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The Importance of Sleep For Learning and Behavior

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THE IMPORTANCE OF SLEEP FOR LEARNING AND BEHAVIOR

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A capstone submitted in partial requirement of the requirements of the degree in Masters
of Arts in Teaching

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CHAPTER ONE

Introduction

If you were told that there was a product that offered maximum health benefits, increased learning, strengthened your immune system, helped to resolve past traumas, lengthened life, and helped to decrease anxiety and other mental disorders, would you try it? It's also worth mentioning that this product is completely free and totally accessible, because the "product" is sleep. "Sleep is the single most effective thing we can do to set your brain and body health each day" (Walker, 2017, p. 7). Sleep is a basic requirement for survival, but most people do not get enough of it for optimal health. Sleep deprivation can cause mood swings, hyperactivity, trouble concentrating, nervousness and aggressive behaviors, which can all lead to many incorrect diagnoses (UCLA Health, 2017). "Teens who sleep five or fewer hours a night have higher rates of violent crimes. Students with specific complaints of difficulty of initiating sleep were 7.5 times more likely to attempt suicide, compared to those without such complaints" (Fitzgerald, et al. 2009).

When I began working in schools I noticed that there were units on health and very rarely did those units touch on the topic of sleep. If the unit did mention sleep it was glossed over. According to Maslow's hierarchy of needs, a person cannot progress up the pyramid without meeting their basic needs. He categorizes sleep as a most basic physiological need. This makes sleep as important as nutrition and shelter. Without adequate sleep, one cannot advance in this hierarchy. In schools, we stress helping students to meet their basic needs, but rarely discuss sleep. Because of this, I felt that

students were being robbed of helpful information that would benefit them for a lifetime. Without sleep, a healthy diet and active lifestyle won't create a healthy person. "We will come to learn that sleep is the universal health care provider: whatever the physical or mental ailment, sleep has a prescription it can dispense" (Walker, 2017, p. 108). Sleep is an incredibly important discussion to have and to think about when working with students. It affects so much of their lives and contributes to long-term academic success and overall health. Sleep is such an important topic and issue that the World Health Organization (WHO) has declared a sleepless epidemic throughout industrialized nations. It affects every aspect of our life. We mention sleep is important in schools, yet we don't devote units to sleep. We speak about diet and healthy eating, but we don't discuss that if you aren't getting enough sleep, those things won't matter. "Generation after generation, our young minds continue to remain unaware of the immediate dangers and protracted health impacts of insufficient sleep" (Walker 2017, p. 332). In schools, students are aware of the impacts of drugs and alcohol and know what a healthy lunch should look like, yet they are unaware of the dangers of not getting an adequate amount of sleep.

There is a common misconception that students are not getting enough sleep because they choose not to; based off of my findings, this is not totally true. Besides the wiring of the adolescent brain, today's lifestyles play a part in sleep deprivation. Stimulation from social or sports activities, homework, technology, and even sports practices too close to bedtime can interfere with falling asleep in a timely manner or the quality of the sleep generated (Walker, 2017). Sleep deprivation impairs the functioning memory, increases the stress hormone cortisol which can compromise the immune

system, decreases alertness, impairs ability to process glucose which contributes to excess weight and obesity, decreases one's ability to control their emotions, and elevates mood disorders (Walsh, 2004). If we can shift the conversation into elevating the importance of sleep to students at a young age, we will see an increase in participation in the classroom, better test scores, and happier students.

Rationale and Significance

Because sleep is so intertwined in our lives, I am executing my capstone on this topic. This capstone seeks to answer the question, "*How does sleep affect a student's behavior and learning?*" For me, being a teacher means affecting lives longer than the year spent with the students. I want to prepare them to have successful lives after elementary school. I want to set them up with tools that will help them in the future, and I believe that understanding the importance of sleep will improve their lives, for the rest of their lives. This capstone will address the changes that can be made in both the classroom and at home that will help improve the quality and quantity of sleep. It will help to educate parents, guardians, and educators on the importance of sleep and provide actions for improvement. Understanding how sleep can change one's life, short-term and long-term, could truly help parents and educators. In turn, they can educate students and affect change. Just as learning the importance of nutrition at a young age was implemented into coursework in hopes to combat childhood obesity and create lifelong healthier habits, we can follow in those footsteps to implement another potential health hazard unit into our schools' curriculums and discussions at home. We cannot expect our youth to know about the importance of a topic if we do not discuss and educate them on

it. The same model can help shape perceptions and actions for sleep. The younger we teach this information, the greater the chance for better choices as these students age.

Upon starting my research on this topic, I began to feel vindicated. I struggled with sleepiness throughout my childhood and during my teenage years. I always felt that my tiredness stemmed from something I was doing wrong. I felt like I needed to sleep later than 9 AM on the weekends, and frequently my parents and I would get into arguments about, “wasting the day.” If I could have had more access to this information in school, I could have taken control of my health and understood more of what my body was going through. This information could have helped my parents to understand why I was constantly craving sleep, and that my actions were not abnormal, they were actually healthy. If I had been able to learn about the importance of sleep throughout my educational career, I would have put more emphasis in making sure I was obtaining the proper amount. I would have tried to steer away from the “all-nighter” culture and have gone to bed at a proper time. If I had resources and had been educated on this topic, I would have known that pulling an all-nighter would perhaps get me the grade I desired, but would not promote lifelong learning of the topic and also would adversely affect every aspect of my health. This knowledge would have impacted my educational career, mental health, and overall health for the better.

In my experience of working with students of any age I have noticed if they are not sleeping, they are not learning. “When sleep is abundant, minds flourish. When it is deficient they don’t” (Walker 2017, p. 316). I have personally noticed inability to focus, lack of concentration, short attention span, impulsiveness, emotional outbreaks, and lack

of motivation- to name a few. Many times, students do not realize the importance of sleep and put it lower on their list of priorities. I found that from speaking with them about how important sleep can be and discussing ways to improve their sleep habits, they worked harder to ensure a better night's rest. Starting this conversation at the elementary level will help to instill a value of sleep that has not been held before. Our society values productivity over sleep. Our society also values a healthy lifestyle and promotes mental health; without sleep these things cannot be achieved. There are more than twenty large-scale epidemiological studies that have tracked millions of people over many decades, all of which report the same clear relationship: the shorter your sleep, the shorter your life (Walker, 2017). Teaching the importance of sleep to students and their families will create a community of generations to come that value and hold sleep high on their list of priorities.

Capstone

The capstone will address: why sleep is so important, change through education, and community, parental, and guardian education. Why sleep is so important will cover the behavioral effects, learning effects, and health effects that sleep has on an individual. Change through education will cover what can be done in schools. This will include school policies, curriculum and lesson plans, and classroom design and implementations. Community, parental, and guardian education will address stereotypes, provide at home advice, and give warning signs that your child is not getting enough sleep.

Project

The project portion of my capstone will be a website. The website created for this capstone allows its users to gain access to research that will help to educate them on the effects of sleep and strategies for improving. This easy to navigate website features research that is compiled into one site. It allows for exposure of this topic and gives its users insight to the importance of sleep. Although the website will be accessible to anyone, it will be geared towards parents, guardians, and educators. The website has the following pages:

- Home
- Why is Sleep Important
- Parents/Guardian Section
- Educators Section
- References
- Works cited

Each page of my website covers the areas of research presented in this paper. The website gives educators and parents quick access to information without the time commitment of reading a paper. The website features links and other helpful items that its users can interact with. Because of the lack of knowledge both my parents and I had on this topic, I included parents, guardians, and educators as the audience for the website. If educators can incorporate learning into the classroom and parents can support it at home, children will definitely create lifelong, healthy habits. Making this a team effort and educating adults who students look to the most for their knowledge will ensure the most change.

