System (NACRS) database revealed 14,406 concussion-related injuries were treated in Ontario emergency departments during 2009-2010 (Carey & Morrish, 2013). Although the highest percentage of reported concussions occurred among individuals aged 10 to 19 years of age, 3,575 elementary-aged students (5 to 14 years old) were investigated for concussion-related signs and symptoms. The potential for injury within the school environment, or during everyday activities, has brought awareness within the literature that concussion is a public health concern and it is not an injury that is sustained only by athletes (Lewington, 2014).

Past research has demonstrated that a lack of knowledge or understanding of the causes, signs, and symptoms associated with concussion can contribute to the underreporting of concussion in the youth population (Albrecht et al., 2013; Caine et al., 2014). A lack of understanding of concussion symptoms has been demonstrated as a barrier for self-reporting among youth. Young people may not be aware of the signs and symptoms of concussion and, due to their age and/or maturity, may not be aware of the severity of what they are experiencing. Youth may not come forward to identify a potential concussion due to concern regarding how their self-reported symptoms will be received (Echlin et al., 2014).
The implementation of concussion awareness programs for athletes, coaches, and parents has resulted in an increased confidence in both recognition and reporting of concussion (Chrisman et al., 2014; Echlin et al., 2014; Echlin, 2010; Echlin et al., 2010; Finch et al., 2013; Frémont et al., 2014; Rivara et al., 2014; Sye et al., 2006). Within the school environment, the implementation of policies and procedures to ensure early identification and effective management of concussion was discussed by Sady, Vaughan, and Gioia (2012), emphasizing the need for awareness and training at the start of the school year to allow for proper implementation. The findings of the current research support this recommendation with participants expressing a need for annual concussion training to ensure that individuals who are new to the profession/school, or those who were absent during the initial policy implementation (due to health concerns, maternity leave, or sabbatical) could obtain the education and training. Participants expressed the need for health training to be combined together, within a professional activity opportunity, similar to the training that they receive regarding the management of anaphylaxis and the administration of epi-pens within the school environment.

Awareness and knowledge of how to properly manage a diagnosed concussion is critical for a student’s recovery, and administrators and educators play a pivotal role in helping to prevent students from premature return-to-play and return-to-learn activities (Ophea, 2014). Premature return-to-play or return-to-learn can place the child or adolescent at risk of exacerbation of existing symptoms or the re-emergence of previously resolved symptoms (Heyer et al., 2014). Most individuals who suffer a concussion make a full recovery, with the majority of symptoms resolving within 7 to 10 days (DeMatteo et al.,
2015). Of importance to the return-to-learn discussion is the indications from past research that have shown that some symptoms may not be recognized until the child returns to school and engages in cognitive activities, particularly school work that requires attention and memory (Grady, 2010). The recovery period may be prolonged in children and adolescents (Heyer et al., 2014), and some children may experience ongoing difficulties that can further impact their academic achievements (Duff & Stuck, 2015; Sady et al., 2012). The potential for a prolonged recovery from symptoms, and the lasting impact of these symptoms, presents concerns surrounding the concussed child’s ability to safely (or adequately) function within the school environment during his/her recovery period. Findings from the current research study demonstrate that children are returning to school with ongoing symptoms, often with the expectation that accommodations can and will be made to sufficiently modify the school environment. Concern surrounding the impact of the physical school environment, the strain of the academic workload, and the decreased availability of individualized support, were factors that participants identified when questioning the appropriateness of the school environment for students during their initial recovery period. The potential for exacerbation of symptoms due to the visual, auditory, and cognitive stimulation of the classroom, as well as the increased responsibility to monitor and manage these symptoms, invoked frustration and unease in the teachers who were obligated (professionally and personally) to accommodate and monitor a child that they did not feel was ready to return-to-learn.
5.2 Connecting to the research questions

This research sought to answer four main questions: (1) What do Ontario elementary school teachers know about concussion?; (2) What attitudes do Ontario elementary school teachers possess about concussion?; (3) How does the knowledge of Ontario elementary school teachers compare to the knowledge that is presented within the Ministry-mandated policy regarding concussion?, and; (4) How does the Ministry-mandated policy on concussion impact the knowledge and attitudes of Ontario elementary school teachers regarding concussion?