Creating a website that is accessible at any time of the day is what I felt would reach the most people. Pamphlets get lost, presentations get forgotten, and books sometimes take too much time to read, but a website that is free of charge and can be used at any moment of the day is what I felt would reach the most diverse set of people and be the most equitable.

Summary

Change starts small. Big change begins with small movements. If educators and parents can work together to ensure healthier sleep patterns for their students and children, we can create a generational change that will impact future generations for the better. This capstone seeks to educate, not drastically turn people's lives upside down. My hope is that small changes can begin to be implemented into schools and homes, which will in turn create healthier individuals. In the past, cigarettes were valued as "healthy" products (Little, 2019). People smoked in hospitals and even promoted them as medications. Doctors believed that they had healing powers and never advised against using them (Gardner & Brandt, 2009). As time went on, new research was found and now smoking is considered harmful to one's health. Changes in smoking habits stemmed from educating the public. I hope the same can be done with sleep. How can someone understand the importance of sleep if they are not provided with the education to promote it? If we can elevate the discussion of sleep to individuals, instead of just referring to it as something we must do daily, it too will hold a more important status in society. Providing individuals with the necessary information to create the changes they can incorporate into their lives is a must. If we never promoted the dangers of smoking

through creating units and spending governmental resources to send in speakers for school assemblies, our society could still be smoking in hospitals. Because of the efforts to educate students at a young age and promote the negative consequences smoking has, the discussion of smoking has shifted. I hope to do the same with sleeping.

Chapter 2 will go into further detail into why sleep is so important, changes that can be made through education, and community, parental, and guardian education. Why sleep is so important will provide insight on the effect sleep has on learning, behavior, and on one's health. Change through education will address curriculum and give lesson plan ideas, what can be done in the classroom in regards to layout and design, and possible school policies. Community, parental, and guardian outreach will provide at home advice, warning signs your child is not getting enough sleep, and addressing stereotypes, and changing the conversation through education.

CHAPTER 2

Literature Review

Introduction

As this capstone seeks to answer the question, “*How does sleep affect a student’s behavior and learning,*” this chapter will include a review of literature providing information, ideas, perspectives, and facts. Through the review of literature, topics that will be included: why sleep is important, highlighting the health effects sleep has on a person; what educators can do to support, through lesson plan ideas and school implementations; and finally, what can be done at home with parents and guardians, from addressing stereotypes, and changing the conversation through education, as well as implementations to incorporate into one’s home to support applications at school.

Understanding why sleep is important sets the framework for this capstone. Diving deeper into the health, behavior, and learning effects sleep has on a person lays a foundation for this paper. The next section will cover the importance of sleep and its overall effects on the human body. In the next section, readers will understand, in greater detail the importance of sleep. Research will show how important sleep is for one’s health, learning, and behavior. While sleep in youth plays an incredibly important role in brain maturation, there is more (Gregory. 2018). “No facet of the human body is spared the crippling, noxious harm of sleep loss. We are, as you will see, organizationally

economically, physically, behaviorally, nutritionally, linguistically, cognitively, and emotionally dependent upon sleep” (Walker, 2017, p. 133).

Sleep’s Importance

Sleep is one of the single most integral things we can do for ourselves each day. It affects many different functions of our health. Sleep is so essential, yet two-thirds of adults in all developed nations don’t receive eight hours, which is the recommended amount of sleep nightly (Walker, 2017). In fact, Walker (2017) reveals that countries where the amount of sleep has declined over the past century are also the countries that have had the most increase in mental disorders and physical diseases. Walker goes on to note that sleep plays a key role in determining how healthy of a life humans will live, as it is a major lifestyle factor which will determine whether or not one develops Alzheimer’s. “It is estimated up to a third of adolescents experience problems with sleep, and poor sleep is associated with sleepiness, learning problems, mood disorders, increased aggression, substance abuse, cardiovascular disease, and obesity” (Hull, 2014, para. 1).

In Arianna Huffington’s book *The Sleep Revolution* (2016), she writes:

Getting enough sleep, says Dr. Judith Owens, the director of the Center for Pediatric Sleep Disorders at Boston Children’s Hospital, is “just as important as good nutrition, physical activity, and wearing your seatbelt.” But most people hugely underestimate their need for sleep. That’s why sleep, says Dr. Michael Roizen, the chief wellness officer of the Cleveland Clinic,” is our most underrated health habit (p. 19).

Clearly, sleep's value to humans is immense, while the need for sleep education is also great. It touches every aspect of our lives, yet is so often overlooked.

Health. Walker (2017) also states that inadequate sleep escalates the chance of your coronary arteries becoming blocked, increasing your chance of cardiovascular disease, stroke, and congestive heart failure. Experts have taken note about how important sleep is. The US Institute of Medicine & Centers for Disease Control and Prevention acknowledge the correlation of insufficient sleep with debilitating conditions like hypertension, diabetes, depression, and obesity (as cited in Mendelson, 2017).

Sleep has such a major influence on obesity that three-year-olds sleeping less than ten and a half hours a night have a 45 percent increased risk of obesity by age seven. Shown through various studies, the facts are clear: the less one sleeps, the more one eats. These studies conclude that people sleeping 5 hours or less a night are eating about 385 calories more the next day (Mendelson, 2017). Short sleep has also been linked to a higher difficulty in losing fat while dieting, increased late-night eating, and an increased appetite (Mendelson, 2017). Getting less than six hours of sleep a night decreases the hormone leptin which helps to alert someone that they should stop eating, while it increases the hormone ghrelin which triggers one to eat. In essence, because of this short sleeping, which is sleeping 6 hours or fewer a night, causes a dissatisfaction of food and overeating. From this same study, it has been found that sleep loss raises levels of endocannabinoids in the body which are chemicals produced by one's body that stimulate appetite and increase the desire to snack. Van Cauter's study showed that reduced sleep caused increased urges to eat junk food by up to 40 percent (as cited in Walker, 2017).

Lack of sleep also reduces the amount of orexin, a neurotransmitter that stimulates physical activity and calorie burning, created in the body (Huffington, 2016). Because of this, it would seem maintaining a weight would be even more difficult.

Sleep deficiency creates a fight-or-flight response within one's body creating a surplus of cortisol which in turn allows excess "bad bacteria" in your microbiome. Because of this, meaningful absorption of food nutrients will be diminished and gastrointestinal problems will occur. Walker (2017) goes on to write:

Sleep reforms the body's metabolic state by fine-tuning the balance of insulin and circulating glucose. Sleep further regulates our appetite, helping control body weight through healthy food selection rather than rash impulsivity. Plentiful sleep maintains a flourishing microbiome within your gut from which we know so much of our nutritional health begins (p. 171).

From epidemiological studies, there is also an established correlation that individuals who sleep less have a higher risk of being overweight or even obese (Walker, 2017). Sleep deficits affecting insulin production can lead to diabetes. Lack of sleep, for even just a week, can change one's blood sugar levels enough that one would be classified as a pre-diabetic (Walker, 2017).