5.2.1 What do Ontario elementary school teachers know about concussion?

Participants in this study were able to provide not only a general description of concussion, but also the acknowledgement of some of the signs and symptoms that may be demonstrated if a concussion is to be suspected. Concussion knowledge was impacted by past personal experience with concussion, past professional experience (involvement with the identification and/or management of concussion within the school environment), and first aid/CPR training or experience. Four of the eight participants had past personal experience with concussion, acknowledging an injury to themselves or to a close friend or family member, with three of these participants describing the knowledge that was obtained by “living through the symptoms” or “watching what he went through” as the biggest factor for increasing their awareness and altering their attitude toward the need for early identification and management of concussion. Participants with past personal experience self-acknowledged their own lack of understanding of the severity of
concussion prior to their own lived experience, reflecting on incidents in the school environment that they would have managed different had they possessed the knowledge that they now have. This finding indicates that personal experience with concussion may lead to better understanding of both the severity of concussion and the impact of this injury on an individual’s overall physical, cognitive, and emotional well-being. This relationship between prior concussion and increased knowledge was previously acknowledged in research conducted by O’Donoghue, Onate, Lunen, and Peterson (2009), who found that personal experience of concussion impacted recognition of concussion among high school coaches.

Individuals without prior concussion experience drew on information obtained from media outlets such as newspapers, magazines, radio, and television, to generate both knowledge and attitude toward concussion. Participants without past experience relied on the images and information portrayed in the media to gauge their understanding of return-to-play and return-to-learn timeframes, as well as the need for symptom management at the time of injury. It is possible to surmise, from the results of this study, that the media depiction of concussion has downplayed the severity of concussion and decreased the acceptance or understanding of an individualized or step-wise recovery plan for individuals with concussion. A study that reviewed televised rugby games noted that the incidence rate of concussion is likely to be higher than what had previously been reported. Although the scope of that study did not allow for the researchers to investigate the impact of exposure to misidentification of concussion within the professional sporting league, the researchers did express that individuals are exposed to mismanagement of a
potential concussion by observing that “the majority of injured players either continue to play or return-to-play having displayed symptoms the public are otherwise told require more caution and more stringent management than demonstrated” (McLellan & McKinlay, 2011, p. 995). The seriousness of concussion in sport has received significant media coverage in recent years and this likely has influenced overall awareness of concussion in communities, assisting people with developing knowledge on what actions to take should they believe concussion has occurred (Gibson, Herring, Kutcher, & Broglio, 2015).

Although only one of the participants held certification in first aid and CPR, the impact of training and experience in emergency situations is worthy of discussion. There was a recognition that the provision of first aid, or the management of health concerns (including concussion), may fall outside of a teacher’s area of expertise. Participants expressed concern regarding their lack of knowledge and understanding surrounding emergency health care and the provision of first aid support, equating their lack of training with a level of discomfort felt with the responsibility of identifying and managing concussion within the school environment. There was a reliance on others within the school environment that possess more experience or knowledge, expressing that the concussion policy places them in a position of responsibility for an area that falls outside of their comfort level and area of expertise. The impact of first aid training on the knowledge and skill of participants regarding concussion, poses the question or inquiry as to why teachers are not mandated to carry certification in first aid and CPR, particularly with the addition of policies and procedures that require health care knowledge and skills.
5.2.2 What attitudes do Ontario elementary school teachers possess about concussion?

Attitude can be defined as the way you think and feel about someone or something; a feeling or way of thinking that affects a person’s behaviour (Merriam-Webster’s online dictionary, n.d.). The findings of this study suggest that attitudes regarding concussion within the school environment are impacted by knowledge (or understanding) of concussion, past experience with concussion (both personal and professional), support from parents or administration, and self-perceived (or self-acknowledged) ability to manage concussion within the school environment. Attitude was positively impacted by the teacher’s knowledge of concussion symptoms, understanding of the severity of concussion, past concussion experience, and support from administration and parents. 

Attitude was negatively impacted by a lack of communication between parents and teachers, the increased responsibility and workload associated with concussion management in the school environment, a sense of obligation (described as being “hands-tied”) to accommodate parental decision for early return-to-learn, and a lack of training or support regarding policies that impact workload and student safety.

Participants with increased knowledge and experience with concussion demonstrated a positive attitude towards both the need for concussion identification in the school environment and the need for school personnel to be involved in the identification and management process. A lack of knowledge resulted in a lack of confidence in ability and an expression of fear regarding misidentification or mismanagement of a potential concussion related to being unprepared, overburdened, or outside of their comfort level.
Although the majority of the participants possessed some knowledge of the cause of concussion and some understanding of potential signs and symptoms, those without personal concussion experience lacked an understanding of the severity of concussion or the length of recovery required, impacting attitude toward the return-to-learn process.

Parental response to concussion, and parental support regarding concussion (during the identification phase and the recovery phase) impacted teacher attitude towards concussion management within the school environment. Parents were viewed as the gatekeepers of information for students in the younger grades, and teachers reflected with frustration regarding the lack of communication that occurs when a child is injured outside of school. The lack of communication between home and school was frustrating for the teachers interviewed. Findings from the current research connects the lack of parental report (communication between home and school) of potential concussion to the school (for injuries that occur outside of the school environment) to decreased parental knowledge of concussion, the busy lives of parents, and parental need to return to work (due to obligations outside of their parenting role).