Sleep doesn't just affect our diets and weight-loss, sleep also helps to ward off viruses and common illnesses. The amount of sleep affects how well one's immune system is able to fight off various illnesses, from the common cold to cancer. An experiment conducted by Dr. Michael Irwin at the University of California, proved that one night of bad sleep can compromise an immune system. In his study, Dr. Irwin found

that sleeping only 4 hours for just one night reduces your “natural killer cells circulating in the immune system,” by 70 percent compared to getting 8 hours of rest (as cited in Walker, 2017). It has also been found that people who sleep 5-6 hours or less are four times more likely to become infected with the common cold than those who are sleeping at least 7 hours (Mendelson, 2017). Dr. Aric Prather, also from the University of California, concluded from his study that sleep deprivation compromises the immune system. He found that those participating in his experiment sleeping 5 hours on average had an almost 50 percent infection rate, while those sleeping 7 hours or more had an infection rate of just 18 percent.

On top of this, sleep’s effect on the immune system determines how effective the standard flu vaccine will be. In 2002, a study found that participants who slept 7-9 hours the week before receiving the influenza vaccine created a strong antibody reaction and therefore, created a healthy immune system. The people in the sleep-restricted group produced less than 50 percent of the antibodies of what their non-sleep deprived counterparts did.

A study of 25,000 individuals found that sleeping six hours or less increased the risk of developing cancer by 40 percent compared to those sleeping 7+ hours a night. Similar results were also found when a comparable study was conducted with 75,000 women during an eleven-year time span. Additionally, not getting adequate sleep is so correlated with cancer risk that the World Health Organization has named sleep disruption and night shift work as a “probable carcinogen” (as cited in Walker, 2017).

Lack of sleep has also been linked to Alzheimer's disease, as sleep allows the body to get rid of toxins, which include proteins that are associated with the disease (Huffington, 2016).

Sleep not only affects one's immune system, it also helps one to recover physically "Sleep can accelerate physical recovery from common inflammation, stimulates muscle repair, and helps to restock cellular energy in the form of glucose and glycogen" (Walker, 2017, p. 130).

Huffington writes:

We sacrifice sleep in the name of productivity, but ironically, our loss of sleep, despite the extra hours we put in at work, adds up to more than eleven days of lost productivity per year per worker, or about \$2,280. This results in a total annual cost of sleep deprivation to the US economy of more than \$63 billion, in the form of absenteeism and presenteeism (when employees are present at work physically but not really mentally focused) (p. 23).

Health is important, yet sleep, a huge determining factor of our health is rarely addressed. Sleep is linked to so many health issues and productivity issues.

Development. In addition to the body's immune system, sleep affects development. Getting an adequate amount of sleep is particularly important while your brain is maturing. Obtaining the appropriate amount of sleep helps with brain maturation and has mental health and emotional regulation benefits (Dahl, 2002). Sleep seems to play a significant role in the development of mature thinking and reasoning. Looking at patterns and changes of NREM sleep, Non-Rapid Eye Movement sleep, one notices that

the changes in NREM sleep is followed by cognitive and developmental achievements (Walker, 2017). During NREM sleep, a sleeper is not dreaming, their brain waves are slow, and their heart rate and breathing is slower (Mendelson, 2017).

REM sleep is also important. While not everything is known about the long-term effects REM-sleep disruption has on humans, it is known that reducing or blocking REM sleep entirely from newborn animals disrupts brain development, which in turn leads to a socially abnormal adult. In one study, scientists deprived animals of deep sleep. By doing this, the animals' maturation of the brain ceased (Walker, 2017). The daytime effects of insomnia include:

- difficulties with concentration, mood, and energy
- alterations in neuropsychological testing
- decreased pleasure from family relationships
- absenteeism from commitments
- increased healthcare consumption and cost

(Mendelson, 2017, p. 146).

These symptoms are concerning and lead directly to increased monetary costs. It is important to note that each year insomnia costs the United States of America up to 107 billion dollars through loss of productivity, absenteeism, and sleep-related automobile accidents (Mendelson, 2017).

Learning. The cost of reduced learning is another factor of brain development. In addition to diminished concentration, lab studies have shown that restricting sleep affects higher cognitive functions, verbal fluency, memory tasks, and abstract thinking (Meijer,

2008). Sleep-deprived students may have more errors on exams or have trouble learning because studies have found that sleep quantity and quality are intertwined with students' learning capacity and academic performance (Curcio, 2006). Fatigued students show less brain activity when working on math problems and make more errors on exams than when they have had a good night's rest. From brain scans of students completing verbal learning tasks, it is shown that the temporal lobe, which is important for the processing of language, becomes less effective the more tired the student is (Willis, 2017). Some of this can be attributed to the massive impact sleep has on memory. Memories created with a lack of sleep are weaker and will disappear from one's mind quicker. Researchers at Notre Dame and Boston College found that sleep consolidates memories and prioritizes them by stripping them down and organizing the components according to their emotional value (Jensen, 2015). Sleep allows for time for our body to consolidate memories, cleanse the brain and body of neurochemicals, and overall health maintenance (Huffington, 2016).

Misdiagnoses. Some of the manifestations of sleep deficiencies can create issues for parents, educators, and doctors, as they observe students' tendencies and try to determine the source. Lack of sleep can cause trouble concentrating, mood swings, hyperactivity, nervousness, and aggressive behavior which can lead to incorrect diagnoses, as these symptoms mimic those associated with ADHD (UCLA Health, 2017). Because the symptoms of insufficient sleep and ADHD are so similar, it is estimated that more than 50 percent of all children with a diagnosis of ADHD actually have a sleep disorder (Walker, 2017). This means that a high number of children are taking

medications that are not necessary or beneficial. According to Dr. Aneesa Das, the assistant director of the Sleep Medicine Program at The Ohio State University, it is hard to tell when a child is sleep deprived as they do not exhibit the same symptoms as an adult would, when a child is sleep deprived they may actually become hyperactive (as cited in Huffington, 2016).

Socialization. Socialization, which is vitally important to the learning process, is also affected by sleep. When one has a lack of sleep, it is harder for one to understand social cues and facial expressions (Walker, 2017). Imagine being an already hypersensitive teenager going through the woes of maturity, only to amplify the intense feelings that having raging hormones bring by also being sleep deprived. Sufficient quantity and quality of sleep is a simple way to make the day run smoother, for someone of any age. It is no wonder that insufficient sleep can increase aggression and other mood disorders. When one is deprived of sleep, feelings are more intense coupled with less of an ability to curb and control the higher intensity emotions (Walsh, 2004). These factors all greatly affect students' social interactions with peers and teachers, which affects the learning process.

Concentration. Lack of sleep directly correlates with a decline in alertness. The less one sleeps, the less alert one is (Walsh, 2004). For example, driving a car requires its driver to be ready and aware of anything to come. In the United States of America, one person dies in a traffic accident every hour due to a "fatigue-related error." Accidents caused by drowsiness are greater than accidents caused by drugs and alcohol combined.

While attentiveness in the classroom is not necessarily vital, alertness does affect one's learning.

Summary. In order to enjoy maximum sleep benefits, one must improve every stage of sleep. All stages of sleep are important. Each stage of sleep triggers different brain benefits. Losing out on sleep will cause brain impairment (Walker, 2017). Walker goes on to write:

Every major system, tissue, and organ of your body suffers when sleep becomes short, no aspect of your health can retreat at the sign of sleep loss and escape unharmed. Like water from a burst pipe in your home, the effects of sleep deprivation will seep into every nook and cranny of biology, down into your cells, even altering your most fundamental self-your DNA (p. 164).

Because we have learned about the importance of sleep and its impacts on health, behavior, and learning, the next section will address *Change Through Education*. This section will consist of what educators can do to support sleep education. Some topics that will be addressed are unit ideas, meditation, and implementation ideas for school settings. The question for the basis of this capstone is, "*How does sleep affect a student's learning and behavior,*" while the goal of this capstone is to address the importance of sleep in addition to educating others and solidifying its importance for generations to come.

Change Through Education

Unit Idea. Implementation to create change and support students can start in schools. Judy Willis, an M.D. Physician, Neuroeducator, and 10 year classroom teacher,

created a unit that can help to teach about the importance of sleep. She feels that students must be taught about the importance of sleep, highlighting that sleep affects their mood and memory. Because of this, she created a unit plan that is based off of self-observations, journal entries, and classroom discussions. Willis created the idea of sleep diaries where students will record what time they went to bed, when they woke, and how long they slept. During the school week, students will take a moment to describe how they are feeling. These reflections will help to draw correlations between sleep quantity and quality and their moods. Discussions can be formed through the students' observations and conclusions. It is good to bring up that sleep actually helps studying, and that studying and sleep should go hand in hand. From here, Judy Willis (2017) recommends, from her article teaching about the sleep cycles, that:

Memory storage in the brain is most efficient during these uninterrupted, deep non-REM sleep. This is when what they learned and experienced that day is reprocessed to build a clearer understanding of the day's events. During this sleep state their brains make relationships and connections between new learning and prior knowledge as concept understanding builds and problems are solved (para. 15).

Understanding the sleep cycle and specific facts about it can improve a student's determination to get more sleep. She urges during this stage of the unit to also highlight the brain's neuroplasticity construction of powerful memories which happens after about six hours of sleep. Willis also suggests another way to use self-observation and convey the importance of sleep to students. She encourages educators to let students create their

own experiments and make observations. Some “experiments” she recommends to try out are: regular sleep and wake times, bedrooms kept dark and quiet, and avoiding screen time close to bed. Her ideas can be used for a multitude of assignments in schools. These lessons could fit in with almost any subject in almost any grade. For example, students could complete this unit in math by adding sleep times together and creating an average of the amount slept.

Lack of Sleep Effects and Risks. Research has shown that 6 in 10 middle schoolers are not receiving enough sleep, while 7 in 10 high schoolers are not getting enough sleep (Centers For Disease Control and Prevention, 2020). Teens are trying to make up for lack of sleep in various ways. Data gathered shows that twenty-percent of all middle and high school students fall asleep in school (Willis, 2017). Studies done in various school districts suggest that the less sleep a student is receiving, the worse the student’s attendance, tardiness, and grades will be. It has also been shown that a student suffering from improper amounts of sleep has an elevated risk of depression, impulsivity, increased frustration, and mood swings (Eide, 2007). To avoid these risks, middle school and high school students need just as much sleep as elementary aged students (Willis, 2017).

When it comes to reasons why students feel they are not getting enough sleep, data drawn through surveys and interviews shows that homework is identified as a top reason (Gaarde, 2020). While homework may be a substantial factor keeping students awake, if they are not getting the adequate amount of sleep, students will not be learn to their greatest capacity, “Within the brain, sleep enriches a diversity of functions,

including our ability to learn, memorize, and make logical decisions and choices,” (Walker, 2017, p. 3). In a study focused on twins, researchers had one twin sleep less than the other and tracked their developmental progress for decades. The findings showed that by ten years, the twin who had obtained more sleep had higher test scores on standardized tests of reading and comprehension, and a larger vocabulary than the less rested twin (as cited in Walker, 2017).

Lack of Sleep Effects on Education. The goal of her lessons is to help students make more informed decisions and to understand the power of sleep. While Willis has a decorated background in teaching, neuroeducation, and health, there is also evidence to back up what Willis believes. Walker (2017) writes:

Following a night of sleep you regain access to memories that you could not retrieve before sleep. Like a computer hard drive where some files have been corrupted and inaccessible, sleep offers a recovery service at night. It is the “Ah yes, now I remember,” sensation that you may have experienced after a good night’s sleep. REM sleep can even take a step back, so to speak, and divine overarching general knowledge—that is, what a collection of information means as a whole, not just an inert back “catalogue of facts.” We can awake the next morning with new solutions to previously intractable problems or even be infused with radically new and original ideas (p. 116).

Willis’ idea to bring a large push for sleep education into the classroom is supported by evidence. Creating a narrative, early on, that “all-nighters” are not the way to go is important. Janet K. Kennedy, Ph.D. (2016) clinical psychologist, founder of NYC

Sleep Doctor and author of *The Good Sleeper: the Essential Guide to Sleep for Your Baby (and You)*, states,

The best way to handle this (studying) is not to pull an all-nighter at all. Sleep is necessary to transfer learned information into memory. Test performance is much better when studying is followed by sleep. And even if a person can cram all night and regurgitate the information successfully on a test the next day, the information will essentially disappear. It won't be stored and it won't be available to the person in the future (para. 13).

Sleep is an aid to memory before and after learning, as it can prepare your brain to make new memories and solidify those memories to prevent them from being forgotten (Walker, 2017).

Meditation and Yoga Implementation. Another way that educators can help improve sleep for students is through the implementation of meditation/mindfulness into the classroom. Mindfulness meditation has been shown to decrease anxiety and aides in helping to overcome past traumas, which can help facilitate sleep (Rusch, 2018). Schools that have implemented mediation into their classrooms have found self-reported improvements of wellness, calmness, relaxation, sleep, self-care, and self-awareness from their students (Waters, 2014). One specific form of meditation, yoga in schools, has been found to reduce stress, anxiety, tension, and improve emotional regulation in students of all ages (Butzer, 2018). These findings could mean improved sleep for students.

Challenges and Effects of Start Times. According to the CDC, adolescents need 8 to 10 hours of sleep per night, but two-thirds of US high school students report

regularly getting less than 8 hours of sleep on school nights (Centers for Disease Control and Prevention, 2017). Wallace B. Mendelson (2017), an American psychiatrist with a specialty for sleep research and psychopharmacology, states that:

Later sleep times appear to occur before the onset of puberty.

Unfortunately, this shift in timing of sleep conflicts with the necessity of getting up early for school, which often starts at 8:30 AM or earlier. As the need for sleep appears to remain the same or even increase, at least during older adolescence, the result can be chronic sleep deprivation which potentially can have effects on alertness and the ability to retain information (p. 92).

Puberty causes adolescents' brains to change dramatically. The best way to ensure that children and teens can develop optimally is to allow for adequate amounts of sleep. Matthew Walker (2017), author of *Why We Sleep*, remembers a billboard from an insurance firm he saw that stood out to him which read, "Why do most 16-year-olds drive like they're missing part of their brain? Because they are." His comment about this particular billboard is, "It takes deep sleep and developmental time to accomplish the neural maturation that plugs this brain "gap" within the frontal lobe. When your children finally reach their mid-twenties and your car insurance premium drops, you can thank sleep for the savings" (p. 91).

Educators could push for changes in start times to improve chances of students sleeping longer and having a better quality of sleep. In the book, *Why We Sleep*, Walker creates an argument for changing school start times:

Forced by the hand of early school start times, this state of chronic sleep deprivation is especially concerning considering that adolescence is the most susceptible phase of life for developing chronic mental illnesses, such as depression, anxiety, schizophrenia, and suicidality. Unnecessarily bankrupting the sleep of a teenager could make all the difference in the precarious tipping point between psychological wellness and lifelong psychiatric illness (pp. 308-309).