Although the participants were empathetic to the need for parents to “move on with their lives” after a concussion injury has occurred, the notion that teachers are “babysitters” or “nursemaids” for the injured child surfaced when discussing a child’s return to the school environment despite encouragement for recovery at home. These results indicate that, from the teacher’s perspective, parents view the school environment as a safe environment for concussion recovery with the impression that modifications (a dark
room, a place to lie down, a quiet space) can be accomplished within the classroom to accommodate the individual child’s recovery. These results may also indicate a lack of parental understanding of the severity of concussion and the need for concussion rehabilitation to be taken seriously. Parental expectation and impression of the teacher’s role in concussion management impacted the attitudes that participants held regarding concussion within the school environment.

From the teacher’s perspective, there appears to be an unavoidable responsibility or obligation to make accommodations within the school environment for children post-concussion. This expectation increases the workload of elementary school teachers, particularly since each child’s recovery is different, and each child’s needs are different. The anticipated increase in workload to create individualized plans, the anticipated responsibility of monitoring a child’s physical well-being, the disruption to the overall classroom environment (when modifications need to be made to accommodate the child’s needs, including a change in lighting, noise, or the decreased use of electronic devices to support teaching), had a negative impact on participant attitude towards concussion management in the school environment. This finding suggests that teachers are already stretched within their current roles to meet the needs of the students within their classroom, maintain the curriculum demands of the Ministry, and balance parental expectations of the teacher and the school environment, without the added impact of the concussion policy expectations. The strain of workload identified in the current study, supports research that was completed by the Elementary Teachers’ Federation of Ontario (EFTO) in 2005 to explore the time spent on work-related activities and member attitudes.
regarding workload. The results of the survey completed by the EFTO demonstrated that
teachers are working long hours, with increased non-classroom duties, inflicting a
negative impact on their personal lives and health due to a feeling of being overworked.
Although the survey completed by the EFTO was conducted in 2005, the struggle to
juggle the additional tasks assigned to teachers, including the front line management of
health care concerns (often outside their wheelhouse) was reiterated within the current
research project, raising concern that additional policies and procedures are overstressing
an already fatigued resource.

5.2.3 How does the knowledge of Ontario elementary school
teachers compare to the knowledge that is presented within
the Ministry-mandated policy regarding concussion?

As the Ministry of Education recognized, and endorsed, the concussion protocol
developed by Ophea (2014) as the minimum standard for the development of a school
board concussion policy, this concussion protocol was used as a framework to develop
both the interview guide and to generate codes and categories for the deductive content
analysis of the interview data. The concussion protocol emphasized seven main areas of
concussion information: (1) definition; (2) diagnosis; (3) awareness; (4) prevention; (5)
identification; (6) signs and symptoms, and (7) management.

5.2.3.1 Concussion definition

Within the Ophea (2014) document, a concussion is defined as “a brain injury that causes
changes in the way in which the brain functions leading to symptoms that can be physical
(e.g. headache, dizziness), cognitive (e.g. difficulty in concentrating or remembering),
emotional/behavioural (e.g. depression, irritability), and/or related to sleep (e.g. drowsiness, difficulty in falling asleep)” (p. 2). Results of this study indicate that teachers without past personal concussion experience may define concussion as a head injury that is caused by a direct blow or force to the head, often failing to acknowledge concussion as a brain injury or that a concussion could result from an injury that does not involve a direct blow to the head (e.g., injury to the face, neck, or body). These findings support prior research that suggests that the term “concussion” may connote a less severe injury (Halstead & Walter, 2010), implying a decreased understanding of, or concern for, significant long-term effects (Dematteo et al., 2010).

5.2.3.2 Concussion diagnosis

Participants recognized that concussion is a medical diagnosis and indicated that they would appreciate and value feedback regarding the management of concussion symptoms within the classroom if provided by the doctor. The Ophea (2014) concussion protocol recommends that a child who has sustained an injury that has the potential to cause concussion be seen by a medical doctor or nurse practitioner, and provides sample supportive documentation to allow for increased communication between the school and the medical professional responsible for the diagnosis. Adequate communication between home and school was recommended by participants to ensure that a concussion diagnosis is verbalized to the necessary individuals to allow for proper management within the school environment.
5.2.3.3 Concussion awareness

The results of the current study found connections between an individual participant’s level of awareness and their current knowledge and past experience with concussion. Participants with increased knowledge, particularly those with past concussion experience, also possessed a more positive attitude towards concussion management and demonstrated an increased awareness of the severity of concussion. Findings indicate that teachers are aware that concussion is a serious injury that warrants attention and care, however, those without personal experience lacked an understanding of the severity of the consequences of concussion beyond the initial disturbance present at the time of injury. The findings identify a gap in knowledge regarding severity, length of recovery, and potential signs and symptoms among individuals who do not possess personal experience with concussion. This provides support for the provision of concussion training opportunities for parents, teachers, and students regarding the importance of not only identification of concussion but also management of concussion beyond the initial injury.