The town of Edina, Minnesota changed its start times from 7:30 AM to 8:40 AM and found that students' grades increased, reporting that they were able to sleep more, and had fewer episodes of depression, and additionally, athletes performed better (Jensen, 2015). A middle school shifted its start time by just 1-hour and found that math and reading test scores rose by a 3-percentile point gain. This finding is significant because it also concluded that changing the start time could have the same impact on standardized test scores as decreasing the class size by one-third (Owens, 2014). When the Air Force Academy required its students to take classes starting after 8 AM, they found that performance increased in all of their courses (Jensen, 2015). These stats from these various sources aren't surprising because the brain function that is the most affected by the smallest change in amount of sleep is concentration (Walker, 2017). Gregory (2018) also writes:

On a more positive note, it was found that the shift did the expected good. Analyzing data from the Minneapolis change four years on, it was found that children who had postponed their start times, as compared with those

who had not, were more likely to attend school. They also reported feeling less depressed and were less likely to nod off in class. There has been a dragging concern that delaying the start of the school day would lead to later bedtimes for the children, with associated problems, this was not found to be the case and it was discovered that the children who had a delayed school start got more kip than others- in fact, a whopping five hours more sleep per week as compared with the children in other schools. Everyone was a winner, with many teachers and parents reporting sunnier, calmer children who were easier to teach or live with (p. 121).

Changing start times can have other positive effects, as it has also shown an increase in attendance and retention rates in schools (Owens, 2014). When schools start later, they have to finish later too. A later end time protects teens from the “Danger Window” which is a well-researched period of time between three and six PM. This time frame is generally the time between when schools finish and parents have not yet returned home. The “Danger-Window” is a recognized cause of involvement in crime and abusing alcohol and other substances (Walker, 2017). By shortening the length of time that students could be exposed to the “Danger-Window,” illegal involvement and dangerous behavior could decrease. When Mantomedi School District of Minnesota changed its start times by just thirty-minutes, it saw a 60 percent decrease in traffic accidents, whereas schools in Teton County Wyoming, that changed their start time by an hour and twenty minutes, saw a 70 percent reduction in traffic accidents in drivers ages sixteen to eighteen (Walker, 2017). Walker notes that it is important to recognize that the

leading cause of death among teenagers is road traffic accidents, thus this information shows that by instituting a later school start time, students' life expectancies may increase.

Cognitive function of adolescents is at its peak more toward the afternoon than in the early morning (Carrell, 2011). Carrell (2011) also noted when compared, students who had schools with a later start time self-reported having slept more, less daytime fatigue, and less depressive feelings. Findings have also shown that the increase of sleep gained from a later school start time massively increases class attendance, reduces behavioral issues and psychological problems, and decreases substance and alcohol use (Walker, 2017). Walker notes that it is no surprise that more sleep caused by later school start times reduces behavioral issues because it not only reduces impulsive behavior tendencies, but it also allows our brain to recalibrate our emotional circuits which in turn allows us to take on the next day with a cool-headed composure. Dr. Lewis Terman, who helped to create the IQ test, notes in seminal papers and his book *Genetic Studies of Genius* that regardless of age, the longer a child was able to sleep, the more intellectually gifted they were (as cited in Walker, 2017).

Summary. This section covered how education is affected by sleep and some changes educators can make to educate students and allow for better quality and quantity of sleep for students. Talking about sleep in schools and learning its importance will function better if help is provided at home. The next section, *Change at Home*, covers what parents and guardians can do at home to promote change, how sleep affects their children, and what affects the quality and quantity of sleep that they are receiving. This

portion will examine ways that parents can help to reinforce and implement what students are learning in school into the home, helping to achieve the goal of a better, longer night's rest.

Change at Home

Implementing changes at home will help reinforce the importance of sleep while also allowing a child to have a better quality and higher quantity of sleep.

Changes in Sleep. Sleep changes throughout life. It especially changes when puberty begins. Adolescents' brains need about 9.5 hours of sleep each night to remain healthy (Walsh, 2004). It can be more challenging for adolescents to get this amount of sleep because of commitments, school start times, homework, and most importantly, because their circadian rhythm is out of sync with normal sleep and wake times. This can mean that teens can be wide awake at 11 PM, but exhausted at 8 AM (Walsh, 2004). To put this into perspective, a typical nine-year-old's circadian rhythm would have them asleep by around 9 PM, while a sixteen-year-old will be at peak wakefulness at ten or eleven PM because melatonin is released later (Walker, 2017). Walker goes on to write:

Asking your teenage son or daughter to go to bed and fall asleep at ten pm is the circadian equivalent of asking you, their parent, to go to sleep at seven or eight pm. Furthermore, asking that same teenager to wake up at seven the next morning and function with intellect, grace, and a good mood is the equivalent of asking you, their parent, to do the same at four or five am (pp. 93-94).

We know that puberty is starting earlier and continues until the brain is fully developed, which does not happen until one is 25-years of age, which means puberty can last longer than previous generations (Walsh, 2004). Instilling good sleep habits early and understanding the importance of sleep may help to remedy some of the sleep issues caused by puberty. To aid a parent or guardian dealing with the changes that child's puberty brings, neuroscientist and sleep researcher Matthew Walker (2017) recommends parents accept the fact that teenagers will have odd sleep schedules, embrace the fact that teens need more sleep than adults, and make a conscious effort to promote sleep in their households to save their children from a raised risk of mental illness and developmental brain abnormalities. Walker also points out that the changes in an adolescent brain that alter their sleep schedule can actually be a good thing, as it gives a child a chance to be independent. He feels that this change is in part due to "Mother Nature" allowing a typically overprotected child to learn on their own while their "protectors" or parents are asleep.

Realizing that naps can have beneficial effects for all ages is important. If your child is tired, it is not bad to let them sleep during the day. In fact, daytime sleep has been linked to improving one's mood, alertness, and performance (Gregory. 2018).

Medications and Stimulants. Dr. David Walsh (2004), a psychologist, educator, and author specializing in parenting and family life, recommends letting teens sleep in on the weekends when possible and avoiding sleeping medications unless recommended by a doctor. Taking sleep medications can be harmful if not monitored. It is important to note that over-the-counter melatonin is generally not regulated by the US Food & Drug

Administration, and because of this, studies have shown that over-the-counter melatonin's concentrations can vary from its label, from 83 percent less to 478 percent more than what the label claims (Walker, 2017). It is also important to note that over-the-counter sleep aids have no proven efficiency as the primary ingredient is typically an antihistamine which can leave users vulnerable to "rebound" insomnia, which can occur after the use of medication has stopped (Dement, 2000). In other words, it is always best to do research and consult a medical professional before using anything over the counter to aid a problem. Stimulants, such as caffeine, can cause considerable sleep issues. When it comes to adolescents, they should avoid caffeine, according to researchers. Using stimulants to artificially stay awake can change one's internal body clock, which in turn can put one into a jetlag state for days to come (Kennedy, 2016). Stimulants also cause the body to release adrenaline which hurts one's chances of falling asleep (Gregory, 2018). Sleeping pills, while prescribed by a doctor, can be effective, but can have side effects such as memory loss, abnormal thoughts, behavioral changes, and headaches (Rusch, 2018).

Ideal Room Settings. When thinking of sleep, the first thing that comes to many people's minds would be a bedroom. Curating an optimal place for one to sleep is especially crucial. The Sleep Foundation (2020) recommends ensuring rooms are clean and uncluttered, maintaining a temperature that is cool (generally around 60-67 degrees), and reducing outside noises by using a fan or white noise machine creating a consistent background noise throughout the night. These undertakings are conducive for optimal sleep.