5.2.3.4 Concussion prevention

The Ophea (2014) concussion protocol identified an approach that included three strategies for concussion prevention: primary; secondary, and; tertiary. The results of the current research project indicate that teachers possess an adequate amount of knowledge and potential skill to implement primary strategies of prevention including: the promotion and implementation of classroom safety techniques; the implementation and enforcement of rules, regulations, and expectations during playground activities, physical education, and sport activities, and; the reinforcement of proper equipment use. The findings further
demonstrate that there may be gaps in knowledge regarding both secondary and tertiary prevention strategies, which impact the teacher’s understanding of both the management of a student with concussion upon return to the learning environment, and the prevention of further injury through the recognition of student limitations. The Ophea (2014) concussion protocol includes information to support these areas, however, it was determined that the teacher participants within the current research study were not familiar with this protocol. These findings further support the need for training that will provide ongoing guidance and education for teachers regarding return-to-learn strategies.

5.2.3.5 Concussion identification

When a child sustains a potential concussion, the child should stop participating in the precipitating activity immediately, should not be left alone, and should seek medical attention as soon as possible, ideally on the same day as the injury (Caine et al., 2014; McCrory et al., 2013; Ontario Neurotrauma Foundation, 2014). The teachers in this research study recognized the need to contact parents/guardians if a child receives a head injury and they suspect a concussion may have occurred. This finding is encouraging but should also be approached with caution as a concussion can be caused by an injury other than a blow to head, and it is fair to assume that there is a possibility that a potential concussion could be missed due to a teacher’s lack of understanding of the other causes of concussion. This gap in knowledge may be narrowed through the full implementation of the school board policy and ongoing training, as past research has shown that exposure to concussion information/training does increase an individual’s ability to identify a potential concussion (Covassin, Elbin, & Sarmiento, 2012).
5.2.3.6 Concussion signs and symptoms

Participants were asked to identify signs and symptoms that may be present that would make them question whether a potential concussion could have occurred. Participant responses indicate that teachers lack an understanding of the broad range of potential signs and symptoms that a student may demonstrate. Participants were able to identify more of the cognitive signs and symptoms (memory loss, confusion, or decreased concentration) than the physical signs and symptoms, identifying that the cognitive difficulties would surface more when a child has returned to the school environment. Recognition of signs and symptoms at the time of injury was based more on the appearance of an obvious head injury, the complaint of a headache, feeling dizzy, or a visual disturbance (blurred vision, unable to focus).

5.2.3.7 Concussion management

PPM No. 158, issued by the Ministry of Education, recommends the development and implementation of an “individualized and gradual return to learning and/or return to physical activity plan for every student with a diagnosed concussion” (Ontario Ministry of Education, 2014, p. 3). The current research found that teachers feel unprepared (due in part to a lack of information, support, and time) to develop and implement a plan for a child’s return-to-learn. Confounding this overwhelming responsibility was the perceived lack of support from parents to participate fully in the execution of a gradual return-to-learn plan due to their own obligations (e.g., a need to return to work, lack of understanding or awareness of concussion severity). Although the Ophea (2014) concussion protocol offers sample documentation (including examples of modifications
that can be made to accommodate specific symptoms), the teacher participants were unaware of a written plan that was required or recommended to assist a child’s return-to-learn. The additional paperwork and consultation required to devise a plan was viewed with trepidation due to the burden of workload and lack of understanding of requirements.

5.2.4 How does the Ministry-mandated policy on concussion impact the knowledge and attitudes of Ontario elementary school teachers regarding concussion?

It is difficult to speak to this research question, because the teachers interviewed for this research study were unfamiliar with both the school board concussion policy and the Ophea (2014) document. Participants expressed surprise and frustration with their lack of information pertaining to the concussion policy, particularly in regards to the expectation of increased responsibility for identification, monitoring, and management of concussion within the school environment. Although job action may have impacted the full implementation of the concussion policy for the participants in this study, participants expressed frustration with the methods used for dissemination of knowledge when policies and procedures are introduced. Participants discussed the number of emails received daily, complicating the ability to decipher importance due to the volume of information received. The increased expectation of knowledge and responsibility that accompanies the policies and procedures, coupled with the volume of information disseminated through inappropriate venues (email or quick inserts of information during complicated and lengthy staff meetings), produced a feeling of anxiety within participants.
who felt strained by the extra hats they were asked to wear on top of the teaching hat they were paid to wear.

### 5.3 Study limitations

This research project did have several limitations, with a significant restrictive factor being time. Due to the timeframe of a Master’s program, it was not feasible to extend the time period for recruitment or interviewing, impacting the number of participants that were included in the research project. Recruitment, interviewing, transcription, and analysis of interview data takes time, and the time constraints of a Master’s degree program impacted the depth and breadth of the current project. The recruitment process for the current research project was more difficult than initially predicted. Recruitment difficulties may be related in part to the job action that occurred during the recruitment phase, or the period in the calendar year (spring/summer) when recruitment occurred, or a lack of financial incentive for participation within the study (resulting in personal interest in the topic as the main motivating force for participation). These limitations extended both the timeframe and the number of participants recruited.

The current research study sought to elicit the insight of Ontario elementary school teachers, and provides a perspective that is unique to the teacher role. Additional research is needed to understand the Ministry of Education’s intention that “administrators, educators, school staff, students, parents, and school volunteers” (Ontario Ministry of Education, 2014, p. 3) are knowledgeable about concussion related care among elementary students. The knowledge, skills, and attitudes of the non-teaching partners
within the school environment could provide further insight into potential gaps in knowledge that could assist in the development of training opportunities to increase the potential for appropriate dissemination of the concussion protocol/policy. Investigating the insight of different partners within the school environment (including administrators, school staff, educational assistants, students, parents, and school volunteers) is an opportunity for future researchers, ideally after the concussion policy has been fully implemented within the schools, to decipher the amount of training received by the different partners and the impact of this knowledge on the management of concussion within the school environment.

There was an expectation by the Ministry of Education that all school boards would have in place a fully implemented program that includes ongoing training plans for teachers, staff, and volunteers to educate them on concussion by January 30, 2015 (Ontario Ministry of Education, 2014). At the outset of this research (and at the time of interviewing), there was an assumption that all school boards would have their concussion policy in place (due to the recommended target date of January 30, 2015), and that training would have been initiated to support school personnel, including the intended teacher participants. Interviewing for this study occurred between May 2015 and August 2015. During the time period when interviewing took place, Ontario elementary school teachers were engaged in a job action that limited participation in staff meetings or professional development opportunities. It is possible that this job action impacted participant awareness of their own school policy, as only two of the participants were aware of the Ministry of Education’s expectations. It was not possible to assess the
impact of the Ministry of Education’s mandated concussion policy during the current research project as participants had not read the policy and they had not received training. Knowledge, skill, and attitude was assessed based on participant current knowledge of concussion, providing insight into Ontario elementary school teachers’ base understanding of concussion, without the implementation of the Ministry-mandated concussion policy.

It is plausible that one could surmise that my personal experience with concussion within the school environment could be construed as a limitation within the present study through the assumption that my own experience could impact the interpretation of the data. This potential limitation was addressed by the outward acknowledgement of my own experience and mitigated by the decision to have all transcripts independently coded by both myself and my supervisor.

Results of this study reflect only a small sample size (eight participants) with representation from only four of the school boards within Ontario. It cannot be assumed that results are generalizable to other school boards/schools in other cities in Ontario, or across Canada.

5.4 Implications and recommendations

The findings from this study highlight the challenges experienced by the teacher participants to move concussion management guidelines from policy into practice in the educational setting. Although concussion is recognized as an important issue that is worthy of the attention of Ontario elementary school teachers, there is concern by the
participants in this study that the school environment may not be the most appropriate
place for children who are still experiencing concussion signs and symptoms, due to the
environmental limitations of the classroom. Teachers want to be informed and feel
confident in their ability to assist, monitor, and manage a student’s return-to-learn.
Findings from this research study indicate that increased knowledge does not necessarily
equate to increased skill in concussion care, or an alteration in attitude towards the
management of concussion, as teachers feel as though their “hands are tied” in their role
during a child’s return-to-learn. The need to provide accommodations for a child that is
not physically (or cognitively) ready to return to the learning environment, or the request
to make modifications to the classroom, impacts the teacher’s ability to execute their
everyday task of delivering the mandated curriculum. The onus of responsibility to
monitor and manage the needs of a child that is unable to engage actively within the
classroom, changes the dynamics of the classroom for the teacher and the students. This
is not to say that a student should not return to school following a concussion, but to
emphasize the impact that modifications to the classroom environment and to a teacher’s
delivery of the curriculum can have on the teacher’s workload, the concussed student, and
the remainder of students within the classroom. Adequate cognitive and physical rest
outside of the classroom environment needs to be acknowledged and endorsed as part of
the student’s individualized return-to-learn plan.

There is an expectation that teachers will communicate concerns that arise within the
school environment to the parents/guardians, but questions arose within the research
study as to whether or not full disclosure from parents occurs when a child returns to
school post-concussion. The lines of communication need to remain open, and teachers rely on the honesty of parents, upholding the expectation that (like themselves) parents will do what is in the best interest of the child.