Turning off the TV when going to bed is also important, as the inconsistent volumes can wake one from their slumber. Specific to a child's room, The Sleep Foundation suggests having no electronics in the bedroom. These can be set up in the household elsewhere. While looking at an analysis of 20 studies, sleep quality, sleep quantity, and an increase of daytime sleepiness were all associated with the use of cell phones and tablets at bedtime. This remained true when children had a cell phone or tablet in their room but did not necessarily use them (Mendelson, 2017). The Sleep Foundation has found that an increased amount of screen time during the day is linked with insomnia and symptoms of depression among adolescents. The Lightning and Research Center at Rensselaer Polytechnic Institute found that exposure to LED devices for just two hours per day suppressed melatonin production by about 22 percent (Jensen, 2015). Before artificial light, IE electricity, and light bulbs were discovered human bodies were controlled by the rise and fall of the sun. The change in light from a setting sun entering through our eyes would tell our suprachiasmatic nucleus in our brains to alert our pineal gland to release melatonin and within a couple hours after dusk, humans would fall asleep. Now, with artificial light, many aspects of how our bodies react have changed. On a daily basis humans trick their suprachiasmatic nucleus into thinking it is still daytime, when it could be 1 o'clock in the morning. Electric light, on average, changes your internal clock and sets it back three hours each night (Walker, 2017). So, it could be 12 AM, but with electric light, your body could believe it is still 9 PM. Guardians can help to remedy this issue by minimizing the amount of lighting in the household at night; this can be done through dimming the lights or using lamps instead of

overhead lighting. Another way guardians can help to minimize electric light contact is by reading bedtime stories or encouraging their children to read from an actual book rather than an iPad. “In regards to reading a printed book over a book off of an iPad, studies have shown that iPad reading has delayed melatonin release by up to three hours compared to those who read a printed book. iPad reading has caused individuals to lose REM sleep and to report feeling less rested and daytime sleepiness” (Walker, 2017, p. 270). It is important to note that iPads’ screens do emit blue light, but the use of e-ink e-readers such as the *Kindle Paperweight* do not and therefore, are not a deterrent to sleep (Sleep Foundation, 2020). Installing certain types of software on computers, tablets, and phones can gradually decrease the amount of LED light exposure throughout the evening. Companies are responding to the need for less LED light exposure. Alice Gregory (2018) writes, “Researchers have been heckling the big companies to deal with this issue. Tech giants like Apple and Amazon have finally acknowledged the problem and made changes to the light emission of some of their products at night. Many phones can now be set to a sounding, red-orange light” (p. 114).

Obviously, the use of LED and electric lighting cannot be totally eliminated. In instances where the use of electric lighting or exposure to blue light is unavoidable, experts recommend wearing yellow-tinted glasses or blue-light glasses to help eliminate some of the harmful effects of exposure (Walker, 2017). The Sleep Foundation (2020) recommends setting a “digital curfew” at least one hour before bedtime and having a “tech-free bedroom policy.” Replacing normal curtains with blackout curtains to ensure

complete darkness is maintained during the night can have beneficial effects on sleep as well (Walker 2017).

Sleep Schedule. Making changes in the bedroom is important, but having a bedtime schedule is also conducive to quality sleep. The Sleep Foundation (2020) advocates starting to return to a normal sleep schedule at least two weeks before the school year begins to let children get adjusted. During this time they suggest slowly setting an earlier bedtime each night and an earlier wake up time each morning, to ensure a smooth transition into school sleep schedules. Studies have shown that adolescents with later bedtimes on the weekdays are more likely to have an increase in body mass index, compared to other adolescents with the same amount of sleep and exercise (Mendelson, 2017). With information gathered from Matthew Walker's book (2017), sleep therapists recommend establishing a regular bedtime and wake up time, as it is the single most effective way of helping to improve your sleep. Parents can also promote not exercising right before bed as it causes your body temperature to rise, and it can remain high for up to two hours after the work-out has ended. Parents can encourage their children to avoid heavy meals too close to bedtime as this can cause sleep disruption (Mendelson, 2017). Mendelson (2017) also notes that working too close to bedtime is not conducive for a good night's rest, instead allowing for relaxation time before bed is recommended to help improve rest. Mendelson (2017) wants parents to understand that relaxation measures have very minimal negatives, but consider the child, as relaxation measures can become anxiety provoking if the child has OCD or is a perfectionist.

Not exercising or eating and promoting relaxation before bedtime is important. It is also important to think about bedtime stories. Alice Gregory (2018) points out:

It seems that helping children to unwind before bedtime might be a good start. Bedtime stories are often far from soporific and are pumped up with ideas that probably excite children in the same way that an interesting email arriving just before bedtime does for an adult. Are stories about flying through space, meeting a monster, talking to animals or having a day out at an adventure park really relaxing? And then parents are sometimes surprised or annoyed that their children don't then fall asleep (p. 72).

Parents as Sleep Role Models. Understanding the research presented, compiling recommendations of the experts, and implementing some of them into a child's home can be helpful. A study in Belgium of school-aged children, ages 6 to 13, found that 62 percent of these students had sleep disturbances at least three nights a week for the previous six months (as cited in Mendelson, 2017). If the parents would have had some of the above information, it could have helped these suffering children. It is interesting to note, that with all of the evidence supporting not having a mobile device or tablet in the bedroom, a report in the United Kingdom indicated that 72 percent of children have a mobile device or tablet in their bedroom (Mendelson, 2017). Education for parents can be the key to alleviating some of these problems.

While all these ideas are important and can be useful, experts agree that being a good role model for a child and demonstrating the importance of sleep will be greatly

beneficial. Data found, through surveys and interviews, concluded that at home life considerably influences a child's relationship with sleep. These findings showed that perceived parent values can significantly influence a child to get a better night's rest (Gaarde, 2020). Parent/Guardian education can also help improve their children's sleep routines, which will help their children learn positive, long-lasting habits.

Summary. A final thought about sleep at home is, "As parents, we are often too focused on what sleep is taking away from our teenagers, without stopping to think about what it might be adding" (Walker, 2017, p. 95). The benefits of a good night's rest, as all this research corroborates, outweighs what might be missed.

This section covered what can be done in a child's home to promote a shift in sleep. It presented research that conveyed why sleep is important for a growing child, how it can affect a child, identified some ways that our daily lives may be disrupting sleep, and ideas to try at home. The next section will summarize Chapter 2 as a whole and give direction about what Chapter 3 will provide.

Summary

This chapter has covered the importance of sleep, change through education, and change at home. Each section went into further detail. The importance of sleep highlighted sleep's health, behavioral, and learning effects. The change through education section provided research on how sleep affects educators' jobs. It also provided insight on what educators can do in their own classrooms to teach the importance of sleep and promote change to support their students. Finally, the change at home section contained research that supported parents and guardians in a movement for change.

Chapter 3 will provide a clearer outline of my project for this capstone. It will highlight research which will give rationale into why a website is an appropriate choice for my capstone. Chapter 3 will also provide a timeline with how I plan to complete my project, organized into understandable steps, as well as dates accompanying the timeline.

CHAPTER 3

Methods

Introduction

Sleep is highly valuable to our learning, health, and longevity of life as the research in Chapter 2 validated. Alice Gregory (2018) writes:

This homeostatic aspect of sleep is unique in that it serves a function that is vital for survival and is partially under voluntary control. However, it can't be replaced. Other functions which are under homeostatic control, partly voluntarily, and essential for survival include eating, drinking and breathing- yet these can be achieved by artificial means such as providing nutrients and fluids intravenously, and using respirators. Sleep is the ONLY homeostatic physiological function that can't be replaced (p. 20).