5.5 Future research

The Ministry of Education (2014) PPM No. 158 mandated that all school boards within Ontario would have in place, a fully implemented concussion policy by January 30, 2015. The implications of the current research study indicate that this policy needs to continue to unfold and that policy alone may not be enough to change attitude and behaviour (or culture) surrounding concussion management within the school environment. During the course of this research project, Bill 149 (Rowan’s Law) unanimously passed second reading in the Ontario legislature. If Rowan’s Law does come into effect, Ontario will become the first province in Canada to have concussion related legislation. As the current Ministry of Education recommendations (as outlined in PPM No. 158) continue to spread and evolve into school board concussion policies, and if Rowan’s law is passed, there may be a shift in the culture or a shift in how concussion is not only viewed (attitude) but also how concussion is managed (skill) within the school environment. Further research into concussion awareness within the school environment can provide support for the implementation of legislation. A larger scale study with a similar purpose, focusing on teachers, will be beneficial after the successful implementation of school board policies and education programs to support the dissemination of concussion information.
The current research study solicited responses from only one of the partners in concussion management within the school environment, teachers. Future research regarding the knowledge, skills, and attitude of Ontario elementary school students and their parents, regarding concussion within the school environment would be beneficial. This research study identified that there are gaps in parental knowledge, as determined by the teacher participants, regarding concussion management and return-to-learn guidelines.

Participants advocated for the need to include parents, administrators, and students within the dissemination of information pertaining to the concussion policy, stressing the importance of these individuals in the recognition and identification of a potential concussion, as well as the management of a diagnosed concussion within the school environment.

Understanding a student’s perspective of the challenges within the classroom and potential strategies for easing back into the learning environment could potentially fill the gap in knowledge that teachers expressed regarding accommodations and modifications to the classroom, or perhaps even extend the recommended amount of time at home that a child spends post-concussion. The participants within the current research study emphasized the importance of students self-advocating for themselves, recognizing the difficulty that children may have in recognizing and adequately articulating their concerns. This finding supports the recommendations of PPM No. 158 for the inclusion of students within the training process, potentially increasing their ability to recognize signs and symptoms, and impact the possibility of early identification of a potential concussion. The current study did not intend to study the impact of PPM No. 158 on
student awareness of concussion, or the impact of a concussion policy on student ability to self-advocate however, this in an important research focus for future study. There are implications from this research study to explore the impact of increased knowledge dissemination on student self-awareness and self-advocacy. Participants in the current research study felt strongly that increased knowledge dissemination to students (targeting students and their parents) could improve not only the ability to identify potential concussion, but also increase a student’s (and parent’s) willingness to report concussion.

There is curiosity regarding the knowledge, skill, and attitude of administrative assistants (office personnel) and school volunteers regarding concussion within the school environment. School volunteers (often parent volunteers) may be present on the school yard during recess activities. The current study also indicated that an injured student would be released to the care of “the office” after a phone call has been made to the parents/guardians. It would be interesting to explore: (1) the level of training and resources that are available to these individuals; (2) the knowledge, skills, and attitude of these individuals regarding concussion, and; (3) the workload implications of a concussion policy for the administrative support staff that receive and often distribute school based paperwork.

Past personal concussion experience impacted the knowledge, skills, and attitude of the participants within this study. As not all individuals faced with concussion management responsibility will possess personal concussion experience, and the current research study demonstrated that information obtained from media may not present an accurate picture
of the severity of concussion, there is potential for future research to explore the impact of training that involves the personal lived experiences of others on concussion awareness and management. Offering insight into the struggles of the student and the role of the school environment in the management of these challenges could increase the empathetic response and provide a personalized experience of concussion for individuals who do not possess past experience with concussion.

5.6 Conclusion

As a health care provider, but more importantly as a parent to three elementary school children, the management of concussion within the school environment is of interest and significance to me on both a professional and a personal level. This study represents an early exploration of the knowledge, skills, and attitudes of Ontario elementary school teachers and provides insight into the current management of concussion within the elementary school environment, including teacher-perceived gaps, despite the implementation of a concussion policy. During the course of this research study, important advances were made in concussion legislation which provides an optimistic outlook into the future of concussion management within the school environment. I am hopeful that the results of this research project will provide a platform for future researchers to continue to narrow the gap in the literature regarding concussion within the school environment.

Future opportunities exist to alter the mechanisms through which pertinent information is disseminated within the school environment. Teachers within this study indicated an
awareness of the importance of the information that is contained within school board policies and procedures, but they also emphasized the overwhelming burden (both professionally and personally) that is experienced due to the high volume of paperwork and the increased workload associated with new policies. The increased strain that can be caused by accommodations and modifications, coupled with a perceived lack of support and training to fully implement their required duties, creates an atmosphere of confusion and potential resentment that may serve as a barrier to the full uptake of policy. Teachers seek the support of administration and parents/guardians when implementing policies that impact the health and safety of students within the school environment, emphasizing the need for a “team approach” to policy implementation, including adequate training and support for all involved individuals. It is difficult to ascertain from the current research study the impact of a school board concussion policy on the knowledge, skills, and attitudes regarding concussion in the school environment, due to the limitations of the present study. Research in this area will continue to grow and evolve as changes and advances are made. This research study provided an initial step towards understanding concussion within the school environment, as experienced and defined by a small sample of Ontario elementary school teachers.

In sum, the main findings of this research study suggest that Ontario elementary school teachers, regardless of the implementation of a concussion policy, have a basic understanding of what a concussion is, what some of the signs and symptoms associated with this injury are, and an awareness of the importance of concussion prevention within the school environment. A past personal experience with concussion may lead to a better
understanding of the severity of concussion (including the life- and personality-altering impact) and may increase an individual’s personal obligation to not only advocate for the child but ensure that accommodations will be put into place to allow for a smooth transition back into the classroom. Teachers are aware of the challenges that a student faces when returning to the school environment following a concussion injury, but they are limited by aspects of the physical environment of the classroom (e.g., fluorescent lights, loud noise, high traffic of students) when implementing accommodations for students who return-to-learn, raising concern as to whether or not a child can recover adequately in the school environment. Additional challenges exist for educators, including a lack of training for the management of emergency situations, the personal obligation to monitor a child’s recovery, the expectation of balancing the needs of the concussed child with the education requirements of the other students, and the influence of the parents/guardians in the decision making process.

Findings from this study recognize the pivotal role that teachers play in advocating for the child, the parents/guardians, and themselves regarding the challenges of managing concussion within the school environment. The implementation of a concussion policy is recognized as an initial step toward the successful management of concussion within the school environment, but our findings indicate that an alteration in attitude toward concussion management requires more than information dissemination (or words on paper), particularly when teachers are already experiencing increased workload demands. These findings impart recommendations to support not only the individual teacher’s skill in management of concussion within the school environment through the provision of
adequate (and annual) training and increased personal support for the individual student in the classroom at the time of return-to-return, but also increased communication between home (parents) and the school to ensure that students are not slipping through the cracks.
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Official Journal of the Canadian Academy of Sport Medicine, 17(2), 140–2.
doi:10.1097/JSM.0b013e31803212ae
Appendix A

Ethics Approval

Principal Investigator: Dr. Sheila Moodie
Department & Institution: Health Sciences/Communication Sciences & Disorders, Western University

NMREB File Number: 106243
Study Title: Knowledge, skills, and attitudes of Ontario elementary teachers regarding concussions within the school environment.
Sponsor:

NMREB Initial Approval Date: March 30, 2015
NMREB Expiry Date: March 30, 2016

Documents Approved and/or Received for Information:

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<td>Instruments</td>
<td>7724_Moodle_Interview Plan Guide</td>
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<tr>
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<td>LOI and consent - clean copy</td>
<td>2015/02/09</td>
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<tr>
<td>Revised Western University Protocol</td>
<td>Revisions attached based on recommendations of review committee. Ethics Application CLEAN COPY (.pdf version)</td>
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The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Ethics Officer, on behalf of Riley Hinton, NMREB Chair or delegated board member

Erika Bailie
ebailie@uwo.ca

Grace Kelly
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Miss Methall
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Vikki Yan
vyan@uwo.ca

This is an official document. Please retain the original in your file.
Appendix B
Recruitment handout

Teacher Volunteers Needed for Research on Concussion Knowledge, Attitudes & Skill

Please consider participating in a study examining current knowledge, skills, and attitudes toward the prevention, recognition and management of concussions in the elementary school environment.

Data collection will be done outside of regular classroom teaching hours, using a one-to-one interview procedure lasting up to 1 hr., audio-recorded format.
We will arrange an interview location that is convenient for you.

Contact: Sarah Jorgensen; 

Version Date: 3-13-2015
Appendix C
Interview Guide

Introduction of Interviewer:

- Hello, my name is Sarah Jorgensen, and I am a student at Western University working towards my master’s degree in health and rehabilitation sciences. I am conducting research on concussions.
- During this interview, I would like to discuss concussion, particularly concussions that occur in children and concussions that occur in the school environment. I am interested in your experience with concussions, as an Ontario elementary school teacher.
- This interview will be recorded but your statements will be kept confidential. I will not be using your name, or the name of the school where you are teaching, within my research.

Demographic Information:

Q: What is your gender?
- Male
- Female

Q: Age: What is your age?
- 18-24 years old
- 25-34 years old
- 35-44 years old
- 45-54 years old
- 55-64 years old
- 65 years or older

Q: Education: What is the highest degree or level of school you have completed? If currently enrolled, highest degree received.
- Bachelor’s degree
- Master’s degree
- Professional degree
- Doctorate degree
Q: How many years have you been teaching?