This quote encapsulates just how important sleep is. We need it for survival, yet it cannot be replaced by anything else. Without sleep major health problems can occur such as shortened life span, cancer, mental health issues, behavioral issues, and lack of performance in school (Mendelson, 2017).

The previous chapter details sleep's importance and value for humans. Upon completing my research for this capstone I realized that the information I found is incredibly important to others and can create a better life for many. Research proves that sleep affects every aspect of human life and cannot be replaced by any other means. This information is meant to be shared with the public to help educate them, as I was educated

through my research, on the importance of sleep. As I thought about the best way to pursue change through education on the topic of sleep, I found that creating a website would best help to achieve my goal. Chapter 3 will explain my rationale about this decision to create a website, describe its intended audience, illustrate in detail what the website will be, and provide a timeline for the project.

This section gave an introduction on the importance of the topic and what is to be expected from Chapter 3. The next section will provide the research theories to support the decision to create a website.

Research Paradigm

According to the most recent findings of the US census, The US Census Bureau (2014) reported that 78.1% of Americans have access to High Speed Internet, and that 63.6% own a smartphone or tablet. This report is from the previous Census Report that all Americans are required by law to complete. From *Surveying The Digital Future*, findings show:

- Percentage of American internet users: 92%
- Average hours per week online: 23.6
- Average hours per week online at home: 17.6
- Internet users who go online on a mobile phone: 82%
- Hours online at work (weekly): 14.3
- Hours actively using the internet at work (weekly): 10.1

(Lebo, 2017, p. 5).

The Pew Research Center (2019) found that in the year 2000 only 52% of adults reported they used the internet while in 2019, 90% of adults reported they use the internet. It also found that across demographics, internet usage is fairly high with 92% of white adults, 85% of black adults, and 86% of hispanic adults reporting that they use the internet. The Pew Research Center (2019) cites not having interest in going online or lack of relevancy to daily lives, being too difficult to use, cost, or feeling “too old to learn,” as reasons that those who do not use the internet, don’t.

These findings made creating a website an easy choice for me, as the results show that the majority of Americans have access to WiFi and access to a smart device that would allow them to use WiFi, thus giving them access to my website. These findings also show that Americans spend a great deal of time online. In fact, Americans spend almost a full day online per-week according to Lebo’s findings. With all this time spent online, developing a website can best fit the schedules of the average American.

This section gave some statistics supporting the creation of a website that can reach a large audience. The next section will describe my choice of method in further detail, as well as will reveal additional rationale as to why I chose to create a website for my capstone project.

Choice of Method

My capstone project is the creation of a website. The decision to create this website was formed with the intent to create a mode of communication that would give access to as many people as possible. A website assembles a plethora of information available at no expense to its user and is accessible at any time of the day. It is a mode of

communication that does not require one to be in a certain place at a certain time in order to gain its information. A website also allows for users to return to it time and time again, without the risk of potentially losing it, as one could do with a book or pamphlet. The accessibility and convenience of a website makes it a good medium for a variety of users from various backgrounds.

In today's world people are busy. It can be difficult to juggle work, children, extracurriculars, and home-life. I took this into consideration when deciding what to do for my project. When I first began thinking about this project, my mind went to creating a presentation for parents and educators to attend. As I continued to think about this idea, I didn't feel like it would reach as many people as I desired. Presentations can cause schedule conflicts, and the information exchanged in a presentation isn't always well received. I felt a website would fix these concerns, as there is no time that one must be available to view it and one is able to refer back to the website and view it at their own pace. Having this flexibility, I felt, would help to ensure this information is reached by as many people as possible. Websites can also be printed and translated for those that may not have easy access to WiFi or a smart device, and can make it accessible to others whose first language is not English. This website will create a space that is accessible to the masses, regardless of their schedules or language-barriers. Andrew Perrin (2019) writes, with findings from the Pew Research Center:

Overall, 81% of Americans say they go online on a daily basis. That figure includes the 28% who go online almost constantly, as well as 45% who say they go online several times a day and 9% who go online about once a

day. Some 8% go online several times a week or less often, while 10% of adults say they do not use the internet at all (para. 2).

These findings show that the internet is widely and frequently used by adults. Because of the frequent use, a website could be used by more individuals.

Another reason that I felt a website would be the best choice for my project is because of the ongoing pandemic we are currently in. COVID-19 has changed people's lives in many ways. One of the most significant changes has been that more things in life are now virtual. Providing another resource for educators and parents to access virtually, I felt, would be the most beneficial. Also, a website makes sharing easy. If educators find it useful, they may link the website to their own personal teaching website, which could help to reach more parents.

This section reveals a look into why I decided to create a website. The biggest influence of my decision was the amount of accessibility that a website has to offer. The next section will describe the target audience that this website will be created for.

Audience

This website will be created for educators and parents/guardians. The decision to create a website geared towards these two demographics is due to the fact that students are getting the majority of their information from these two sets of people. Educators and parent/guardians have the most influence on students and can push to create the most change. Another factor of the targeted demographic is that they are American based. I am targeting Americans because I personally am in America and feel that some of the information given specifically applies to people in this country. This does not mean

citizens of other countries will not have access to this website; in fact, everyone is able to access it. I am targeting certain demographics, but hope others will use everything the website has to offer.

Although this website will be specifically geared towards educators and parents/guardians, it will be accessible to anyone. It will be on the internet which means anyone can access and benefit from its information. It is going to be a free tool that can be beneficial to those outside of the targeted demographic.

This section revealed the audience of my website. The next section will dive into a more in depth description of my project. It will reveal more insight of what to expect from this website.

Project Description

The website that I hope to create is an artifact of information for others to use. As mentioned above, the target audience for the website is American educators and parents/guardians, so the website will be separated to fit these demographics. The website will have a home page, an overview page of the website which will give an explanation as to why sleep is so important, a parent/guardian page, an educator's page, and a reference page. The website is organized much like this capstone is. Each of the pages will be set up to cater to each respected group. It will provide relevant information on the topic and also provide resources for its users to access. An example of a resource that will be included is worksheets for educators to use in their classrooms to promote sleep education. When possible, I plan to provide resources with translations into other

languages. The goal of this website is to combine the manpower of each targeted group to educate, influence, and work together to create change.

This section described the features my website will have along with the different pages its users can access. The next section is entitled, Timeline, and it will explain each step required for me to finish my project, along with dates that each of the actions should be completed.

Timeline

To continue this project, I must keep up-to-date research, find more resources to benefit its users, and create the website. I have researched a lot for this project, but new research and articles are published daily. As I am creating this website, it will be in my best interest to continue to research and keep up to date with the newest information. I will also need to find resources to include in the website. Examples of the resources can be, but are not limited to, informational videos, quizzes, or links to other websites. Finally, I will have to construct the actual website. All of these things need to be completed by the end of the Fall semester.

This section has given steps that I need to complete in order to finish my project. The next section will review Chapter 3, and give a preview of what Chapter 4 will include.

Summary

Chapter 3 described the details of my capstone project, a website. It explained the pages the website will contain, the audience the website is targeted towards, the setting of the website, and the timeline for constructing the website. Chapter 3 explained why a

website is the best mode for my project. A website was chosen for my capstone project because it will reach the most amount of people. The United States Census Bureau (2014) found that about 78.1 % of Americans have access to high speed internet and 63.6% of Americans own a smart device. Because of the findings in the previous census, a website could reach the greatest amount of people.

The next chapter will review what has been covered in this capstone. It will revisit some of the literature review. Chapter 4 will also cover reflections that will touch on limitations of my project, how this capstone has helped me to grow, and how I would like my project to impact others.

CHAPTER 4

Conclusion

Overview

My project focuses on providing information in a website format specifically to people who are parents/guardians or educators. My research question is, “*How does sleep affect a student’s behavior and learning?*” My project shares findings that I feel will be most relevant to these groups of people. The research reviewed has been edited and shortened to create an easy to navigate website that is a great starting point for understanding the importance of sleep. This chapter reflects on what I have learned through this experience from research and about myself, the key sources for my research, the limitations of my project, and finally, my hopes for the future of this project.

Ending my research to answer the question, “*How does sleep affect a student’s behavior and learning?*”, my hope is that the information uncovered in this capstone will help others to promote healthy sleep habits in their households and classrooms, which can hopefully create generational change. If these caregivers can learn the importance of sleep and incorporate these ideas to promote high quality and ample quantity of sleep student’s behavior, learning, and overall health can be improved.

This section covered what Chapter 4 will entail. It went over each section of this chapter. The next section will cover what I have learned from this experience; from research and reflection.

Learning

I would like to start this second off with a quote from William C. Dement, M.D, Ph.D. (2000) from his book *The Promise of Sleep*:

At least we are taught the facts of healthy nutrition in school, and we know what is good for us, even if we don't always put it to practice. But as a nation of sleep illiterates, few of us even grasp the importance of healthy, age-appropriate sleep. So when we get insomnia or when we fall asleep at the wheel, we can't figure out why it's happening, or we come up with the wrong explanations for these events. Sleep education is light-years from achieving parity with teaching about nutrition or physical fitness. Sleep becomes the stepchild of our lives, pushed aside by social and work demands. The only time most of us catch up on sleep is when our bodies break down and force us to rest (p. 103).

I appreciate this quote for a couple of reasons, one being that Dement calls us a, "nation of sleep illiterates." This stands out to me because he is exactly right, sleep is not taught in schools. We cannot expect students to learn how to read if they have never been taught, just as we cannot expect students to understand the magnitude of weight sleep holds on our daily lives. This quote also encapsulates the reason I choose to pursue this topic. Dement is also correct in his statement that sleep is often pushed aside or ignored. I believe this is partly due to lack of education on its importance. There is room for improvement in the educational field, there is room for change, and I hope that this capstone can make a difference.

Health. The implications sleep has on human's health is huge. Before this capstone I was completely unaware of the significance sleep has on our health and how much data there is to support its importance. Dement (2000) states it best:

As a result of this alarming lack of awareness about sleep in the medical community, doctors simply miss or ignore a veritable flood of sleep disorders. Hundred of thousands of people worldwide are dying each year in large part because of undiagnosed and untreated sleep problems- tens of thousands in the United States alone. For instance, if someone you know has had a heart attack, there is a good chance (especially if the victim is young) that an undiagnosed sleep disorder contributed to the problem. I have seen near-miraculous cases in which a patient's advanced heart disease was dramatically reversed after his sleep problem was diagnosed and treated- although cardiologists had overlooked the underlying sleep problem for years (p. 3).

Sleep deprivation is considered a carcinogen (Walker, 2018). These facts are large, yet we don't discuss them in great depth in schools. Schools discuss drug and alcohol's link to health issues or how eating an unhealthy diet can cause issues for one's overall well-being, but miss the mark on another huge determinant of health; sleep.

This section revealed what I learned throughout this capstone process. Some of what was learned was through research, while some was learned through reflection and analysis of the research. A topic that I found to be important to this paper was health. The quality and quantity of sleep one is receiving is largely related to their overall wellbeing

(Gregory, 2018). Educators strive every day to meet the needs of their students, both basic needs and beyond. We want our students and children to succeed, but they cannot excel if their basic needs are not being met.

The next section will revisit and reflect on my literature review. It will reveal some sources I found to be very beneficial to this project.

Reflecting on the Literature

While reflecting on the research gathered, there are a few sources that stand out to me. Walker (2018) was one of the first sources I found. His book, *Why We Sleep*, revealed so much information I had not previously known about. It opened my eyes to the importance of this topic and the need for change. This text is one that I will recommend to all of my colleagues and students' parents because it provides so much eye-opening information that can really change lives. I found the majority of the topics addressed in Walker's book are relevant and applicable.

Another source that I found to be very useful was Mendelson (2017). His book, *The Science of Sleep: What it is, How it works, and Why it Matters*, is very informative. It is written like a textbook, so the facts are straightforward. While Walker wrote in a more conversational tone, Mendelson laid his book out factually and uncomplicated. While I found Walker's book to hold a little bit more relevancy to the research I was looking for, Mendelson is a great source and I would also recommend this book to others.

This section revisited my literature review. It discussed sources I found to be most beneficial to this paper and my project. The next section will discuss limitations of my

project. It will also look forward into the future and discuss what hopes I have for the research I found and the project I developed.

Limitations

Ultimately, the largest limitation of this project is how small of a scale it is. My website is able to reach millions of people, but they have to know the address to get there. I plan on sharing my website URL with my colleagues, students, and students' families. I hope by doing this, it will educate them and that also they will share the URL with others.

Research has shown that most Americans have access to WiFi and a device that allows for internet access. In fact, in 2019, 90% of American adults reported using the internet, while 81% of Americans reported they go online on a daily basis (Pew Research Center, 2019). This information, along with others, is why I decided to do a website as I felt it had the most accessibility. I wanted as many people to be able to use it as possible. The website does not require a fee, a specific date, or a password to use it. Users of the website are free to access it when they desire, as many times as they would like.

This project was also completed during a pandemic. I felt that a website would be a great way to share information as more people are working from home or staying home. A website would be able to deliver information without the hassle of attending an event. I chose a website over a presentation to allow people to use it on their own time. Hosting an event, during COVID-19, posed a lot of challenges and restrictions. I adjusted my plans to help keep others safe, while still promoting my message.

Future. As time continues, I hope to add to my website and continue to share it with others. New research will emerge. I hope to keep it up-to-date with the most recent information as possible.

On the website, there is a section where users are able to contact me. Their message will be sent to me via email. I chose to have this option because I hope that people will send me suggestions on readings or new information to upload. If change is going to happen, it will require the work of many.

Along with keeping my website updated, I plan on using these findings within my classroom. I will definitely have lessons and activities correlated or centered around sleep. I plan on using the sleep journals, described in a previous chapter. Creating a dialogue about sleep in my classroom is important to me. I hope that it will resonate with students and they will use the knowledge. This is also a topic I plan on discussing with parents/guardians. I plan to share my website with them, as well as literature recommendations.

Summary

This chapter discussed what I learned, revisited my literature review, and discussed my plans for the future of my project. This project taught me so much about sleep's importance.

Without sleep, we cannot plan on living a healthy, active, or full life (Huffington, 2016). Lack of sleep prohibits us from living up to our full potential (Walker, 2018). Just as the discussion of nutrition, exercise, and the avoidance of drugs and alcohol is an important conversation to have in schools, sleep must be added to that list.

This experience was challenging, but so rewarding. I did not expect to complete this semester during a world-wide pandemic. The implications of COVID-19 were incredibly difficult, but I am proud of the adjustments I made for this project.

I am hopeful that the information provided in this capstone will reach others and promote change; whether it be a school-wide curriculum change or just even small changes within a single household. The more access people have to this information, the higher likelihood of change.

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