Q: What grade do you currently teach?

Q: Is your current school in a rural or urban setting?

Q: Do you presently have certification in First-Aid?

Q: Do you presently have certification in CPD?

Q: Coaching experience: Do you coach a sports team at your current school?
   • If yes, which sport(s) do you coach?
   • If yes, do you coach intramural or extra-curricular

Q: Do you have playground supervision responsibility at your current school?

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<th>Main Questions</th>
<th>Additional Questions</th>
<th>Clarifying Questions</th>
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<tbody>
<tr>
<td>• In your own words, how would you define concussion?</td>
<td>• How did you learn about concussions?</td>
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<td></td>
<td>• What do you think about the increased media focus on concussion?</td>
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<td></td>
<td>• Does information you read in the media impact your attitude/opinion about concussion?</td>
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<td>• What would make you think that a child had a concussion?</td>
<td>• What are some of the causes of concussion?</td>
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<td></td>
<td>• What are some of the physical signs that you might see in that child?</td>
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<td></td>
<td>• What do you think the child might say to you?</td>
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<tr>
<td>Question</td>
<td>Answer</td>
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<td>Can you walk me through the steps that you would go through if you are present when a child may have suffered a concussion?</td>
<td>How do you feel about managing concussions in the school environment?</td>
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<tr>
<td>• How do you feel about managing concussions in the school environment?</td>
<td>• Can you tell me about any of your past experiences with concussions in the school environment?</td>
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<tr>
<td>• What was/is your role?</td>
<td>• Who else was/is involved?</td>
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<tr>
<td>• Who else was/is involved?</td>
<td>• How did you feel during this experience?</td>
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<tr>
<td>• How did you feel during this experience?</td>
<td>In the school yard?</td>
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<td>• What do you think that you, as a teacher, can do to prevent concussions in the elementary school setting?</td>
<td>In the classroom?</td>
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<td>• When do you think a child is ready to return to school after a concussion?</td>
<td>How do you know that they are ready?</td>
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<td>• What is your role, as a teacher, when a child returns to school after a concussion?</td>
<td>What are some of the challenges that a child might encounter?</td>
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<td>• As of January 2015 all Ontario schools now have a plan in place for managing concussions in the school environment. How do you think a concussion policy at the school help teachers to manage concussion?</td>
<td>How do you think this policy has changed awareness of concussions in the school environment?</td>
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<tr>
<td>• How do you think this policy has changed awareness of concussions in the school environment?</td>
<td>How do you think this policy changes a teacher’s ability to recognize or manage concussions?</td>
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<tr>
<td>• How do you think this policy changes a teacher’s ability to recognize or manage concussions?</td>
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<td>Question</td>
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<td>What training/support have you received for this new policy?</td>
<td>How do you feel, as a teacher, about concussions in the school environment?</td>
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<td>How do you feel about your role in managing concussions in the school environment?</td>
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Appendix D
Curriculum Vitae

Name: Sarah J. Jorgensen

Post-secondary Education:
- BA (Sociology)
  The University of Western Ontario
  London, Ontario, Canada
  1992 – 1995
- BScN (Nursing)
  The University of Western Ontario
  London, Ontario, Canada
  1995 – 1999
- MSc (Health and Rehabilitation Sciences, Health Promotion)
  The University of Western Ontario
  London, Ontario, Canada
  2013 – present

Related Work Experience:
- Brant Community Health Care System
  Brantford General Hospital
  Value Stream Navigator
  January 2015 – present

  Continuing Education
  Conestoga College
  Program Development Lead
  June 2014 – July 2014

  School of Health and Life Sciences and Community Services
  Conestoga College
  Coordinator, Personal Support Worker Program
  September 2013 – April 2014

  School of Health and Life Sciences and Community Services
  Conestoga College
  Sessional Instructor
  September 2012 – July 2014
Work Experience: Brant Community Health Care System
Brantford General Hospital
Discharge Planning Nurse
June 2007 – August 2010

Community Care Access Centre
Brantford, Ontario, Canada
Case Manager
May 2004 – August 2007

Brant County Health Unit – Sexual Health Program
Brantford, Ontario, Canada
Public Health Nurse
August 2001 – August 2003

Brantford General Hospital
Brantford, Ontario, Canada
Registered Nurse
June 2001 – July 2002
September 1999 – June 2000

South Fraser Health Region – Public Health
Surrey, British Columbia, Canada
Public Health Nurse
October 2000 – May 2001

Peace Arch Hospital – Geriatric Assessment Treatment Unit
White Rock, British Columbia, Canada
Registered Nurse
August 2000 – October 2000

Terrace Hill Walk in Clinic
Brantford, Ontario, Canada
Registered Nurse
August 1999 – June 2000

Community Geriatric Practice
Brantford, Ontario, Canada
Registered Nurse
May 1999 – June 2000